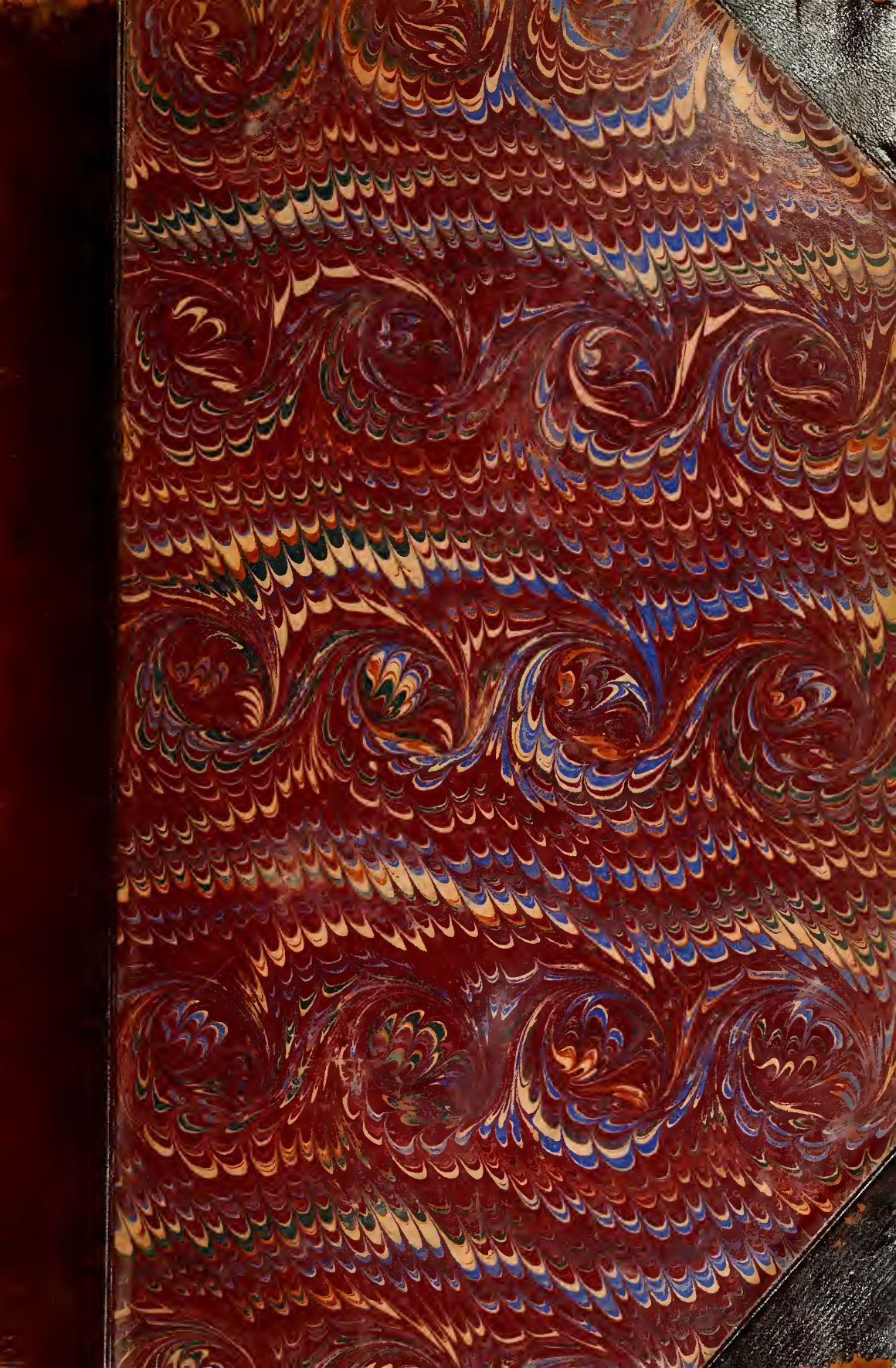

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School of Practical Science 1792

The Metal Worker

A WEEKLY JOURNAL OF THE ROOFING, CORNICE, STOVE, TIN, PLUMBING AND HEATING TRADES.

With which is Incorporated The Stove and Tin Trade Journal, the Sheet Metal Builder and Metal.

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NEW YORK AND CHICAGO.

Saturday, January 7, 1893.

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"The Metal Worker" for 1893.

It is proper, on the occasion of the change of form of *The Metal Worker*, to review very briefly the contents of this number and hint of certain improvements in management and new features that will be adopted during the coming year. The Trade Review which *The Metal Worker* has presented for the past two years is continued, and we take this occasion to thank our readers for the very generous response they have made to our circular letters and for the information they have supplied. We appreciate the confidence that has been bestowed upon us in the many cases where information of a private nature has been furnished, and this trust, we hardly need add, will be faithfully respected. The summaries of these reports are printed in the various departments and present a review of the trade in the chief divisions in which the readers of *The Metal Worker* are concerned. In addition to this account of business for the preceding twelvemonth we publish a regular number of *The Metal Worker*.

Among other things in this issue we would call attention to a competition in skylight construction, announced on another page. We believe that it will call forth a great many competitive plans. In the same department we commence a series of articles on a Country Cornice Shop, which will deal with the question of cornice making in a way to attract the beginner. The primary instructions given about pattern cutting for cornice work will interest all sheet-metal workers, and the account of home-made tools will be of particular value to tinsmiths and others in country districts who have occasion to do a little cornice work.

The Stove Trade department is given up largely to reviews of the trade, including a special article about the situation in the West. There is also the beginning of a serial on changed conditions in the Eastern stove trade, prepared by one who is thoroughly conversant with the history of the industry. We have in view for this department, furthermore, articles written by a foundry manager on practical stove making, covering the various stages of the work.

In steam and hot water heating and plumbing and gas fitting, we shall present many instructive articles for the benefit of the journeymen, and which will also, we trust, interest the employers as well. A part of the review in this week's *Metal Worker* entitled "The Business of 1892 in Steam and Hot-Water Heating Apparatus," is furnished by a member of the trade who is thoroughly conversant with the conditions as seen from the standpoint of a manufacturer. A series of articles on hot-blast heating will be begun, and in the Plumbing division of the paper we shall introduce a series of competitions of a sort that will be particularly interesting to the younger members of the trade.

The Letter Box and Correspondence department of *The Metal Worker* will receive more careful attention hereafter, and it is our wish to interest all our readers and persuade them to write us on topics about which they may seek information. We have practical experts connected with the paper ready to answer all ordinary questions and to make search for information that is not at hand.

Pattern cutting and sheet metal work generally will continue a prominent feature, and we take pleasure in announcing that *The Metal Worker* now has more contributors among practical men engaged in furnishing articles for this department than ever before.

The hardware division of *The Metal Worker* will be given ample space and receive careful treatment, while the Trade Report and Price Current will continue to furnish a reliable and valuable guide to buyers.

The serial on tin-plate manufacture will be completed, and besides such technical articles we will print information about the American industry, including descriptions of works and new machinery. We will also present an interesting account of the different brands and grades of plates that are being made in the United States.

Concerning the present form of *The Metal Worker*, it is not necessary for us to speak. We believe that it will commend itself to all, and that the advantages of greater compactness and convenience in handling will appeal to every reader of the journal. In conclusion, we wish to return a very cordial New Year's Greeting to the host of friends who have wished us prosperity for the coming year.

How to Get Ahead.

The investigator who cut open the bellows to see where the air came from, has been credited with an unwise curiosity; yet it is possible to learn a lesson from his example, although our zeal for information may not lead to like destructive consequences. The boy who takes his toy to pieces to see what makes it go, is more likely to improve its construction or invent a new one than he who is content to be simply amused; and as the boy is father to the man, he will, at maturity, continue to search after the How? and Why? "Inquire within" is written for him on all mechanical matters with which he may be connected, and instruction of the eyes, the ears or the hands is always welcome. The Yankee character has long been expressed by an interrogation mark, and his inquisitive disposition made a subject of ridicule. Yet this trait has a bright side in that it is usually accompanied by the putting his acquired information to practical use, primarily for himself, but also benefiting others. Those who call him a regular "Paul Pry" also recognize his constructive ability, which fact is illustrated by an old story. Once upon a time a traveler in the Southern States was, though a stranger, hospitably entertained there according to their usual custom, and when the host learned that his guest was from Connecticut he exclaimed, "I'm powerful glad you stopped here for my clock is right smart out o' order."

Investigate and Invent.

This duet of investigation and invention, which often are in accord, is not now confined to New England people, and the poet's line "He makes the thing and the machine that makes it" will apply to others than the Yankee Boy. There is a pleasure and a promise in observing the spread of an observant disposition among craftsmen, especially the younger class, instances of which have been noted in these columns. It has been said that the man who makes two blades of grass grow where but one grew before is a public benefactor, and so likewise is he who by study and experiment increases mechanical production. We expect that the young man who enters a trade school or becomes an apprentice does so from purely selfish motives, or, as we say, to get an honest living; also, if he, by a persistent searching after the possibilities of his calling, discovers a better way, it is for personal advantage, and he feels a corresponding proprietorship which may make him object to a competitor whose superficial knowledge may carry him along until a crucial test shows his deficiency. In such a case there should be a survival of the fittest, but the right of a man to

claim a monopoly simply because, after passing through an apprenticeship or trade school, he is self-labeled an expert at any particular craft may be questioned. There is no royal road to success in mechanics, but the persistent search after the best way referred to above will usually get there, and a continuance of the same may lead to a broad knowledge covering more than one trade, making it possible for a good tinner to be also a good plumber.

An Old Fashioned Winter.

The distribution of cold this season is more general than it has been in many previous years, and the usual effect of seasonable weather upon many lines of trade is manifest. The favorable influence is felt in all kinds of winter sporting goods. Skates, which have had a very meager use in the vicinity of New York for several seasons, are this year likely to have a chance to add much zest to the sports that winter inaugurates. A cold winter always has a favorable influence upon the heating business for the ensuing season. It discovers weaknesses in apparatus not hitherto known and whose realization will lead to the substitution of more powerful apparatus or to increase of the capacity of that already employed. Many a building that in preceding milder seasons has not had opportunity to test its full requirements for comfortable heating in protracted severe weather, has been found by this visitation of cold sadly deficient. Somebody will, next summer or fall, get the job of overhauling the heating plant and supplying the needed alterations and additions. An instance of this has just come to our knowledge—a new church that last year was sufficiently warmed by its heating apparatus (four large warm-air furnaces) without serious difficulty, but which on Christmas day of this year could not be comfortably warmed by driving the furnaces to their utmost and adding to their heating power all that could be added by lighting in the daytime every gas jet, high and low, in the building. Numerous failures of this kind will be developed before the cold winter we have entered upon will make way for milder climatic conditions. Such extreme weather also makes itself felt upon the plumbing in all large and small towns and cities. Pipes will freeze and burst, some of them through neglect of servants and house owners, others because they have been placed in positions too much exposed to frost, and care enough has not been taken to protect them. All this will make immediate work for plumbers. It has been observed that when cold weather comes early enough to make large quantities of ice and to freeze the ground deeply before the sun begins its return northward, cold climatic condition in these latitudes are apt to be protracted well into early spring. If this observation be accurate we are likely this year to experience an old fashioned winter, with all this implies to the various callings that supply the wants cold weather creates, including the manufacture of overcoats and of cough remedies.

Protection to Merchants.

The question as to the character of the protection the dealer has a right to expect from the manufacturer whose goods he handles is one which is often coming up. The trade have frequently reason to complain that after placing orders with manufacturers their customers are canvassed by the manufacturers and the sale of goods seriously interfered with. It is to be regretted that there are indications of a disposition on the part of manufacturers to visit consumers, and in cases where they would probably be well looked after by the local trade. Many of our readers are familiar with the annoyance and loss thus occasioned. Precisely what is to be expected in this regard is a question about which there would be some difference of opinion, and it is obvious that it would depend upon the special circumstances in each case. This matter has been suggested by the letter printed below, which is from a well known house in a Western city:

We would like to have your opinion in a matter of controversy now going on between a manufacturer in Cincinnati and ourselves. We are about 60 miles from that city and are carrying their goods on our shelves. They furnish us printed matter with which we can canvass the trade here and in surrounding towns. They recently quoted a shop in a town 11 miles from us, and we objected to it, claiming that they ought to refer the parties to us. In their reply they say, "We aim to protect the jobber in every way whenever we quote prices or sell to the smaller trade." We claim that this is in no sense a protection to the jobber and they disagree with us.

In submitting this question to our readers we would state that the discount quoted to the shop was 67½ per cent. and the discount at which the goods were purchased by the house, 70 per cent. We shall be glad to have an expression of opinion from manufacturers or merchants as to whether under these circumstances the protection given the dealer was sufficient.

A Two Years' Fair.

As usual, the question of preserving the World's Fair buildings at Chicago as one of the attractions of the city is now coming up for discussion. There has probably never been a great exposition with its special buildings of enormous extent and more or less pretension to architectural beauty that has not suggested this idea to the persons interested. It does seem a heartless and woeful waste of money to lavish millions on structures only intended for a season's occupancy. The Chicago buildings being confessedly superior in size and adornment to anything of their kind, the regret of the Chicago people that they should be doomed to destruction next winter is perfectly natural. Suggestions are now being made that while many of the buildings can and should be removed some of the largest and finest ought to be preserved. A few of the latter have even gone so far as to advocate a World's Fair for two successive years instead of confining it to six months of 1893. The experience of all cities that have attempted to maintain so-called permanent expositions is unfavorable to such a scheme. The great attractiveness of a World's Fair arises from the fact that a host of exhibitors are stimulated to put forth their very best efforts at a particular time. This requires somewhat elaborate preparation, much thought and considerable expense. Exhibitors would not do this two years in succession. There would be no freshness to the second year's display, and with this known the attendance would be light, and financial failure would result. The glory of the first year's achievement would be sadly eclipsed by the inglorious ending of the second season.

The Danger of Cholera.

There is no single question upon which the voice of the business community should be heard with greater emphasis than that of guarding against an invasion of cholera this year. We venture to say that no subject is being given so much thought as the possible effect of such a visitation upon our business. Yet, it is a curious fact that it is very rarely referred to in print. Every forecast made privately by business men, be it sanguine or otherwise, is coupled with the one reservation, "provided we keep free from cholera."

Under ordinary circumstances the influence of a panic of fear on the commercial interests of this country would be serious enough, but this year it would be particularly disastrous because it would cause a failure of the Chicago exposition. If cholera reappears this spring, the vexatious delays due to the necessary quarantine measures will greatly cut down the number of foreigners who would visit this country. In itself this would not be a very serious matter, because after all the foreign visitors will be a factor of minor importance.

But if it should happen that deaths from the plague took place beyond the Alleghenies Mountains, or if there should only be a single case in Chicago proper or in its vicinity, the attendance at the fair would drop off at an alarming rate and the undertaking would be a flat failure. It is quite useless to blink at the fact that the whole country would seriously suffer with the interests of those most directly stricken.

The whole matter is altogether too serious to be waved aside as an effort to borrow trouble. It will not do to attempt to silence discussion. It is in the thoughts of every conservative business man now. It is important that the public should be thoroughly aroused to the danger and that the business interests of the country make their power felt.

They do not want to have enormous losses inflicted because there is bickering over an exercise of authority. They will not allow professional jealousies to imperil the well-being of a whole nation. Vigorous and enlightened measures which will reassure the most timid must be adopted. This is no time for dallying. The danger should be faced squarely. It is not a matter which those who are not living on the seaboard can afford to placidly neglect. The central West has a very conspicuous interest in it. Pressure should be put upon the authorities to make every possible preparation to meet a possible visitation. When it comes from business men individually or through our great commercial bodies, resistance to it is out of the question.

PLUMBING AND GAS FITTING.

Plumbing.

A VERY general demand, on the part of the public, for a better class of plumbing work is a feature of this trade which has been noted by letters and reports received from correspondents in, or connected with, the plumbing business. Better education in sanitary matters is abroad; and people nowadays will not be satisfied with the rough and ready methods which were good enough for their progenitors, who got through their lives in blissful ignorance of the better sanitation of the present day. We believe that the plumber himself is more than ever alive to the value of thorough education in his craft, and appreciates the vital importance which attaches to the thoughtful and thorough performance of his work. So much depends upon the efficient manner in which the plumbing work is done in our homes that the matter comes, perhaps, more closely to each individual householder than any other social or economic question. Health, which means happiness and prosperity, hangs largely upon the sweetness of our domestic sanitary atmosphere; and for this we depend, in greatest measure, upon the intelligence and conscientiousness of the plumber who has carried out the work there.

We are glad to know that much is being done to aid the beginner in this trade by means of trade schools and other agencies of instruction, which give him a thorough groundwork of learning in his occupation. But more opportunities are still wanted for the education of the working plumber in the higher branches of his craft. We look for the day when every large city will hold out such opportunities as will come within the reach of every artisan, but more especially of those engaged in the plumbing trade.

IMPROVEMENTS IN WORK DONE.

We rejoice to hear from the reports of our correspondents this season that a marked improvement in the work done by plumbers has been observed during the year gone by. More brains and time have been put into it. And it has been found that this conscientious work has paid. Customers of average intelligence (and they are still the vast majority of the citizens of this country, fortunately) soon get to know and appreciate honest and efficient work, particularly in the plumbing line, and, sharp competition notwithstanding, will always employ the artisan of whose ability and integrity they are aware in preference to another whose prices may be more attractive, but with whose qualifications they are not acquainted. If the plumbing trade would more generally recognize this fact we feel sure we should have less complaint of obligation to cut prices to secure work, small profits and dull business.

Business, according to the general testimony of our correspondents in the plumbing trade, has been good during the past year. An average of about 10 per cent. more in its volume would, we believe, fairly represent the increase experienced. But this has been largely discounted by the low rates of remuneration received for work, although there has been a growing tendency noticed to adopt a better basis of prices in this respect.

NATIONAL ASSOCIATION.

The National Association of Master Plumbers have done good work in bringing the members of the trade more together and thereby promoting a spirit of harmony and good understanding, resulting in the furtherance of their mutual interests. A mitigation in reckless keenness of competition in some quarters is attributed directly to the influence of the association. The acceptance of contracts on imprudent terms is still noticed in some sections of the country. This cutting of prices naturally involves poor material and cutting of time and care in carrying out the contract, with the result of inferior and unsatisfactory work. We are not surprised to learn of the dropping out, during the year, of several concerns who were leaders in the "skinning" business.

OUTLOOK FOR 1893.

Building operations, which have been very active in most parts of the continent, have entailed good trade for plumbers, especially in the country. The good prospects of work in the building trade which are held out for 1893 are expected to insure a satisfactory volume of business for the plumbing trade, so that a prosperous year is hoped for, with, possibly, rather better prices. These, at any rate, are being agitated for in many districts, and we learn that the tendency is toward a better understanding in this respect.

Plumbers' Supplies.

In no one branch of industry, perhaps, has more material advance been made within the past five years than in the manufacture of sanitary fixtures and plumbers' supplies. Every year recently has seen marked improvements in methods and devices, as well as better workmanship and material put into the manufacture of these appliances, and of kindred lines connected with the plumbers' craft. The year just closed has been no exception to its immediate predecessors in this respect. We hear from the largest manufacturers of plumbers' supplies and specialties, in every part of the country, of new lines of goods put on the market during last year; of improvements on old methods, and the introduction of numerous devices tending to render more efficient the appliances used in the past. Manufacturers have been very active in their endeavors to attain perfection in this respect; and such strides have been made that, with the general level of efficiency and excellence which has been reached in these goods nowadays, it seems hard to believe that many improvements of a radical character are awaiting the trade in the immediate future.

What may be termed the artistic side of the manufacture of sanitary specialties and household conveniences, however, presents a wide field for variety in the design and decoration of such goods. This feature has received much attention this year, as the new catalogues of manufacturers which have reached us recently abundantly testify. Improvement in form and design of goods is apparent on nearly every page of these documents.

PROSPECTS FOR SANITARY GOODS.

Competition has been stronger than ever, and although the volume of sales made in 1892 generally overtopped those of previous years by a material increase, the margins of profit were so close as to leave, in some cases, less net gain than was the case with smaller business in former years. There has been some weeding out of rash and inexperienced concerns, while those most actively engaged in the business are devoting themselves to the problem of how to combine improvement in quality of goods with economy in cost of manufacture. A good deal of cheap stuff has been put out in novelties, in many cases whose sole merit is in their cheapness, and this has operated somewhat unfavorably upon the success of good and legitimate productions in the market.

A good volume of business in supplies is looked for during the present year; but little hope is held out for any general improvement in prices. As selling expenses increase annually, a very large augmentation will be necessary in sales to insure the pecuniary returns of former years. This is, however, a feature not peculiar to the branch of trade now under review. It is almost universal at the present time.

In Chicago great impetus has been given to the plumbing trade generally by the active building operations going on in that city in preparation for the World's Fair. This activity is expected to continue during the first half of this year. Meanwhile competition is almost lost sight of, there being ample business to go round the entire trade.

From Eastern makers of plumbing goods we hear that collections are poorer than they have been for years, and the demand for longer credit has been an important factor in 1892 business.

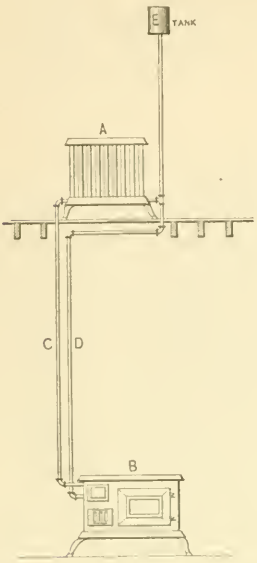
From Canadian sources we learn that manufacturers of plumbing and sanitary goods in that country have passed through a satisfactory season, and that the outlook for 1893 promises steady increase and fairly remunerative prices.

Heating Radiator from Water Back.

From G. R. W. *East Walpole, Mass.*—Please answer through your columns if the following is a practical scheme for hot water heating for a small room. Is it correctly arranged? In the drawing A is the hot-water radiator in room above; B kitchen stove with water back; C the feed or flow pipe to the radiator; D the return pipe to stove and E tank in the attic.

Answer.—We reproduce our correspondent's sketch in Fig. 1. The arrangement as shown will circulate the water through radiator on floor above and heat a small room, as desired. It is, however, preferable to connect the expansion pipe and air pipe to the flow pipe, as shown in Fig. 2. Our correspondent does not say if the hot-water reservoir H, Fig. 2, is to be left connected. If the radiator only is to be attached to the back, as shown in Fig. 1, the relative size of the back to the radiator and the radiator to the room to be

heated should be considered. Should the room be small and require little heat the radiator is liable to become excessively



Heating Radiator from Water Back.—Fig. 1.—Plan Proposed by "G. R. W."

hot and trouble may result through the production of steam in the back. As arranged in Fig. 1, the temperature of the radiator can only be controlled by the condition of the fire. The use of a valve on the radiator to impede circulation might result in blowing the water out of back and system through overflow pipe. If the reservoir H, Fig. 2, is used and its cold-water supply is from a source having a greater head or pressure than that due to the hight of the expansion tank, this tank and pipe connection from F, Fig. 2, will be removed. The tee at F will be replaced by an elbow. The flow and return connections from back to reservoir H are shown by dotted lines. A valve may be placed at G, Fig. 2. By partially closing this valve the flow of heat to the radiator is controlled, and may be stopped; in which case circulation goes on through the reservoir H. When this valve is open the greater part of the heated water from the back will pass to the radiator, because it it at a higher point in relation to the back then the reservoir H, and is in what may be termed a more favorable location.

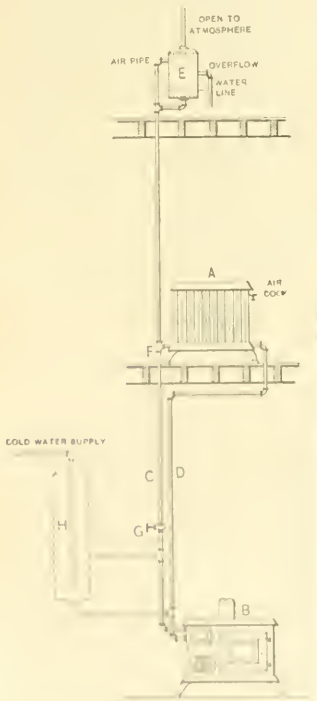


Fig. 2.—Sketch Showing Air and Expansion Pipe Connections

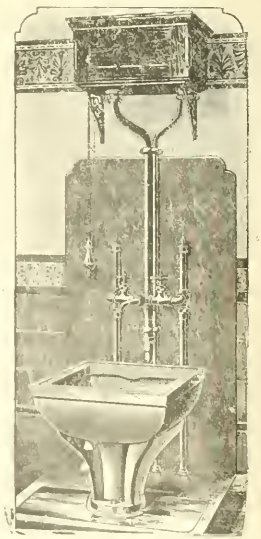
Without knowing all the circumstances and conditions connected with such cases, it is not possible to answer definitely the question as to whether such arrangements of pipes are correct or otherwise. Our correspondent will therefore accept our conditional reply to his query. We shall, however, be pleased to refer to the subject again when more data are supplied. Designs of such arrangements of piping between backs in ranges or stoves have appeared in some past issues of *The Metal Worker*, and there are several arrangements in use somewhat similar to the ones illustrated.

Old Dominion Mfg. Company.

In the fall of 1890 Clarence H. Rose, dealer in plumbers' supplies, 242 Water street, New York, made a trip through the Shenandoah Valley with a view to selecting a site suitable for the erection of a plant for the manufacture of plumbers' cabinet ware, including water closet seats, tanks, bathtub rims, laundry tub frames and covers. This prospecting tour resulted in the organization and incorporation of the Old Dominion Mfg. Company, capitalized at $125,000, of which $100,000, Mr. Rose says, has been paid in. A new town has since sprung up at this point called Sheudun, which is in the western part of Virginia, on the Shenandoah Valley branch of the Norfolk & Western Railroad, distant about 14 miles from Staunton. This region is well stocked with hardwoods, among them a variety of oaks, ash, cherry, cedar, walnut, poplar, pine and sycamore. Mr. Rose holds a controlling interest in the company, which has reserved for its purposes two full city blocks and two smaller ones, aggregating about 8 acres. On one of the blocks has been erected the buildings as mentioned below, viz.: a brick building 200 x 60 feet on the first floor and 70 x 60 feet on the second. A power house 43 x 25 feet equipped with an 85 horse-power boiler and 60 horse power engine; a dry kiln and steam house 90 x 17 feet, together with a new dry kiln recently added, 100 x 25 feet, the latter having a capacity of 40,000 feet of lumber, yielding about 4000 feet a day. There is also a brass and iron foundry building 200 x 40 feet. On a separate block is a finishing building 140 x 50 feet, having two stories. On still another block are the sheds, varnish and oil houses, the two latter, as a precautionary measure, being placed at a safe distance from the main buildings. The total floor space is nearly 50,000 square feet. Protection from fire is afforded in the wood-working departments by means of an automatic sprinkler equipment supplied from a tank 70 feet high, with a capacity of 16,000 gallons of water. A hydraulic ram forces water from the river near by at the rate of 4000 gallons a day, supplementing the supply afforded by wells dug on the property. In the new dry kiln is a 65 horse power boiler. The lumber supply is largely drawn from the adjacent forests, gangs of men employed by the company selecting and marking the trees while standing, which are subsequently cut and drawn to the mill as wanted. In July, 1891, but nine men were at work. Now the wood-working department has 75 men employed, while the brass and iron foundry, where are made all the metal fittings, valves, &c., used in the tanks, has a force of 25 men. There is a hand car railroad connection with the different departments, constructed on the gravity principle, for the quick and economical handling of lumber and materials, the idea being to so arrange the different stages of manufacture that progress is always made toward the finishing building without retrogading and getting in the way of work following. The finishing building is located alongside the railroad, where cars may be side tracked, the company's facilities being equal to the loading of a car in two and a half hours. The office and salesroom in New York are located at 242 Water street, in charge of C. H. Rose, where may be found a line of samples showing excellent workmanship.

Earthen Slop Hopper.

Peck Bros. & Co., New Haven, Conn., and 47 Cliff street, New York, manufacturers of fine sanitary appliances for water, gas and steam, are introducing an improved all earthen slop hopper, with double supply cock and flushing tank, as here illustrated. The company emphasize the desirability and great convenience of such a fixture, provided, as it is, with a long tube double cock, which will enable servants to thoroughly cleanse the slop receptacle, having at their disposal both hot and cold water. There is a reservoir or tank above, as shown in the illustration, con-

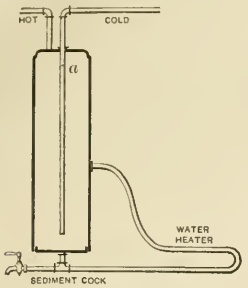


Earthen Slop Receptacle, Flushing Rim, Double Cock and Tank.

nected with a flushing rim in the hopper, which insures a complete flooding by merely pulling the chain.

How to Set a Boiler.

From YOUNG MECHANIC.—I am a subscriber for *The Metal Worker*, and have got a great deal of information from the questions asked by other mechanics and the answers that you have given. I would



How to Set a Boiler.—Fig. 1.—First Method of Connecting Range Boiler.

like to still further draw on your storehouse of information by asking which of the two inclosed sketches is the more correct way of setting a boiler for heating water for domestic use? Fig. 1 is my method and Fig. 2 is my friend's method. The reason my friend set his as per sketch Fig. 2, is because the boiler stands which come with our boilers are 12 inches lower than the fire boxes of the ordinary stoves used in our part of the country. I used to do the same thing until I got to reading *The Metal Worker*, and from its pages I learned that I was a little wrong, and I also noticed that with my boilers set as per Fig. 2 the lead pipe would sometimes burst at the point marked B. I then began to make neat wooden boxes, high enough to raise the top of my stand on a level with the

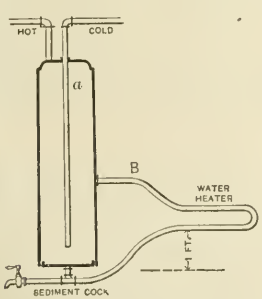


Fig. 2.—Second Method of Connecting Range Boiler.

bottom of the water back, bringing the bottom of the water back and the bottom of the boiler on a level. I find that I have no more trouble with bursted lead pipe, but my friend still says it makes no material difference. Please answer this question as soon as you can for the benefit of myself and other workmen.

Answer.—The sketch, Fig. 1, is the true way to set the boiler. The boiler must stand high enough above the cold-water inlet to the water back so as not to form a trap in the hot water circulation. In Fig. 2 the upward flow of the cold water from the bottom of the boiler to the water back is in contravention of the natural law that cold water descends and hot water ascends. A varying pressure in the supply of cold water results and this irregularity affects the flow of hot water from the water back to the boiler, which in time tests the strength of the lead pipe and may cause it to give way as our correspondent has described. The flow of cold water to the water back in sketch, Fig. 1, being natural, there is no such irregularity in pressure and consequently no strain on the pipe. The stands to which illusion is made are not of the right kind. There are boiler stands of the proper hight to bring the boiler up to the level of the water back or a little above it, in order to insure perfect circulation.

Education of the Plumber.

Henry A. Desper of Worcester, Mass., sends us some forcible remarks on the necessity of a better training for the working plumber, and urging the desirability of legislation to prevent incompetent workmen from exercising this important branch of trade to the hurt of the community at large.

Our correspondent begins his remarks by urging us to advocate the passage of laws requiring plumbers to pass examinations and obtain certificates of competency before being allowed to practice their trade. "Let the certificates," says he, "be first, second, third and fourth class, thus showing the ability of the holder, and have examinations held yearly so as to give aspirants an opportunity to advance their class. This method would stimulate the workman's ambition to perfect himself so as to attain the highest class, and consequently to secure the best wages. The standard of excellence could be advanced from year to year, thus leading the way to the best work possible."

The writer then proceeds to give a few reasons why plumbers should be examined before being allowed to do work:

"We do not trust our lives to incompetent engineers on steamboats (they being required by law to obtain licenses). Why should we then trust to incompetent plumbers?

"It is a crime to put poison in food. Why should it not be a crime for a plumber to put in work which fills a house with sewer gas and thus endangers the lives of the occupants?

"An old maxim says: 'Ignorance of the law excuses no one.' Why should ignorance on the part of the plumber excuse him when through his work he has introduced diphtheria and other kindred diseases into a man's house, and death has removed some of the best loved ones of the family? Does the plumber's excuse of 'I did the best I knew how,' make good the loss or give consolation for the vacant chair occasioned by the defective work performed by him?

"It is time we took hold of these things in a way that should be felt by all who have any such risks at stake.

"We are not talking now about the 'skin' plumber, who knows better but does not practice it; the one whose soul or conscience is so small that it would have as much play room in a tobacco seed as a mosquito would in a 40-foot barn. For such there should be laws passed that would place him behind the bars as securely as you would a murderer or like villain.

"Another class that should be dealt with as accessory to the 'skin' plumber is the parsimonious landlord, who cares not a whit for the lives of his tenants so long as he can keep them just alive enough to pay their rent.

"The lawyer is not allowed to practice until he is examined and admitted to the bar, which implies that he is qualified to practice.

"A physician is supposed to have a diploma before practicing medicine. Pilots, sea captains and ship masters are not picked up on the street anywhere and intrusted with the lives of others in a haphazard kind of way. Why not, then, elevate the standard of the plumber, and hold him responsible for his acts, or put him in such a place that you may know what you are intrusting your lives to? There is much more that can be said on this, but abler pens than mine are better qualified to deal with the subject."

TRAPS AND VENTS.

THE SHUSTER FOUNDRY COMPANY, Philadelphia, Pa., distribute an illustrated circular of Shuster's Sure Seal specialties. The publication, of oblong shape, is bound in cardboard with a front title of four interlocked capital S's, the initials of the goods described. The pages of the circular give illustrations, general and sectional, of a variety of the specialties, including square T clean-outs, sanitary T clean-outs, Y clean-outs, rain water leaders of different forms, combination traps, fresh-air inlets, soil pipe plugs, &c. Accompanying the illustrations are price lists of the various sizes and styles. In an introductory note attention is directed to the Shuster Foundry Company's pipe, the advantages of which are briefly described.

THE MOSELY FOLDING BATH TUB COMPANY, 181 South Canal street, Chicago, have issued a catalogue describing the different styles of folding tubs now made by them and also calling attention to the improvements made in their water heaters. The company refer to the fact that they have had two years of marked success in placing their goods in the hands of the public, that their sales extend from Maine to California, as well as to foreign countries, and that they now show a full line of 18 different styles. A great many reasons are given for the introduction of this class of bathtub to the trade, all of which are cogent and well directed. Folding tubs seem to be specially well adapted to small bathrooms, or to houses in which bathrooms have not been built, or to summer cottages located where running water and other conveniences cannot be had. The heater is so arranged that it can be used with the tub or for heating water separately if desired. Heaters are made for use with gasoline or gas. Folding tubs are made without heaters for use in small bathrooms in cities. In short, all requirements of this special line of trade seem to be met by the company, who have aimed to make their specialty as complete as possible.

WE HAVE RECEIVED from Kirtley Bros., sanitary and contracting engineers, Kansas City, Mo., a circular descriptive of Neff's patent system of water works operated by compressed air. The system is very clearly described and illustrated by a sectional view of a house supplied with water by this means, showing the method of operation. The compressed air system is recommended as a simple and economical means of water supply to homes, hotels, schools or public buildings, either in town or county, being easily adaptable for use with water drawn from a well, cistern, spring or lake. The compressed air necessary to force the liquid to a hight of 60 to 80 feet is pumped, together with the water, into an underground steel tank. The pressure of the air drives the water with great force through pipes, supplying

house and yard fixtures, 5 pounds pressure on the tank delivering water in the second floor. The water, according to the circular, never freezes in the winter, nor does it stagnate in summer; but an unfailing supply of pure, cool liquid is always insured. The circular concludes with a number of testimonials received by Messrs. Kirtley from users of the system in the Western States.

STANDARD FIBER-WARE COMPANY, Mankato, Minn., are distributing dainty little colored circulars, advertising the flax fiber ware household utensils made by the firm. The cards each bear on their face the portrait of some famous navigator, together with a picture illustrating the scene of his discoveries. On the reverse side attention is called to fiber chamber ware, which is recommended for its various merits—in being non-breakable, easy to clean and not subject to rust, while it is stated to be so thoroughly japanned inside as to resist the action of acids or alkalies. Illustrations of different articles made in this ware—such as dairy pails, wash basins, pitchers, cuspidors, slop jars, &c.—fill up the card.

Labor and the World's Fair.

A perfect tempest has been raised in labor circles by the World's Fair authorities in Chicago. It is claimed that the printing of the official catalogue of the exposition was awarded to the W. B. Conkey Company of that city without the formality of asking bids for the privilege and that this company have been conspicuously opposed to typographical unions. Representatives of trades unions have vigorously protested against the award and threaten all sorts of direful things if it is not withdrawn. The unions go so far as to proclaim a boycott on the fair and everything connected with it, if the demands of "organized labor" for the annulment of the award are not forthwith conceded by the exposition authorities.

The claim is made by the latter that the terms upon which the publication of the catalogue are to be undertaken by the company are more favorable for the World's Fair treasury than could possibly be obtained from any other printing house of the high business standing of the W. B. Conkey Company. The further claim is made that but 2 per cent. of the entire cost of the catalogue will be incurred in the wages to be paid compositors to be engaged on it and that therefore the row over the award is unreasonable. The unions, however, are fighting it as a matter of principle, on account of the stand against them which has been taken by the publishing company in the past.

Even if this trouble between the unions and the exposition management is amicably adjusted, it will be very remarkable if some other grievance against the fair is not sprung before it opens which will array organized labor against the enterprise. From its inception the labor agitators have endeavored to make capital for themselves among their followers on the slightest pretext. They have interfered with all sorts of arrangements and meddled with all kinds of contracts, persistently attributing to the managers the willful ignoring of the regulations of organized labor. They have been respectfully treated and their demands have been complied with to the extent of interfering seriously at times with the rapid progress of the work of construction. But they are insatiable. They must have control of everything. If their "rights" are abridged in the least degree they at once threaten a boycott. The award of the catalogue contract privately to the W. B. Conkey Company may not be defensible as a business transaction, but the outcry over it from the unions that it is a direct attack on them is childish and ridiculous. They are pushing the claims of "organized labor" too far, and have already aroused public sentiment against their attempt to monopolize employment under World's Fair contracts for their own membership. It is time that the reasonable element among the unions haul up their ridiculous "leaders."

The Johnson Steam-Pump Governor.

It is claimed by T. M. Johnson of New London, Conn., the manufacturer of the governor illustrated, that it is as positive in its action as a steam engine governor. The speed of the pump is controlled by the work being done indicated by the water pressure, and is uniform at all boiler pressures. It is further claimed that the governor is durable and not liable to get out of order, as there are no springs or diaphragms.

The body *a* of the valve is connected to the steam pipe from the boiler at *b*, with the throttle or starting valve between it and the casing. The body is also connected to the steam chest of the pump by a pipe connection at *c*. The weight on the end of the lever is adjusted to equalize the friction of the moving parts so that if the lever and water piston *k* are raised their full stroke the weight will be just sufficient to return the parts to their lowest point.

The slot in standard *g* is of such length that when the lever is at either end of its movement the steam valve *d* will be entirely closed, thus cutting off steam from the boiler to the pump at either position, as will be referred to later on.

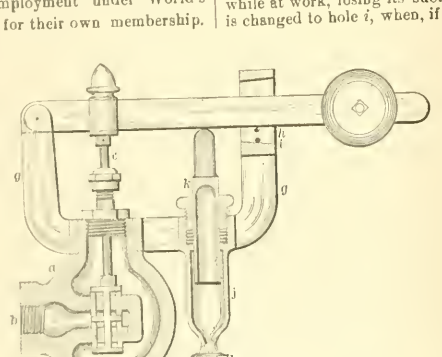
By inserting a pin in the hole *i*, the lever resting on it will hold the steam valve *d* in a central position or full opening, as shown in the cut, so as to admit a full head of steam to the pump.

The standard *g* swivels on the head of the casing, thus allowing for adjustment to suit the pipe connections.

The pipe *n* is connected to the water discharge pipe as near the pump as possible, and through the tee *m* to the water-pressure cylinder *j*.

The overflow pipe *p*, and overflow valve *o*, are connected by the pipe *q* to the suction near the pump.

In order to start the pump the valve *o* is opened and a pin is inserted in the hole *h* with the lever resting on it. The throttle valve is then opened. When the pump has started the valve *o* is closed to such a point as will permit a pressure of water in the cylinder *j* sufficient to raise the piston *k* and lever, thereby admitting enough steam through the valve *d* to run the pump. If there is danger of the pump, while at work, losing its suction, the pin is changed to hole *i*, when, if the pressure below the piston *k* is lost through failure of the water supply, the lever will drop to the pin, thus nearly closing the valve *d* and allowing only sufficient steam to pass to the pump to keep it moving. If the pin is not inserted in the hole *i*, then upon failure of the pump to draw the lever will drop to the bottom of its slot, closing the steam valve and stopping the pump.



THE JOHNSON STEAM-PUMP GOVERNOR.

Europe competes sharply with the United States for South American trade by constantly improving steamship communication. Line after line has been added, until to-day there are five direct and competing European lines to the West Coast of South and Central America and more than 30 to the East Coast. The United States has but six to the East Coast, five of which are owned and operated by English companies and sail under the English flag, while on the West Coast we are wholly unrepresented.

The year just drawing to a close has been one of great prosperity to the grain trade of Philadelphia. The exports of corn were 19,005,971 bushels against 2,201,264 bushels in 1891, and of wheat 10,001,172 against 6,733,663 bushels last year.

The Master Builders' Exchange of Philadelphia have resolved to recommend to the national organization a method of arbitration that shall be universally applicable and which shall fully recognize the rights of both employers and workmen.

WORLD'S FAIR NOTES.

Will the Fair be Ready in Time?

As much discussion has recently taken place over the probability of preparations for the fair not being completed in time, the following extract from an article, which appeared on the 31st ult. over the signature of Director-General Davis is significant:

"Will the exposition be ready in time?" is the question of the hour. Hundreds of thousands of people have visited Jackson park and returned to their homes amazed at the extent and magnificence of the buildings prepared for the reception of exhibits. To such as may have visited the exposition grounds a year ago, when the greatest of the buildings, that devoted to manufactures and liberal arts, was yet but a chaos of construction material, but one answer to such a query will suggest itself. Others who have only seen the completed buildings, and to whom the vastness of unoccupied floors has presented an appalling vista of work yet to be done, may have entertained misgivings as to the possibility of completion before May 1. Others again there will be who have not had an opportunity for personal observation, but who will recall the opening days of previous international expositions, and will predict therefrom a state of unreadiness next May. I think, however, I may be justified in saying that every one, whatever his personal misgivings may be, will join in the universal expression of goodwill toward the exposition, and desire at least that our most sanguine hopes may be fulfilled and that everything will be in readiness when the President of the United States shall declare the opening of the exposition a matter of history.

Work That Is Yet to Be Done.

To answer the question which now forms such an absorbing topic of discussion I should say frankly that there does not appear any reasonable ground for apprehension as to the completeness of all preparation in the time yet at our disposal. The loyalty and earnestness of every branch of the magnificent organization which has accomplished such marvelous results in the last 18 months will be found equal to the task yet before it, be the strain however great. Whatever human energy can accomplish will be done so far as it rests with the exposition to do and act.

Within the next four weeks every building on the grounds will be the scene of the greatest activity. The task of marking off aisles and avenues on the great floors is already under way. Allotments of space, which have so far been specified only in draftsmen's plans, will be speedily transferred to the floors of the various buildings. Thereafter the work of erecting inclosures and cases for the reception of exhibits will be pushed forward with all possible celerity. Already plans for handling the tremendous traffic are matured. Miles of freight cars will be emptied of their precious burdens with the regularity of a well-appointed railroad. The machinery for installation is well in hand, and inspires every confidence in this branch of the service. Upon the preparation of the catalogue, a work which has never yet been completed at the opening of a great exposition, one department is already engaged with the best assurance of success. In brief, whatever remains for the exposition management to do in the way of providing for the opening will be done.

The Exposition Management Ready.

Thus far the answer to the question, "Will the exposition be ready by the opening day?" must be an emphatic affirmative. There is, however, another phase of the question which must be considered, and upon which our predictions cannot be based with so much certainty. Up to the present the work of preparation has been absolutely under the immediate direction of the exposition management. Whether in the difficult task of negotiating with exhibitors or in the physical labor of erecting the buildings the authority of the exposition has been absolute and final. Wherever, for any cause, the work has dragged, extra assistance has been forthcoming. Careful supervision to the minutest detail has led to stupendous results, astonishing even to those under whose charge the work has been accomplished. But now comes a new element in the calculations for the future. The exposition management may do everything in its power, but its power is henceforth restricted according to the promptitude of exhibitors in fulfilling their share of the task of preparation.

Space in the Electrical Department.

Assistant Chief Hornsby of the Department of Electricity has completed the allotment of the greater portion of the space in the Electricity Building. In doing so he has not only been in advance with the work, but has accorded to France 22,790 square feet on the main floor and England 19,382 square feet on the main floor and galleries. France will occupy the entire northwestern bay. Germany's exhibit will take up 13,384 square feet on the ground floor, east of the French exhibit, and 5998 feet in the gallery. England will secure 7330 square feet in the western part of the building, and, with Canada, occupy 5998 feet in the galleries.

Thomas A. Edison, the wizard of Menlo Park, has been allotted 4,471 square feet just north from the center of the building. Mr. Edison will have probably the most attractive space outside of that embraced under the central dome of the building.

The south end of the ground floor has been allotted to large electric firms of the country. They include, among others, the Bell Telephone Company, the Detroit Electric Works and the Brush and Westinghouse concerns.

In the galleries will be installed the phonographs and scientific instruments and specialties. Here will also be shown the exhibits of the insulation and wire people and small displays of foreign countries.

Painted with Hose.

One of the great novelties in construction work on the Exposition grounds is the paint machine of which there are in the Manufactures Building alone ten in active operation. Thomas Turner of New York is the inventor of the paint machine, and those in use at the expos tion grounds are under the direction of C. Y. Turner, the assistant director of decoration. Mr. Turner is a member of the National Academy of Design, and prominently identified with a number of the leading art societies of the country. The principle involved is the use of color mixed with compressed air. The compressor is a rotary one, which, when driven by an electric motor, compresses air from 15 to 18 pounds a square inch; this air is then mixed with calcimine, and both are impelled through a hose upon the surface being painted or calcimined from the nozzle in the hands of two men on the scaffolding. A large part of the interior work in the Electricity and Agricultural Buildings has been done by means of this apparatus.

An Interesting Transportation Exhibit.

J. E. McNay, Treasurer of the Northeastern Railroad Company of England, contributes to the railway division of transportation exhibits a unique picture of the opening of the Stockton and Darlington Railway, the first in the world used for the conveyance of passengers. The artist was a native of Darlington, and the point of view chosen by him for his sketch is the railway bridge over the Sherne at this place. To the right and left of this drawing will be hung the original announcement and programme of the opening and the original and first time table. Above it an enlarged photograph of the No. 1 locomotive will be placed.

Why the Other Fellow Caught the Trade.

Here is a feature of the retail tin, stove and plumbing trade that is open to study and criticism:

Bill Whitney and me went to school together, but when I was 12 years old I had to hustle for my living, took care of the horse, swept the shop and was as useful as the boss of the tin shop where I worked. Bill always was a good feller, never got stuck, and not only finished our school but went through college, then came home and went in with his old man; but though we always spoke, we did not hobnob much as we did when kids.

I stuck to biz, because I had to. Didn't have time for reading, which put me to sleep after a day's hard work out of doors. So what Bill called rhetoric was scarce in me; but I saved my money, and now the boss' business is my business, and I know how to do good work and won't do any other kind, or won't sell any other kind of goods, for it don't pay.

Well, I was dirty and not polished, and as the town boomed another feller started and he talked sweet, wore a biled shirt but didn't know the trade. He never learned it and did some horrible bum work, but the way he talked of products of combustion, transverse sections, conflicting energy and things was equal to a college professor, and the people just dumped the dollars in his till, for they thought because I could not talk sanitary and sich that I wasn't even sane. Well, Bill Jones got married and built a house and gave me a show, but when he asked me about scientifics I wasn't in it, but the other fellow talked it as glib as ice and Bill, wanting a good cage for his bird, thought the other fellow knew it all and he done the work.

Well, I done it over and Bill blames me for knowing my business and not knowing how to talk to the boys I grew up with intelligently so as to get their confidence, and says I ought to be poorer than what I am for not giving my brains a show, and he is brushing them up and I dress more to suit my wife and hang me, if the talk and clothes ain't bringing me trade.

George Baker, an old and well-known resident of Albany, N. Y., died at his home on South Pearl street, that city, January 1. For 30 years he was in the stove business, and at the time of his death was conducting a stove store at 16 Green street.

C. H. A. Dissinger, Wrightsville, Pa., is the patentee of an improvement in metal seaming tools, the invention consisting in providing such a device with a vertically moving jaw as is adapted to hold the same close while giving the overlapping portion a downward bend by the act of lowering the lever connecting with the member, and to release the same by the act of raising the lever.

D. W. Cree of Griggsville, Ill., has retired from the stove and hardware business, and is now devoting his time exclusively to the sale of Cree's camp stoves in connection with furniture and wall paper.

THE LETTER BOX.

Plans for a Store.

From C. F., *Erie, Pa.*—Compliments of the season 1893, and may *The Metal Worker* flourish and prosper as of yore. Being a constant reader of your paper for the past 15 years or more, I think, and having received a great deal of valuable information, I should like some of my brother chips to give me a little now. I am thinking of putting up a business building in the near future and, knowing that I could receive no better advice from other sources, I ask this favor from those who have had some practical experience. To start with, I wish to put up a good, plain building, adapted to light hardware, tinware and house furnishing goods. There is to be no tinshop, as that is in another building. The size of the store is to be 38 x 75 feet, using the basement and first floor for my business, with living rooms on the second floor. The points I would like suggestions about are the best arrangement in store of shelving and counters, balconies or step ladders. Whether to have a balcony across the rear; whether to have one entrance or two; where to have the desks and the best way and mode of heating. The first and second floors of building to be of brick, with galvanized iron front. How shall I arrange the store front to prevent frost? What is the best style, size and shape of a small, cheap elevator from basement to first floor? I might also add that I am having a 16-foot alley made at one side and will have a side door to receive or deliver goods without having to pass through the front of the store. Now I know that among your readers some have had experience in building and no doubt can give me a great deal of very valuable information. I should consider it a great favor if any one would be kind enough to give me a little of their experience.

A Curiosity from the Country.

From E. C. M., *Madison, Wis.*—In regard to the apple problem in your paper of December 2, would say the premises are wrong. Thirty apples at 3 for a cent and 30 apples at 2 for a cent are not the same as 60 apples at 5 for 2 cents. The proof is as follows: Thirty at $\frac{1}{3}$ cent each and 30 at $\frac{1}{2}$ cent each make 2 of the apples cost $\frac{5}{6}$ cent, or 0.835 cent for 2 apples, which would make an average of 0.4166 each. Now, 60 apples at 5 for 2 cents would make the 2 apples cost $\frac{5}{6}$ cent, or 1 apple $\frac{5}{12}$ cent. Sixty apples at 0.4166 each is 25 cents and 60 at $\frac{5}{12}$ each is 24 cents, which solves the problem.

From A. B., *Hamilton, Ohio.*—Referring to the letter in *The Metal Worker* of December 2 about an apple problem, my solution is as follows, viz.—the 60 apples should have been sold for 25 cents, or at the rate of .0041666 each, which price per apple should have been fixed by averaging them as follows:

2 for 1 cent would make them ..... (.0050)
3 for 1 cent would make them..... (.0033)
(.0083) ÷ 2 = .0416

The seller of the apples made a mistake in selling them at 5 for 2 cents, which is .00400. The error on 1 equals .00416 — .00400 = .00016. The error on 60 would be 60 times this amount, or .0099, or if carried into indefinite fractions 1 cent.

From A. M. R., *Rochester*, N. Y.—Allow me to give you my solution of the problem under the heading of "A Curiosity from the Country." I found several ways, but the following seems to me the most simple, viz.: On the first sale of 30 at 3 for 1 cent he gets 10 cents for the lot, and on the second sale of 5 for 2 cents, 12 cents, a gain of 2 cents; on the second lot of 30, on the first sale he gets 15 cents, while on the second sale, or 5 for 2 cents, he only gets 12 cents, a loss of 3 cents, making a net loss of 1 cent on the 60 apples.

From P. H., *New Madrid, Mo.*—I thought I would have to give up the apple problem, but I have got it all right now. Five apples for 2 cents holds good only an equal number of times for each kind of apples, viz.:

10 x 3 apples for 1¢ = 30 apples for 10¢.
10 x 2 apples for 1¢ = 30 apples for 10¢.

Now we still have ten apples of the two for a cent variety, which bring the other 5 cents. Five for 2 cents would not work after the 3 for 1 cent supply is exhausted. The apple vender lost 1 cent. The undersigned has fooled away 6 cents in postage and about 3 cents worth of stationery over it.

Note.—It is necessary to say, in explanation of the final clause in our correspondent's letter, that the communication we print is the third one received, as he offered a solution, then he sent in a withdrawal of it, and finally we have the one which we print. We are sorry to have him put to 6 cents expense, but we feel sure that the experience he has gained was well worth the outlay.

Material for Gutter.

From W. D. M., *Sunbury, Pa.*—I would like to be informed through the columns of *The Metal Worker* what material to use for a gutter that was lined with XX bright tin, but which has become so defective that a new one is required. The matter of expense is not to be considered, providing something is secured that will prove durable.

Answer.—While our correspondent has neglected to give any particulars regarding what caused the gutter to become defective, it is presumed that bright tin is not adapted for the purpose. Where coal is used for fuel it is necessary to protect the surface of the tin used about a building, which can be done by painting. The joints in a tin gutter must be well soldered in order to prevent cracking caused by the expansion and contraction of the metal. Did the gutter mentioned by our correspondent fail through neglect of either of the above requirements? A number of materials have been used for lining gutters, as terne plates, lead, galvanized iron and copper. Terne plates would appear to be well adapted for the purpose, if properly joined and laid, and protected from corroding influences. Sheet lead has been used for gutters, but is not calculated to give satisfaction when laid upon sheathing boards in the way common to tin plates. Galvanized iron is quite durable as long as the zinc coating remains intact, but when used as a gutter lining difficulty may be encountered in making the joints sufficiently strong to resist the expansion and contraction of the metal. Copper is a very desirable metal to use for lining gutters on account of its durability, but due provision must be made for expansion and contraction or the joints will become leaky, even when well soldered. This much said, we should be pleased to have our readers give our correspondent the benefit of their opinions.

Blue Prints Direct from Original Drawings.

From JAMES F. HOBART.—In reply to "D. H." of Chicago, Ill., who asked in a recent issue how to take a blue print from an original drawing and thus save time and trouble of tracing, I would offer a method which, though somewhat expensive and troublesome to successfully carry out, will be found to give good results.

Before describing the method I wish to call attention to the fact that the idea of saving anything by working from the original drawing, instead of from a tracing, is entirely wrong. In order to make an acceptable print at all the drawing must be done in good black ink, either India ground from the cake, or in Higgin's liquid India ink, which is sufficiently good for all purposes. It is no more work to make the ink drawing on a piece of tracing cloth laid over the pencil drawing than it is to put the ink on the paper direct. It is for other reasons much better to use the tracing cloth for the ink and keep the original drawing in pencil, for, as almost every drawing has to be changed, the desired removals can easily be made on the pencil drawing with rubber and a hard pencil, whereas if the lines were inked in the task would be a tedious one.

In case of extensive changes, a new tracing can be made, and the changes incorporated therein. By this method the original drawing is not subject to wear or the risk of being soiled, and may be kept as choice as one pleases in fire-proof safes or vaults. Should, however, a man get hold of an inked-in drawing, or should he wish to copy some engraving, he can make the paper temporarily transparent by wetting it with benzine, naphtha or turpentine. This substance evaporates very quickly, but is prevented from escaping by the plate of glass which is laid over the drawing during the printing process. The great trouble with this and similar processes is that it takes too much time to print, owing to so much of the sunlight being stopped by the thick paper in which the drawing is made. Were it not for this, the problem would be a very simple one.

PRINTING SOLUTION.

The best way out of the difficulty is to use some liquid which is more sensitive

than the ordinary blue printing solution, and which will therefore require less time for sufficient action of the sunlight. A solution which will print through ordinary paper in 30 minutes consists of 10 grains of bichromate of potash and 20 grains of sulphate of copper dissolved in 1 ounce of water. This mixture is spread as evenly as possible over the paper with a brush or a sponge, and then dried. The paper is then exposed under the drawing in the same manner that blue prints are made and shows a faint copy of the drawing in yellow. The print then must be washed over with a solution of 20 grains of nitrate of silver in 1 ounce of pure rain or distilled water. The print will then change to a brilliant red color, and is finished like an ordinary blue print by washing in pure water until all the chemicals have been removed. The above method does not give a blue print, but it may be changed to a greenish blue color by soaking in salt and water. In a few moments the picture will entirely disappear, but if the paper be held in the sunlight the picture or print will appear again of a greenish blue color.

When it is necessary that the time of exposure to sunlight must be reduced to a few seconds instead of minutes resource must be had to the salts of silver for the sensitizing solution, instead of the salts of iron or potash as used thus far. Silver paper, technically known as "bromide," cannot well be prepared by the printer, but should be purchased ready for use of a dealer in photographic materials. This paper is very sensitive to light, and a dark room lighted by red or orange colored light is an absolute necessity. There are three kinds of the paper in the market, and the thin, smooth kind should be chosen, especially if it is to be used as a negative from which to again make a print of the ordinary kind.

The sensitive bromide paper is sold in three kinds, and marked respectively "A," "B" and "C." The kind marked "A" is the variety required for the work in hand, the other kinds being either on thick paper or with rough surface for finishing with crayon. The bromide paper will be found to be very expensive, a dozen sheets 8 x 10 inches cost over $1. But where one sheet only is used to a drawing the actual expense is not as great as appears at first sight. By using one sheet of bromide to a drawing it is assumed that ordinary blue prints will be made from the bromide print, which really is made to take the place of a tracing.

THE BROMIDE PROCESS.

There is one point in favor of the bromide process and that is prints can be made by it in the night, although, of course, the printing process is much slower than when sunlight is used. The drawing is prepared for printing in the same manner as for an ordinary blueprint, only a dark room must be used for handling the paper between the original package and the printing frame, and again during the removal therefrom, and the developing process which the exposed prints must be carried through. There is no outwardly visible change to indicate when the exposure has been completed, therefore it is well to experiment a bit with a small piece of paper placed under the drawing. Let the part of the drawing under which the test piece is placed be covered with a thick piece of dark cloth when exposed to the sun, then, watch in hand, slide back the cloth, exposing a strip of the bromide paper. After, say five seconds, slide the cloth back again, exposing another strip. Then another, and another, until half a dozen have been exposed, the last for five seconds, the first for 30. Then, when the test strip is removed to the dark room and developed, the part which received the correct time of exposure will give a perfect print. The rest of the slip will be either too light or too dark. Once the proper time of exposure and kind of paper is determined, all drawings on that kind can be exposed with confidence, the only allowance necessary being for the strength of the light at the time the exposure is made.

THE DEVELOPER.

A developer is required for this kind of paper, which from the very beginning to the end must be handled with great care and cleanliness, both as regards the developer and the paper. The former is made up in three separate solutions, and mixed together only when used, as it does not keep well when mixed. A fourth solution called a "restrainer" is also used, but in such small quantity that a little of it goes a good ways. For making up the solutions two bottles will be required with a capacity of 32 ounces (2 quarts), one which will hold 8 ounces (½ pint), and one of almost any size, say 1 to 4 ounces.

Into the smaller bottle put one part bromide of potash and 9 parts of water. This makes a 10 per cent. solution, as it is called. Into the 8-ounce bottle make a citrate of ammonia solution by dissolving ½ ounce of citric acid in 2½ ounces of rain water. Then add ammonia (stronger) till a slip of red litmus paper immersed in the solution will just lose its color, then and rain water to make up the whole volume to 4 ounces. Mark this bottle "C." Procure 4 ounces of oxalate of potash and dissolve in 15 ounces of clean rain water. Then add 30 grains of citric acid and 1 ounce of the "C" solution. Place in one of the large bottles, and mark "A." In the remaining bottle dissolve 2 ounces of sulphate of iron in 16 ounces of pure water, then add 8 drops of sulphuric acid, and mark the bottle "B."

When ready to develop arrange the dark room and its red or orange light, then remove the exposed pieces of paper from the tight box in which they were placed after being exposed, and put them in a tray or other flat dish containing clean, pure water. It will be better to begin with one piece of paper, then, after a little of the "know-how" is acquired, as many as seven or eight pieces can be handled at one time, both in the preliminary bath and in the developer. While the prints are soaking in the clean water (this is only to prevent staining by the developer, which might flow unevenly over the paper were it put on dry) mix the developer, which is formed of one ounce of the "B" solution, two ounces of "A," one-half ounce of water, and three to six drops of the potash solution.

Turn the water off the paper, being careful from the time the paper is first taken out of the original package till the picture is finished and dry, to keep the fingers off the face side of it. They will leave a stain every time, and it is best to make use of paper large enough so that it can be handled by the margin, which can be cut off after the picture has been finished. If small paper, the exact required size must be used, keep the fingers off, and handle by means of a glass rod or some other means. After the water is turned off pour on the developer with a flowing motion which will cause it to cover the entire surface of the paper with one sweep. Keep the tray in motion so the developer will not stand still, or it may spot the print. In a few seconds the lines will begin to appear when they are dark enough, or rather when the ground between the lines is well blackened, pour off the developer or if other pieces are to be developed, remove the print to another tray and flow with water; then place in a solution of hyposulphite of soda, 1 ounce to the quart of water. Allow the print to remain therein at least ten minutes, then soak in several changes of water for at least one hour, after which the print may be dried and pronounced finished.

If the thin bromide paper A is used for this purpose, a blue print may be made from the bromide on a bright day by an exposure of ten minutes, or even less. The blue print will possess the advantage of being a "blue positive," which presents a much finer effect than the ordinary blue print, as the lines are blue on a white ground. It would be well to experiment on a few small prints at first, say not more than 4 x 5 inches, and when the "trade is learned" on these begin with larger prints. It is a troublesome process at the best, and unless great care, cleanliness and exactness are observed at all times the whole business will surely be a miserable failure. When, however, success is obtained, the results will well repay for the time and trouble spent.

From J. P. A., *Newport News, Va.*—Replying to the inquiry of "D. H.," Chicago, Ill., I would say that drawings made on cardboard are rendered temporarily translucent by flooding the drawing paper with purified benzine of the best quality. This liquid soon evaporates without injuring the drawing. While in the translucent state the blue print may be taken.

Hydraulic Cement.

From A. B., *Buckingham, Canada.*—Please inform me if there is a cement that will set under water and resist water where there is no possibility of drainage. If so, please let me know what it is.

Answer.—Our correspondent does not state what sort of work is to be done, but if it is in the masonry line we recommend him to use Portland cement, which is a material of world-wide reputation and can be purchased of any large dealer in building materials. Portland cement is what is known as hydraulic cement—that is, it will harden under and resist water. Gad'a cement is also another material that might be used. Its compesition is described as follows: Clay, well dried and powdered, 3 parts; oxide of iron, 1 part; mixed together and made into a stiff paste with boiled oil. This is used for work required to harden under water.

A Remedy for Frosty Windows.

From G. L. B. *Portland, Maine.*—Referring to the question of frosty show windows asked by a correspondent in *The Metal Worker* of November 19, if he will make his inside showcase perfectly tight, or approximately so, so that no warm air can enter from the store, he will have no trouble with condensed moisture on his outside glass. Five years' experience makes me sure of this. There is no need of ventilation in the outside window.

A Rubber Cement.

From C. T., *Croghan, N. Y.*—Can you furnish me the receipt for making rubber cement, such as is used for cementing wringer rolls on shafts?

Answer.—We presume the manufacturers of wringers have special cements for the purpose, so we cannot do better than refer our correspondent to a cement which it is said will fasten rubber firmly to either metal or wood. This cement is prepared by making a solution of shellac in ammonia. It is best made by soaking pulverized gum shellac in ten times its weight of strong ammonia, when a slimy mass is obtained. This in three or four weeks will become liquid without the use of hot water. The cement softens the rubber and becomes, after the ammonia evaporates, hard and impermeable to gases and fluids.

An ordinance adopted in Philadelphia after much discussion makes it a nuisance to run a locomotive or stationary engine with soft coal.

ROOFING AND CORNICE.

Roofing and Cornice Trade.

BUILDING OPERATIONS, on the extent of which depends the prosperity, or otherwise, of the roofing and cornice trade, were, in most parts of the country, undertaken on a more extensive scale during the year 1892 than has been the case for some time past. In the Eastern and Middle States especially great activity in this respect is reported, while a very fair amount of building has gone on throughout the West generally. In and around Chicago, of course, preparations for the World's Fair have given a vast impetus to the trade and created an almost unprecedented demand for building material of all kinds, and this has benefited manufacturers in many other parts of the country, as the capacities of local concerns were not equal to the demand.

The Southern States alone show any falling off in this industry. The general financial depression which prevailed throughout that section of the country up to within a few weeks of the close of last year was unfavorable to enterprise of all kinds. But the prospects for the building —and, necessarily, for the roofing—trade have brightened very considerably in the South since then, and the outlook in this respect is much more cheering for 1893.

In almost all branches of the business, roofers and cornice makers send us reports of improved trade in the past year. These reports are usually coupled with expressions of confidence in the outlook for 1893, based on estimates for building work now under contemplation.

WESTERN TRADE.

From a large metal roofing manufacturing corporation in St. Louis, however, we get a rather less favorable estimate of prospects in the West. They write as follows: "We are not 'boomers' for 1893. In our territory several causes presage a quiet demand for that season. In our cotton States the crop is smaller than in 1891; in some parts of Texas decidedly so. The price is better, but a great deal was sold before the advance, so the factors, not the growers, reap the benefit. In our agricultural districts we are met with unusually low prices for the cereals. In our mountain coast States the low price of silver lessens the demand for our goods by checking the establishment of new plants or the repairs or extensions of old ones."

The majority of our correspondents in the trade nevertheless advise us that prospects for a good and growing demand for roofing and cornice material during the present year are decidedly bright in their different districts. From Minneapolis we are advised that prospects for the roofing trade through the Northwest for 1893 are particularly bright—much building is in hand, or projected—but the general complaint of all trades, that competition keeps prices down so close as to materially affect the margin of profit, is equally the cry of the roofing men. More money has to be laid out in advertising and more push and hustling employed to get business by those concerns which do not handle some specialty that lifts them out of the crowd. Staples are hard to sell, with so many novelties coming into the market. Changes in fashions have to be watched almost as narrowly in the building world as in that of dry goods. Roofing materials are now so varied and complex in character that the general roofer is kept at his wit's end to meet the possible requirements of customers. We are told that terra cotta roofing tiles have made a long step into public favor in the last 12 months. Sheet copper, too, has been more in demand in the Eastern States than ever before; while the various kinds of metal shingles and other coverings are constantly being added to.

PHILADELPHIA.

Next to Chicago, perhaps the most favorable reports of the roofing trade come from Philadelphia. Manufacturers of standing in that city speak of gains in the volume of trade, reaching from 25 to 50 per cent. over the previous year, with business on a firmer basis than before. The demand has been pretty evenly distributed for sheet metal, slate and tiles. This prosperity has existed along with exceedingly sharp competition, and evidences a very large amount of trade. Prices, however, are stated to be exceedingly close, so much so that some of the principal makers refused large contracts in favor of smaller ones, where somewhat larger margins of profit were assured. Specialties have held their own prices pretty steadily, and those manufacturers who handle such goods report far better pecuniary results from them than from their general lines.

New machinery and appliances for the better and more efficient production of metal roofings are noted as having been introduced into several factories, but little of particular note has been done in this line.

Some of our Western friends mention some difficulty in making collections promptly; and this drawback has been also felt to some extent in Eastern States.

Strikes in various quarters have affected more or less seriously the roofing business. This element has been felt in most of the large cities; but that phase has passed, for the time at any rate, and work is now undisturbed by labor troubles.

Iron and Steel Roofing.

Corrugated iron and steel roofing has had an upward tendency ever since the new tariff went into effect. A larger business was done in this material during 1892 than ever before. As a Western manufacturer of sheet iron writes to us, "the volume of business has been much greater than in 1891. Not only the 12 months, but each month has shown an increase over the corresponding periods of last year. Competition has been sharp, but our own territory took so much iron that we did not feel it much. Margin of profit is probably a little better than for 1891."

From one of the largest Eastern makers of steel and iron roofing material we learn there was a falling off in the sale of corrugated iron and -crimp, but a more than counterbalancing gain in high-grade standing seam and roll roofing. The falling off was attributed to quoting higher rates on the material in reply to large inquiries than was done by some Western companies, who are able to purchase the raw material near their plants and save a heavy rate of freight, which the Eastern maker has to pay. The same concern express a belief that the demand for sheet metal in 1893 will be far in excess of 1892.

Metal Shingles.

Increased business in metal shingles for roofing and architectural purposes is reported, with a tendency at the same time to cut prices to a ruinous extent. A Western correspondent in this line speaks of 33⅓ per cent. gain over 1891, with good prospects on a close margin of profit. An Eastern concern tells us of increased foreign trade in metal shingles and siding plates.

Roofing Slate.

A slate company in Pennsylvania give us good accounts of the industry in that district. They remark as follows: "We have had three years of good trade, and this year has been the best. A steady demand that has been fully up to the supply." It is thought, however, that the range of prices might be established on a more profitable basis to producers. The concern above mentioned say: "It is now entirely a question of supply and demand. The jobbers take orders at such figures that they are obliged to ask manufacturers to make concessions to fill them. The indications now are that in the near future Pennsylvania slate manufacturers will enter into an arrangement whereby their goods will pass through one channel, thus stopping the jobber and consumer from peddling their orders."

In New England the granite workers' strike, by causing a suspension of building operations for some time, operated unfavorably on the business of the State quarries. The adjustment of that difficulty has, however, given a new start to the building business, and a greatly increased trade is looked for by New England slate roofers in 1893.

Improvements in the preparation of slates for roofing have been introduced in the drilling and countersinking each slate ready for putting on.

Canadian Roofers.

We are favored with reports from roofing and cornice concerns in Montreal and Toronto, Canada, which speak of increased business during the year, partly attributable to the number of grain elevators erected lately in all parts of the country. Although this source of business is not likely to continue to yield as much profit this year, prospects are looked upon as good. Preparations are being made for a large amount of European travel through the country this year, going to or coming from Chicago, which it is hoped will help general trade.

Competition in the Dominion continues keen, causing a sensible decrease in profits on individual sales.

Conductor Pipe.

From the West, we are advised that the manufacture of corrugated conductor pipe has proved very satisfactory, showing a considerable increase in 1892, notwithstanding the fact that a number of new concerns have lately embarked in the production of this material.

The Country Cornice Shop.—I.

By Cornice Worker.

How many country tinners are often called upon to do some little job or other in the cornice line, but who lack the experience which only long service in this particular branch can give. A tinner who was competent might receive such orders as putting up eave troughs that run around the corner of a building, for which miter patterns would be required, or he may be called upon to put up a sheet-metal hood over a cottage entrance, for which other patterns would be required.

It has often been the case in the writer's experience that carpenters would prefer to have old wooden crosses on spires or elsewhere replaced by those of sheet metal, such as copper, zinc or galvanized iron, owing to the tendency to decay when what is worth doing is worth doing right, one job will bring another.

In some of the country towns, growing in population, brick buildings are put up, for which galvanized sheet-metal cornice work is required, such as molded gutters and cornices, plain crown molds, plain dentil cornices, modillion cornices, cornices with brackets, sills and window caps, door hoods, &c. Garden vases could be constructed with wooden frames on the inside, for plants. Baptismal basins, when not made in marble, are sometimes made from heavy sheet zinc, the outside being painted to represent marble or granite. Or, let us suppose that a flag pole is to be put up on a conical spire, the roof of which is covered with shingles, and it is desired to have a sheet-metal base covering the joint between the pole and shingles, so as to obtain a water-tight job. The tinner, not having a circular molding machine, would have to hammer the metal by hand. The method of doing this work and the way to construct the cheap home-made tools required will be fully illustrated and described in the following articles on cornice work. Again, a schoolhouse being erected, the tinner might be required to furnish a square or octagon ventilator for the roof, for, although not exactly cornice work, it would be required of the cornice maker.

As mentioned before, all this and many other kinds of work would occur in a country cornice shop, which can be done by the tinner, providing he will take a little pains to study out the several articles which shall follow.

To illustrate the work resulting from accurate patterns, obtained by the geometrical rule, and those produced by the cut and try method, I will describe an incident which occurred some time ago.

Being in a tin shop on business, and waiting for the party to return whom I desired to see, I noticed one tinner having three pieces of tin pipe, each about 10 inches long and about 4 inches in diameter, from which he wished to make an offset by the cut and try method. A brick was placed upon the bench and against the wall, which I presumed was the distance the offset was to project over the brick water table on a building. He had now cut his miter on one piece of pipe and was sighting it to see if his cut was straight, and placing the pipe just cut upon the two other pieces, the miter lines were marked and cut. After tacking the offset together, it was found that one angle was too obtuse, and the other too acute, so the tacks were opened and the miters trimmed, fitted and tacked again; then, holding one side of the offset against the wall and over the brick, it was found that the center piece of pipe in the offset was trimmed too much and would not pass the brick projection. The tacks had to be opened again, another sheet of tin rolled up and a new miter cut. All this goes to show that had the tinner been able to cut patterns for elbows of any angle by the

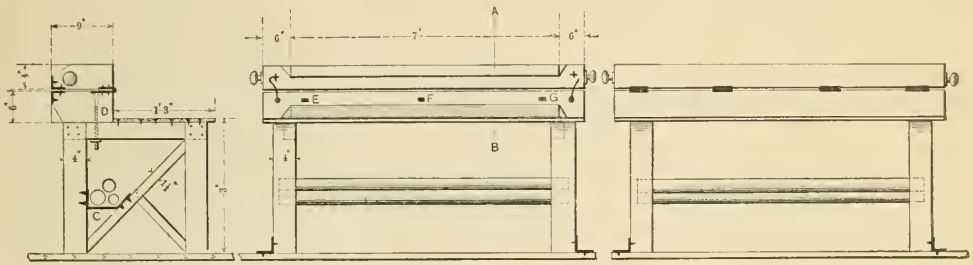


Fig. 1.—End, Front and Rear View of Brake for Country Cornice Shop.

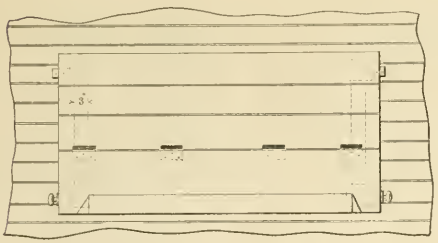


Fig. 2.—Plan View of Brake.

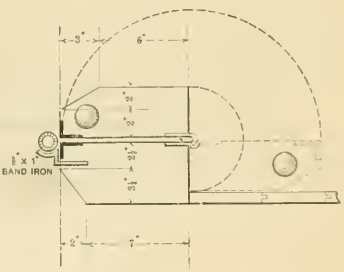


Fig. 3.—Enlarged Section through A B, Front View, Fig. 1.

made of wood. The writer has also seen wooden church spires, the miters of the different moldings having been drawn apart from the heat of the sun, which had to be covered with sheet metal so as to obtain a water-tight job. Such cases are more than likely to arise in any country place, and the tinner or sheet-metal worker would be called upon to do the work. Another job that may turn up is where a sheet-metal sign is required, the letters or figures having perhaps beveled corners; or a lantern is needed having the letters or figures cut out of the sheet metal, and colored glass fastened on the inside for effect when lighted at night. I remember a country tinner for whom I cut two sets of patterns for tombstones, which he informed me he would make of No. 22 gauge galvanized iron or 16 ounce copper, the copper having the preference on account of lasting the longest. I merely mention this because a country tinner might receive such an order for sheet-metal work if it was known he could do it, this class of work being chiefly made of wood in the country towns. Let the tinner become known for doing small jobs of cornice work and, providing

A HOME-MADE CORNICE BRAKE.

As the majority of country tinners have not the service of a cornice brake, one must be provided which shall be simple and inexpensive, but still turn out a fair rate of work.

The accompanying diagrams, therefore, have been prepared to explain how to construct such a brake. Let Fig. 1 represent the end, front and rear view of brake; Fig. 2 the plan. Fig. 3, which represents the enlarged section through A B, front view, also shows clamp and pipe in position, and upper leaf of brake opened, as indicated by the dotted lines.

Construct the bench for the brake as shown in the end and front view, Fig. 1,

the uprights being made of 4 x 4 inch joists, braced with 1½ x 3 inch spruce strips, as shown, and which can be obtained from any carpenter. On each side of the brackets, form, of $\frac{3}{16}$ x 1½ inch band iron, a small angle, which screw to same, as shown at C, end view, Fig. 1. These form a good angle for keeping the pipes when not in use, and where they will be handy when needed. The bench should be fastened well to the floor, with angles bent of suitable band iron, as shown in Fig. 1, front and rear view.

To construct the brake obtain a piece of hard wood, from which saw a piece 6 inches by 9 inches by 8 feet long for the bottom and a piece of 4 inches by 9 inches by 8 feet long for the top, the corners to be beveled as shown on front and end view, Fig. 1, and in plan, Fig. 2. The inner corners of the brake are to be inlaid with angle iron of ¼ inch by 1¼ inches by 1¼ inches, as shown on end view, Fig. 1, and enlarged section, Fig. 3.

make the bend. The different ways of making the different molds and gutters will be fully explained further on. In Fig. 3 is shown one of the clamps, which should be made of ⅜ x 1 inch band iron, three being required for the brake, as indicated in the front view, Fig. 1. In cutting the holes E, F and G in the lower leaf of the brake to receive the clamps, care must be taken that the clamps fit well in the openings made so as to obtain stiffness. Care must also be taken that they are cut on a line parallel with the edge of the angle iron, and that the clamps are all of one size. If the clamps are not of even size, or the holes are not cut on a horizontal line, that is, parallel to the angle iron, the bar or pipe will not rest level on the three clamps. Ordinary gas pipe can be used in 8-foot lengths, made perfectly straight. For each different mold a different size pipe will be required, and for that reason we must have as many different size clamps as we have

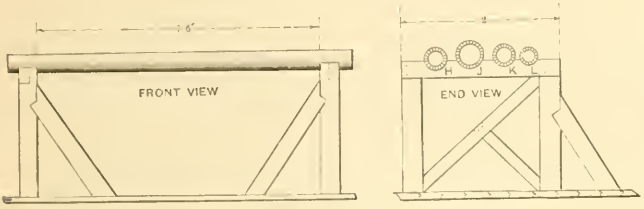


Fig. 4.—Front and End View of Ridge and Gutter Former.

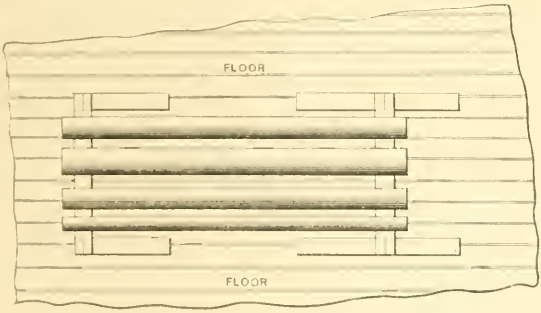


Fig. 5.—Plan View of Former, Showing Pipes in Position.

Four hinges, which can be obtained from any dealer in hardware, are to be screwed on the inside rear of brake, as indicated in the enlarged section, Fig. 3, the dotted lines showing the sweep of the brake. The position of the hinges is also shown on rear view, Fig. 1, and in Fig. 2.

After the angle iron is in place and the hinges in good working order, set the brake upon the two brackets and bolt through the wooden joists with two bolts ¾ inch by 12 inches, carrying nuts and washers, as shown at D, end view, Fig. 1. When the brake has been well secured obtain two large hooks and eyes from a hardware dealer, which place in position as in front view, Fig. 1. Two knobs are also to be attached, as shown in the same illustration.

Having described the construction of the brake, it will be well to briefly explain the way the iron is held, and later the use of the brake will be referred to. First grasp the knobs, and raise the top leaf until it has the position shown by dotted lines, in the enlarged section Fig. 3. The sheet or piece of iron having been placed on the lower leaf in the right position, the top leaf is raised and closed, the hooks drawn through the eyes, and we are ready to

different size pipes. In bending the clamps care should be taken that when the pipe is placed in position half of the pipe will project over the top of bottom leaf, as shown in Fig. 3. With these directions any person should be able to construct the brake as shown.

RIDGE AND GUTTER FORMER.

In making half round gutters and forming ridges, fronts of brackets and modillions, we require two stationary brackets, as shown in end and front view, Fig. 4. These brackets are to be constructed of the same material that was used for the brake. In forming or rolling the gutters, ridges, molds, large pipes, &c, the pipe, when laid across the top of the brackets, has a tendency to roll one way or the other according to the pressure. To obviate this we cut cross grooves on top of the joist, corresponding to the size of the pipe used, as shown by H, J, K and L in Fig. 4, end view. Fig. 5 shows the plan view of former, with pipes laid in position. The use of this former in practice will be explained as we come to the subject.

HATCHET AND MANDREL STAKES.

Fig. 6 is an end view of bench, showing the hatchet and mandrel stakes in position. These can be purchased from any dealer in tinners' tools, the former costing from $1 to $4, according to the length of the blade, and the latter from $3 to $8, according to the size required. The stakes are important tools for moldings of small lengths, such as finials, bases, hoods, caps, panel heads, letters, figures, and many other little things that might be mentioned, as will be explained at the proper time.

Preserving Tin Roofs.

Among the subjects discussed at the second annual convention of the New Jersey Association of Master Painters and Decorators, held at Long Branch in July of the present year, was that of the best material to be employed for preserving tin roofs. The discussion was opened by H. A. Barbier, who spoke as follows: In relation to the wearing qualities of paint and the best paint that can be used on a tin roof, I do not think there has been any systematic examination into this matter by either the local or State association. As I have made roof painting a specialty, I will give the results of my experience, hoping that they may be of benefit to some present. I have found that the three paints most in use are graphite or plumbago, metallic and yellow ocher. When I first learned my trade we used pure yellow ocher in the section where I lived. After preparing the tin by scraping the resin and washing with benzine, we used two coats of ocher ground with yellow. The average life of the roof was two and one half years. Within the last two or three years

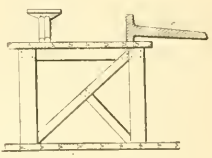


Fig. 6.—Hatchet and Mandrel Stake in Position.

I have taken up the matter of graphite paint. I have tried that in two ways. First, scraping the roof with resin and then washing with benzine, and then giving two coats of graphite. I have found, however, that by applying two coats of graphite there was lacking covering power, the paint was ground coarse and it was not quite satisfactory. I discontinued the method of treatment and gave as a first coating red lead. Then I made a mixture of graphite paint in oil. I kept track of that roof for three years, and I found it in first-class condition, and that it does not need repainting. It seems to me that this matter is of sufficient importance for the association to take up. My suggestion would be that we take up this matter from different parts of the State. Some live far from the sea and others near it, and there is a vast difference in the wear of paints in different sections. I think it would be a good idea to have three or five prepared tin plates with material and expose them and report at the next convention their relative wearing value.

Mr. Test: I happened to learn my trade on the Pennsylvania Railroad, and I think we had as many tin roofs to paint as there

are anywhere. Their idea of painting then was two coats of red lead and one metallic. Prior to that, in 1876, I painted a house in Philadelphia at Twenty first and Vine, and I put two coats of red lead and a coat of ocher on top, and that roof is there to-day and has never been touched since. I knew that this discussion was coming up, so I looked at it two weeks ago. That is too long for a roof to last for the good of the painter. I painted a roof in my place seven years this August, and I put a coat of red lead on that and then red metallic ; that roof is good to-day, and it does not need painting, and will stand two or three years longer. I have noticed in painting gas holders where there is more actual wear and tear that the paint which is used, and which will last longer in the gas holder, is metallic paint. I have used this many years and sell it. I have found that if a person takes pure ocher right straight through it is as good as any, but you don't find a person in a hundred who does, because the people, if you charge them more than a half or three-quarters of a cent a foot, think you are robbing them.

Mr. Buckel: We don't have much roof painting in our section, and I have not given it much attention, but we generally use the metallic. I cannot say that it is generally satisfactory. The best I have used is Venetian red, which is better than the metallic. It strikes me that the use of red lead and the metallic on top is better. I think that the idea of painting tin plates and exposing them is a good one.

H. A. Barbier: I would like to add to what I have said, that I have tried the metallic paint, and that the oil lost all its virtue, and by rubbing the hand over the roof all the outside came off in a powder.

A. S. Barbier: I take it that the best material you can use is one not active in its nature. From the discussion we have had there have been two things suggested, the one ocher, the other graphite. Pure ocher is rather inert, and is durable, and the same applies to graphite. Another thing in reference to graphite—while there may be some graphite paints on the market which are equally good, there is as much difference between graphite paints as there is between ocher mined in France, known as the best French ocher and that mined here and sold as French, which does not act the same under atmospheric conditions. That paint which oil leaves quickest contains the most active material. I have never superintended the painting of a roof with two coats of metallic or graphite paint, but I have put the graphite paint on old metallic and found it durable. One thing must be borne in mind, that Prince's paint is the cheapest that can be used on a tin roof. One thing in their advertisement has struck me and made me think a little. It says : "Mix 7 pounds of dry Prince's metallic paint to 1 gallon of linseed oil." The metallic has the best body of any paint. Did it ever strike you why they take 7 pounds of dry metallic and 1 gallon of oil? The reason is they don't grind it in oil. You can draw your own conclusion. I think it would be better if the painter took, for instance, dry metallic and ground it. I don't think you could get any better If you bought it ground in oil, but you do get better if you grind your own. It shows that 50 cents' worth of this paint will cover 500 feet of roof. I had occasion to see how much surface a gallon of graphite paint would cover. It covered 558 square feet; but it costs $1.20 if you buy it ready for use, and if in bulk and paste it costs you 8¼ cents a pound with oil at 40 cents a gallon. So you see graphite is twice as expensive, yet, at the same time, it is twice as durable as metallic. The nature of good graphite paint is that it is almost insoluble in water, and water runs off it like water off a duck.

Mr. Cottam : I painted a roof on my house in 1886 with metallic and I have not touched it since. It is in good order to-day.

Mr. Holzapfel : My experience is about the same as Mr. Barbier's. I have used graphite on tin roofs and it lasts longer than metallic, but it costs twice as much. Graphite has a further advantage over metallic from the fact that it contains a principle which preserves the tin.

Mr. Test : Where are you going to get graphite paint pure? I had a schoolhouse a year ago, where the architect called for graphite. I sent for it and it all came off in six months. I took especial care to put it on, as I wanted to see what it would do, and we paid 13 or 14 cents for it. The covering power was not anything to begin with. In six months I had to paint the gutters over. If graphite paint is the paint, where are you going to get it? I have the first to see. Last Thursday, Friday and Saturday I painted a roof between 13 and 14 thousand feet. The committee went all around the country to examine roofs. What was their decision? They let me do it as I thought best. After examining graphite, I finally sent to a man whom I thought was honest and put it on.

Mr. Sharrock : We never use a pound of paint other than the metallic.

The President : In Passaic we don't use anything but metallic.

A. S. Barbier: Another point about painting roofs. Is it a good plan to let the roof rust before you paint it? The reason for that question is this : If you let iron rust before you paint, all the paint you put on, unless you clean the rust off, the rust will come through the paint in less than a year. It seems to me the best time to paint a roof is before it rusts, because sometimes the trouble with a tin roof is that the rusting keeps on through the roof. There is no question but what in Jersey City where the roofs are painted with metallic that they should be repainted every two years; they need it badly. The roofs which have been painted with graphite there have stood four and five years and even six. It costs twice as much to paint with graphite as with metallic. I think that it should be the aim of master painters to recommend durable material. If you get a job of painting a roof every four years and get twice as much for it you will make just as much as though you painted it every two years for half the price. I think a great deal lies in the oil used. I think that in roof painting two-thirds boiled oil and one-third of raw should be used. I painted the Mansion House at Moorestown, and if I remember rightly it was five years before it was touched. I had occasion once at New York to have charge of the work on the Academy of Music, and we painted with ocher, and the roof was not painted again for four years. These paints were mixed with two-thirds boiled oil and one-third raw.

Mr. Butler: It strikes us from Philadelphia that there must be something wrong with the tin or the material you use in New Jersey. We in Philadelphia expect a roof to stand four years. It is our custom to expect it to last that long. I have used some graphite and I think it lasts longer than metallic. One thing you have not touched on at all is the application of the paint. You start a man out on a tin roof with a wall or a whitewash brush and he spreads it in all directions. When the rain runs down the resistance is greater than when it is on a level. If the color is laid on smooth and even with the fall of the roof the resistance to the water is less and the wear is less. One will use benzine and color and another oil and benzine. I have not heard what they used when it came off in six months. In badly rusting roofs you will be apt to find that the coating of tin is very thin. The iron stands nothing. You take the old tin which is heavily coated and it will stand for years without painting; but the great trouble with many painters is when they come to paint a tin roof anything will do for it and anybody can paint it, and then we fine fault with the material. We have no right to find fault with the material without taking into account our own shortcomings. I think if we took the same trouble in painting a tin roof that we do in our other work it would last longer.

Mr. Ballinger: "The longer I live the more I learn and the more I am satisfied that we all should be humble students. Another fact that should be considered is the comparative cost between graphite and metallic. I agree with Mr. Butler that we expect properly painted roofs to last four years without difficulty. If a roof is to last six, seven or eight years with graphite paint, it would be a good idea so get at the cost and see whether it is economy to use the graphite or the metallic paint. I want to suggest that so that it will come out in the magazines and the trade can get the benefit. Two or three weeks ago I had a customer applying for an estimate for a roof and wanting the separate cost of graphite as against metallic. I said I had no experience with it and could not give it. If the fact can be got at that graphite costing three times as much is cheaper than metallic or if metallic applied every three or four years is twice as cheap, I think that the fraternity should know it; and I think the cost should come out and appear in the magazine.

Mr. Golden: We do not have as much experience in painting tin roofs as those living in cities. My experience is that metallic is the best in this section of the country. I use Prince's metallic with linseed oil, and I find them in very good condition when I come to paint them again. I think that Prince's metallic is as good as any, if not the best.

A. S. Barbier: I think I can enlighten the trade as to the cost of material. I have taken the pains to figure that point. One pound of graphite paint mixed in oil to the consistency to cover well over metallic will cost you 8¼ cents a pound. That is based on graphite at $12.75 a hundred in paste and oil 42 cents a gallon. One pound of that paint will cover fifty-eight square feet from several careful tests I have made. If you buy by the gallon ready mixed it will cost $1.20. You have in your hand the book of the cost of metallic paint and how many feet it will cover, and you can compare the two.

Mr. Thatcher: I think there is a great difference in the time of year you paint a roof as to how long it lasts. If you do it to-day, before the fall, the oil will be burned out while the hot sun is pouring on it; if you wait until the fall the oil becomes hard before it is burned out, and I guarantee that it will last as long again as if applied at this time of the year. If you take it on the seashore, where you know the salt air is death to any oil, it will not last near as long as a house inland. The house on the seashore must be painted twice where inland once. Another thing about plumbago—it is a first-rate pitch roof paint where you don't have to walk over it. In my own house where I have a pitch roof I painted it seven years ago and it is as good now as then. The oil is gone, but if you put water on it it runs off. I have painted the flat part twice since that time with metallic. It makes a great difference as to the time of year you paint a roof and the way you apply it. If you use a large brush on a stick it is bound to be ridgy, and it will catch the rain, and that surface will crack first. Another well-known fact, if you paint a new tin roof with the best kind

of material it won't last as long as if the roof had been on two or three years, as there is a scum on the tin which will resist the paint, and that is why it is said you should let the roof rust some before you paintit.

FLASHINGS.

A SHEET METAL ROOF, having a standing seam in which the bent or folded line of a cap piece is formed with lateral crimps to interlock with the top edges of the up turned flanges of the roofing plates and extend from the top or apex of the cap piece down toward the base thercof, has recently been patented by Louis H. Britton of New Lisbon, Ohio. A one-half interest in the patent has been assigned to Jacob B. Warner of the same place.

WARREN EHRET COMPANY, 432 Market street, Philadelphia, makers of roofing materials and building papers, announce that they will shortly open a branch office in New York, at the Seabury Building, 59 and 61 Maiden lane.

THE PENN IRON ROOFING & CORRUGATING COMPANY, Twenty-third and Hamilton streets, Philadelphia, have added a number of new machines to their plant for next year's work. The additions include a 40,000-pound stamping and pressing machine; one die-roll machine of 29,000 pounds, with 38 steel dies for the different branches of stamped work; one new swedging machine; 5 to 10 foot dies for special molding work; three crimping machines and 10-foot rotary shear.

AULD & CONGER, 100 Euclid avenue, Cleveland, Ohio, furnish us with a statement of production and shipments of Sea Green roofing slate for the past four years. This slate is handled by the Vermont Slate Company. The following cable shows a very healthy growth in this industry:

	Production.	Shipments.
1889	$138,692.45	$115,339.86
1890	152,958.45	178,304.04
1891	189,608.57	187,356.54
1892	201,527.19	192,997.24

TWENTY OF THE LARGEST slate quarries in the Slating and Bangor districts in Pennsylvania have, it is stated, been formed under a syndicate, headed by James L. Foote of Slatington "to market slate on a more business-like basis than has heretofore been used."

IT IS REPORTED that the Canton Steel Roofing Company of Canton, Ohio, whose plant was completely destroyed by fire week before last, will rebuild their works at Ellwood City, Pa. The proximity of Ellwood City to Pittsburgh, where ample supplies of steel plates and sheets can be secured, is put forward as one of the reasons for the probable change in location.

"BECK'S MAD BOY" is the title on the cover of a wonderfully funny picture booklet, for which we are indebted to S. Bowen's Sons, North Penn Junction, Philadelphia. We thought, on first opening the envelope, that the book was intended as a holiday gift for the juveniles. However, on examining it more closely, we found the pictures to be so excruciatingly funny that we decided to keep it for our own private delight and edification. The work, which contains a dozen illustrations in colors, is described on the title page as a "History of the Uses and Abuses of an Indestructible Paint." It is, in short, designed to advertise the merits and uses of Pecora Plumbago Paint, manufactured by the Pecora Paint Company, to the business of which S. Bowen's Sons are the successors. The first illustration within the cover is the "family tree," showing the genealogy of Pecora Paint, the main roots being labeled "Black Lead," "Plumbago" and "Graphite," mingled with such qualities as "Research," "Honesty," "Knowledge" and "Diligence;" while the branches bear fruit, in the various merits and uses claimed for the paint. The illustrations depict the hero, "Beck's Mad Boy," armed with a large brush and a pot of Pecora Paint, with which he adorns everything he comes across, from a tombstone to a policeman or the sacred white elephant. The situations are most diverting, showing a wonderfully vivid imagination on the part of the artist. The paint is, for instance, recommended for "corporation work," such as railroads, manufacturing concerns, &c. The tableau illustrating this feature represents a festive gentleman seated on a fire main engaged in smoking a large cigar, while a small bootblack is giving him a "shine." The ever-present Beck's Boy is, meanwhile, placing a coating of Pecora Paint on the abdominal protuberance of the unconscious "swell." Each picture is equally humorous; and we are sure the book will be appreciated by all who are fortunate enough to procure a copy. It is one of the most unique advertising pamphlets we have come across.

A ROOFING PLATE or shingle composed of a single piece of metal, longitudinally ribbed, has recently been patented by L. H. Montross of Camden, N. J. The rib has its turning edge bent inwardly and upwardly upon itself in such a way as to form a vertical or upright longitudinal locking groove. It also has a gutter and a nailing strip which is made integral with it. In operation the first shingle is properly laid on the roof board and secured by nailing through the nailing strip. The adjacent shingle is joined thereto by holding at a convenient angle and slipping its locking tongue into the locking groove of the preceding shingle, after which it is pressed down and nailed. The arrangement is such that each following shingle of a row covers the preceding gutter and overlaps the nailing strip, so that the nails are protected from the weather. This patent has been assigned to Merchant & Co. of Philadelphia.

A GUTTER PROTECTOR, comprising a covering portion connected with the front edge of the gutter and extending upward and backward of the roof a short distance, has recently been patented by John Grogarty of Decatur, Ill. The portion extending backward above the roof is perforated in such a way that the water falling on the roof and running down may readily enter the gutter. The covering may be made either of sheet metal or of wire gauze, as may be preferred. The gutters can be supported in the ordinary manner or the protector employed as a support for the outer edge. We understand that the protectors are made in sections in any desired length.

THE ILLINOIS ROOFING & SUPPLY COMPANY of Chicago have favored us with one of the calendars which they are distributing to their customers. It is composed of heavy cardboard, 11 x 14 inches, artistically lithographed and embellished with illustrations of the company's specialties. Attached to the card are leaflets for the months. The company manufacture Perfection steel roofing and handle Gilbertson's Old Method roofing tin, in both of which they enjoy a large trade.

A Steubenville, Ohio, dispatch speaks of the successful use of petroleum fuel in lieu of natural gas, which can now be supplied only to a limited extent to manufacturers in the Ohio valley. The Hall Steel Pump Company of Pittsburgh have furnished the necessary engines and other apparatus, and the oil used is obtained from the McDonald field. The burners used in the Acme Glass Works are made on what is known as the aerated fuel system, where air highly compressed is mixed with crude oil and a tremendous heat is obtained.

Points for Commercial Travelers.

The ideal commercial traveler for Mexico is described by Consul Fechet. He "should be a gentleman in manners and address and should speak Spanish fluently. The Mexicans are a polite and formal people in their counting houses, as well as in their homes, and often do not understand the more familiar manners of other nations. Politeness, patience and tact, joined to a full trade knowledge and ability to speak Spanish, will sell goods in Mexico. Goods are not sold in Mexico in the quick way of our own country; several days of chat and social intercourse often precede the closing order for a large bill of goods. Many questions must be asked and clearly answered; this is especially true when the Mexican buyer knows but little of American goods, and this ignorance is unfortunately but too common. As to the questions to be answered, the commercial traveler must know the weight, size and all the subdivisions his goods may present; manner of packing, sometimes the measurements (cubic or square), rates of freight from the United States to the town where he offers them for sale, customs duties, rates of exchange or difference in value between Mexican and United States money. In other words, he must be prepared to figure at short notice how much the goods he would sell will cost, laid down at the door of his customer, making proper allowances for possible additional customs charges, brokerage and municipal taxes. The commercial traveler able to figure quickly, within a few cents one way or the other, the cost of his goods delivered will get the order in preference to another man who when asked, 'What is the rate of freight, of exchange, the weight, the duty, packing, &c.?' can only answer, 'Don't know.' Every merchant worth dealing with in Mexico keeps a 'book of costs,' in which he has figured the cost prices of all his goods; and he can tell you very quickly how much the same article has cost him at different times, from different sources, and at different rates of exchange."

Here is a pointer on Mexican methods for the benefit of commercial travelers. They should always ascertain, the Consul explains, before soliciting orders in a town, if there is a license tax to be paid. Of late years certain States have imposed a license tax on commercial travelers, amounting in some cases to $150. It is almost certain that a considerable reduction can be obtained by promptly applying to the town authorities for permission to exhibit samples and solicit orders for a specified time. Samples brought to Mexico by commercial travelers are subject to duty if in such shape as to be salable merchandise. Duties may be saved by allowing the customs officers to cut or deface the samples so as to be unsalable, but still available as a sample with which to solicit trade. Or a bond for double the duties, to run six months, may be arranged, and within the six months samples must be returned to the Custom House and the bond will then be canceled.

San Francisco is expecting to derive important advantages from the construction of the proposed Mexico, Cuernavaca and Pacific Railway, upon which the engineers are now engaged When the road is completed San Francisco will be only 350 miles distant by rail to the city of Mexico from the nearest port. St. Louis, which is making special efforts to secure Mexican trade, is 1900 miles distant by rail.

"The Metal Worker" Competition in Skylight Pattern Cutting.

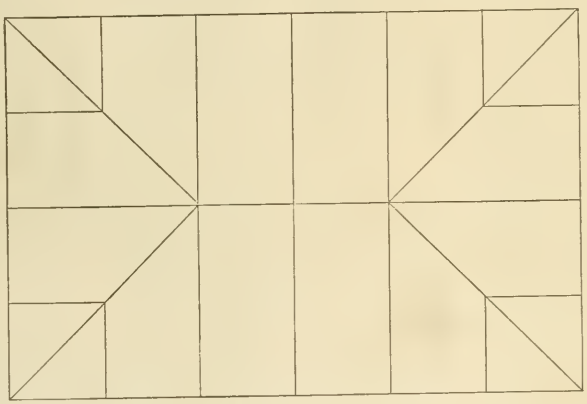
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

Steam and Hot-Water Circulation

Steam and Hot-Water Boilers.

DURING the year under review, the progress of steam and hot-water heating has been unmistakable. It has proved equal to expectations in every respect. Reports received from manufacturers in this line in all sections of the country speak of satisfactory growth of business, both as to contracting and general sales during 1892. In Chicago the increase has been particularly noticeable, but this may be attributed to special and transient causes, in connection with preparations for the World's Fair, and will probably not be maintained in the same proportion during the present year.

That the demand for heating apparatus of this description has been at least commensurate with the growth of the country, is proved by the general testimony of the trade; and it is believed to exceed it in most quarters. The production of heating boilers during the past year has been considerably in excess of anything done in the same line before. A number of concerns mention 30, 50 and 60 per cent. increase in output; while, in some cases, business is said to have been more than doubled during 1892. These statements, taken in connection with the fact that in the same period quite a large crop of new concerns have taken up this line of manufacture, show that the adoption of steam and hot-water heating is widespread and growing.

A considerable number of new pattern boilers have been placed upon the market, especially combination types of steam and hot air, or hot water and hot air. Improvements have been generally made in the fittings of those types already known and used, in order to bring them up to modern requirements. Machinery and appliances for manufacture have been simplified and improved, reducing the cost of production; and a much better boiler can now be put on the market at a less cost, than was the case with the heating boilers of two or three years ago. In a word, steam and hot-water heating is coming more and more to the front as an important branch of industry.

Competition does not appear to have affected the trade adversely to any large extent. The field has been ample for the number of concerns hitherto engaged in the business; and the outlook, even in view of the expected increase in competition in 1893, promises well. A disposition is, however, noticed with some firms to take jobs more for the reputation there is in them than for the sake of profit. This is a feature which is to be regretted, in the true interests of the trade. On the whole, nevertheless, prices have been fairly maintained, with a reasonable margin of profit, and a closer affiliation between the manufacturers during the coming year is likely to lead to a more remunerative business. The expenses attending sales have been rather greater than heretofore. The steam fitter has to be assisted, and his customer visited by the manufacturer's salesman, in order to close sales. Appeal to the "house owner buyer" also costs more, in advertising literature of an attractive kind, and personal application. But gradual reduction in the cost of manufacture more or less offsets these increases in expenditure.

As regards the quality of work turned out, a correspondent in a neighboring city writes us as follows: "I think the whole trade is producing a better article than heretofore, and that the work done is of a much higher order. There does not seem to be the amount of work turned out with too little radiation and insufficient boiler capacity, as has often been the case before. In fact, people now demand first-class work and are willing to pay for it."

The car heating branch of the trade, too, has experienced a large augmentation in the volume of business; and our reports speak of bright prospects in this line.

The Master Steam and Hot Water Fitter's Association of the United States continues its good work in endeavoring to lessen the disadvantages of too keen competition and establishing a fair level of prices, by means of local associations throughout the country devoted to maintaining the well-being of the trade. The association has had much encouragement and hopes for more during the present year, in which its annual convention will be held at Chicago.

Radiators.

So far as the amount of business done is concerned, manufacturers of radiators have no reason to complain of lack of occupation. The volume of sales has been very large, and the demand for these appliances continues growing, according to our correspondents in the trade, at a rapid pace. One of the largest concerns making radiators in the Eastern States writes to us: "Our business has increased very materially; so much so, that for a large portion of the time we have been at our wits' end to know how to fill our orders. Never in the history of our business have we been so driven." Others report "much greater" or "doubled" business during 1892. Improvements in form have been effected, tending to simplification of construction and economy in operation, while the decorative capabilities of the apparatus have received special attention. Radiators embodying one or two novel features have been introduced, as noticed from time to time in the columns of *The Metal Worker*, and considerable progress in this line of work has been made.

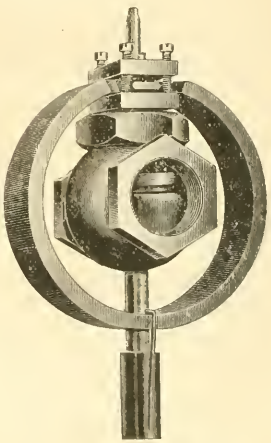
On the other hand, competition has been keener than ever; and the margin of profit on the ordinary run of goods tends to become closer. Those concerns who aim at excellence in their workmanship rather than at cheapening the cost of production, have, however, found quick recognition of the fact at the hands of customers in largely increased sales at fair prices.

From the growing popularity of the radiator system of heating, and the prospect of extensive building operations projected in many sections of the country for the present year, we judge that good business with moderate profits is assured to manufacturers in the coming months, should nothing unforeseen hinder the general trade of the country.

Our Canadian correspondents do not give us quite as favorable a report as do those of our own country. The legitimate radiator business in the Dominion is stated to suffer considerably from the efforts of foundrymen in other lines of manufacture to add this branch as a side line to their own trade, resulting in the stocking of the market with poor and cheap work done on unscientific principles. Profits have accordingly been cut down to a very small margin, showing a material depression since the previous year.

Powers Automatic Gas Valve.

We illustrate in the accompanying cut the Powers Automatic Valve for natural gas, made by the Powers Duplex Regulator Company, 90 Illinois street, Chicago,



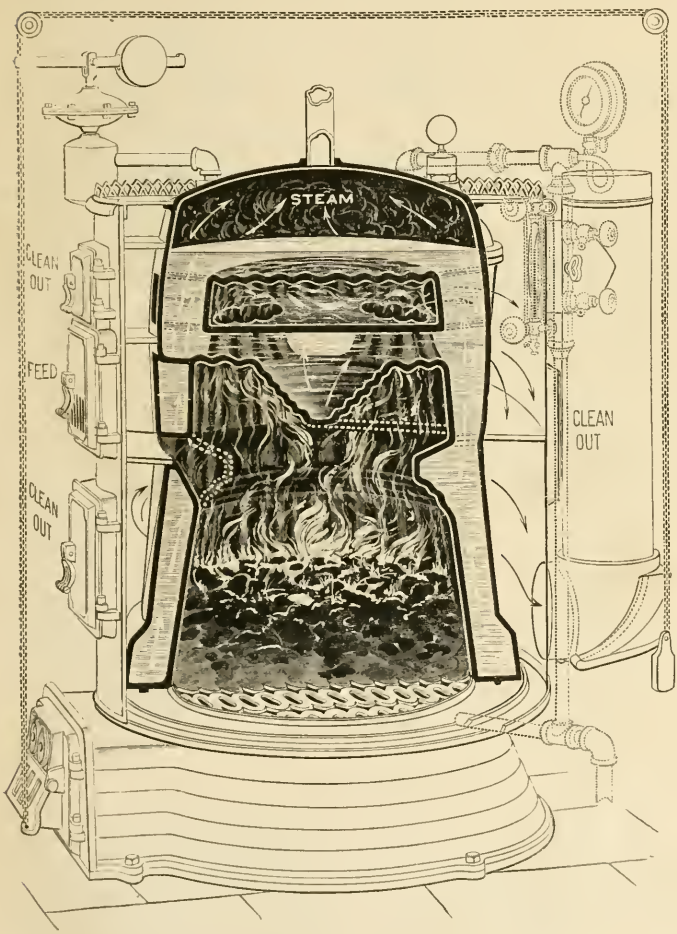
Powers' Automatic Gas Valve.

Ill. The valve is used with a Powers Automatic Regulator to control the supply of gas to any heating apparatus, and is similar in construction to an ordinary check valve. The valve is lifted by a rod resting in a cup into which extends a tube from the bottom of the valve shell, the cup containing mercury, which prevents the gas from escaping. Surrounding the valve and supporting the mercury cup is a magnetized steel ring, and between the poles of the magnet is a brass plate with a stem, to which the chain is attached in the same manner as to a damper. Underneath the poles of the magnet ring is an iron plate, in contact with which the magnet rests when the valve is closed, while above the magnet is a similar plate supported by four adjustable screws resting upon the plate below. When the ring is pulled upward with force enough to overcome the attraction of the magnet to the lower plate, it at once rises in contact with the upper plate, and the valve is lifted sufficiently to allow the passage of enough gas to supply the burner at the lowest stage at which it can be depended upon to burn without flashing and burning back in the air mixer. If the ring is lifted still further the upper plate goes with it, and the valve opens to its fullest extent. When the valve is closed by the thermostat the operation is gradual until the

screws in the upper plate come in contact with the plate below. The magnet is then held by attraction in contact with the upper plate until sufficient power is exerted to detach it, when it drops at once to the bottom plate, instantly shutting off the gas. By adjusting the screws in the upper plate the minimum supply of gas is secured that the burner will consume. The valve is said to be frictionless and very sensitive. It is made in various sizes from 1 inch and less up to 2 inches.

Perfect Safety Portable Steam Boiler.

The accompanying illustration shows a sectional view of the Perfect Safety Portable Steam Boiler that is manufactured by



Perfect Safety Portable Steam Boiler.

the Richardson & Boynton Company, 232 Water street, New York. The boiler, it will be noticed, consists of three sections resting on the ash-pit section or base. There is a conical fire-box section, water-dome section above and at the top the steam-dome section. The fire-pot section is 20 inches high on the outside and 16½ inches high on the inside, and permits a fire varying in depth from 12 to 16 inches. It is constructed tapering from bottom toward the top, and is corrugated and arched at the top, beside being all cast in one piece. Over this is the inverted water dome with circulating and drain connection, which is likewise cast in one piece and has four corrugated smoke flues through it, two of which are shown in the illustration. The manufacturers point out that the inside of the fire pot in the second section can be easily seen and cleaned through the feed door. Another feature noted is the four large water ways to insure a steady water line and perfect the circulation of water throughout the boiler. The steam-dome section, which is likewise cast in one piece, is accessible from the front clean out door. The boiler has a large combustion chamber, taking up the whole of the inside of the boiler, and which gives ample room for the gases to thoroughly consume. The large return flues encircling the outside of the boiler can, it is said, be easily cleaned through front and rear clean-out doors placed in the casing without interfering with the fire. The ash pit is 12 inches high and fitted with the Perfect Triangular Revolving grate. All the inside surfaces of the boiler are vertically corrugated and surrounded by water. The boiler has direct and indirect draft dampers, and is adapted for hard or soft coal. It is made in four sizes with 21 and 26 inch grate and 52 to 62 inches in hight, adapted to heat from 325 to 600 feet of surface. All the joints of the boiler below the water line are made on the principle of a flange union, being held together by 3-inch bolts on the outside of the boiler, and so placed as not to be exposed to the fire. The joints, furthermore, are milled. The boiler is covered with a non-conducting galvanized-iron casing lined with asbestos and wrought iron, and is said to be easily handled and can be taken through any door.

English Practice in Hot-Water Heating.—XVII.*

INDEPENDENT BOILERS.

The subject of gas boilers cannot well be left without referring to an ingenious introduction of Mr. Fletcher's. This is a water heater, or boiler, as Fig. 62. The peculiarity consists in the quantity of solid metal (copper, in this instance), pins projecting from the lower heating surface. Mr. Fletcher, in a paper read before the Gas Institute meeting, describes how he has ascertained by experiment that flame never has actual contact with surfaces which are at or below 212°, the temperature of boiling water. He adduced in evidence several facts to show that surfaces at this heat had a sort of repelling action, and between the flame and the surface there always exists a thin film or space, to the disadvantage of the water receiving the full benefit of the heat. The remedy proposed, and which he has brought into practice, is to furnish the heating surface with these solid pins, protuberances, or gills (all can be adopted to the same end), as, when flame is applied to their free extremities, it has ready contact, owing to the much higher temperature that they (the extremities) can be raised to.

It will be seen that although we cannot get a surface, having water on one side of it, hotter than 212° (and rarely this with boilers), if solid rods or projections extend from this surface sufficiently far, we can get their extremities red hot, although at their other ends they are in contact with water. Mr. Fletcher makes his rods about 1½ inches long; this permits the extremities to obtain 500°, and flame has actual contact at this temperature, and the greater and more effective heat so obtained is readily transferred to the water by conduction. Now, the peculiar effect of these rods does not end here. It has been common knowledge for many years that the affinity of water for heat—its heat-absorbing power—is two and one-half times greater than a plain heating surface can impart the heat to it. This power of water is met with these rods, which, being solid, go to increase the heat-receiving surface to the extent named without increasing the water surface. In other words, if the flat bottom of this little heater be a superficial foot, the addition of the rods make the actual heat-receiving surface some 2½ feet, and the superficial foot of water surface resting on the flat bottom is quite able to absorb all the heat of this greater heat-collecting area. There is now advertised a boiler tube made upon this principle having a series of flanges inside it, where the flames and heated gases have contact, and the makers contend that these flanges, which are solid, and simply additions to the heat-receiving surface, add fully 30 per cent. to the boiler-tube's effectiveness. Mr. Fletcher's experiments showed a really great difference between boilers that had the rods and those that had not. The length of the rods has a limit, as when the heat received is more than the water can dispose of, the extremities perish.

This little gas boiler would require to

* Reprinted from the London *Builder*.

be fixed in a house or little structure by itself, like the others. There must be free ingress of air for combustion, and equally free outlet for the products of combustion. This provision of inlet and outlet ventilation must, however, be unattended by violent drafts, or the flame will be blown out, or caused to "light back." In the former case a disagreeable effect might be experienced when relighting the burner by the explosion of the unburnt gas that may have collected.

INDEPENDENT BOILERS FOR COKE FUEL.

It will not be possible to enumerate more than a few of these, having distinct features peculiar to themselves. The number is too great to speak of them all. About the smallest and least expensive we rather small pipe, as shown. A coil is undoubtedly effective, for it presents a greater surface to the fire in comparison to the quantity of water it holds than any other water heater; it has the advantage of being wholly direct heating surface in contact with hot fuel. The drawback to coils is, however, that accumulation of deposit cannot be readily removed, even if some sort of provision is made for it. With this particular pattern accumulated dirt may soon do harm, as the pipe is small, and would be readily filled. Beard's coil boiler, to which we may presently refer, is considered successful, the pipes being 3 inches and 4 inches.

The next description of boiler to notice is Messenger's Loughborough, as Fig. 66. The peculiarity of this boiler, as every all makers, is the "dome top," as Fig. 68. This is a very good and serviceable form of upright boiler, and has had general use and approval for many years. This boiler has a water-way top, and is the first we have shown with the flow pipe starting vertically, which is decidedly the best way for it to start if the works are of any magnitude. It is unnecessary to describe this boiler in detail, the illustration gives what is needed in this respect, but there is one feature in the drawing which requires specially alluding to.

The feature in question is the water way, shown carried down below and beneath the fire bars. This arrangement, owing to the increased cost it incurs, is not generally adopted, but it certainly has pronounced advantages. In the usual way,

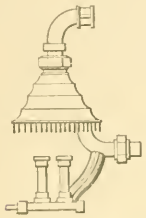


Fig. 62.—An Ingenious Water Heater or Boiler.

Fig. 63.—Boiler for Coke Fuel.

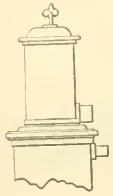


Fig. 64.—Coke-Burning Boiler with Fuel Chamber at the Top.

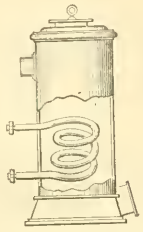


Fig. 65.—Small Boiler with Coil.

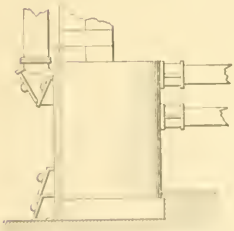


Fig. 66.—Messenger's Loughborough Boiler, Adapted for Building into the Wall of a Greenhouse.

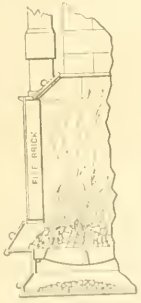


Fig. 67.—Another Form of Greenhouse Boiler with Fire-Brick Front.

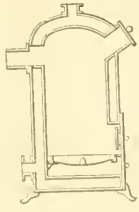


Fig. 68.—A Dome-Top Boiler.

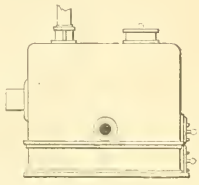


Fig. 69.—Independent Horizontal Boiler.

ENGLISH PRACTICE IN HOT-WATER HEATING.

have is what is generally termed the Star, as Fig. 63; it is, however, unsafe to give some of the old patterns, as this is, any specific name, for a similar design of boiler may be found in every maker's list, but not more than two will name it alike. This is a useful little boiler for small purposes, for heating a greenhouse or carriage house, or for two or three coils in an entrance hall. Its size does not admit of taking a charge of fuel to last many hours without attention, but it can be had with an extension, or fuel chamber, at top, as Fig. 64. They are also made with sloping sides that is, slightly conical—which assists the free movement of the fuel in its falling to replace that which is consumed below. These boilers are made to heat from 150 feet to 700 feet of 2 inch pipe (theoretical quantity), and can have the pipe sockets on right or left side or at back, as desired; the smoke nozzle can be on top or at back.

Fig. 65 represents a distinct form of small boiler, if it can be termed such, the heat receiving surface being a coil of reader must know, is its being adapted for building in the wall of the greenhouse. When it is so fixed, the stoking, &c., is all conducted outside, and the flue pipe is similarly placed; but the opposite side of the boiler projects inside the house, and the pipes are there connected. By this arrangement there is practically no loss of heat from the boiler, and the whole of the circulating pipes do good service in radiating heat. The only loss of heat is from the front surface, which faces outward. The writer cannot see any reason for making water-way fronts with these boilers. Messrs. Kinnell's Horseshoe boiler, of a somewhat similar design to the Loughborough, has an air chamber in front, by which the air which enters the fire is heated; this is in lieu of the water-way front, and seems a very good idea. Another good form of boiler for building in the thickness of the wall is Jenkins & Son's Ivanhoe. This has a fire-brick front, as Fig. 67.

A very good pattern of boiler, made by the water way terminates exactly level with the fire bars all round, except where the stoking door comes; it is arched here, as is necessary. Terminating the boiler at this point means that the lowest point of the boiler, where dirt accumulates, comes exactly where the very greatest heat is felt, and where it can bring about the most harm, and what aggravates matters is that a weld or joint has to exist at this important point. If the water way is carried below, as shown, the accumulation of deposit occurs below the point where heat is felt, and the dirt, being at this low point, can do no harm; but in addition to this, it is so much easier to remove the dirt from this flat surface than it is from the cylindrical space higher up. Added to this is the gain effected by the absence of welds and joints immediately near the glowing fuel—it is better to keep them away from this point. Welded joints are, as a rule, strong and very serviceable, but exceptions to this rule are not uncommon. If a boiler of this type is used for the sup-

ply of hot water at taps, and the water it heats is "hard," the water-way bottom is a very great advantage, and cannot be overestimated. The hard deposit is thus almost entirely kept away from the heated points where it so readily causes damage, and the removal of the deposit is facilitated. This hard deposit is difficult enough to remove at any time, but particularly so with cylindrical boilers having the water way ending level with the fire bars. The water-way bottom forms a sort of settling bed for sedimentary or precipitated matter of every description, as very little can adhere to the vertical surfaces just round the fire box. It will be understood that matter deposited anywhere else than just where the great heat is felt does little or no mischief.

There are several effective shapes of independent boilers that are not of vertical design, as we have hitherto referred to, but are horizontal, as Fig. 69, for example. These are nearly all much like square saddle boilers, placed upon iron bases and furnished with the necessary furnace fittings, making them independent of brick setting. The illustration shows one with water-way front and back, with top feeder. This is a very good form of boiler, can be fed to last the night without attention, but a deal of heat can be radiated and lost from its exterior if not covered, or if not fixed in a little close brick chamber. It could have the smoke nozzle on top, if desired. This style of boiler is made to heat up to 2000 feet of 2-inch pipe, and if fitted with internal flue or cross tubes is still more powerful. It is a boiler the writer has used, and has given every satisfaction. A square boiler can be cleared out with comparative ease.

The Business of 1892 in Steam and Hot-Water Heating Apparatus.

BY OBSERVER.

The present may well be regarded as the commercial era in steam and hot-water heating apparatus. The volume of business done in 1892 in boilers, radiators, valves and all that goes to make a complete modern house-heating apparatus has never before been approached since these justly meritorious systems of heating were introduced, and this large volume of business has been done at fairly remunerative prices, we think, to the manufacturer, jobber and local dealer. While prices have uniformly ruled a little lower than in previous years, this is but the result of more systematic methods adopted in the manufacture of this line of goods and the commercial importance of this branch of industry being more fully recognized by those engaged in it.

COMMERCIAL IMPORTANCE OF THE TRADE.

It is with this as with every other business—it cannot be recognized as being legitimately established until its commercial importance is fully appreciated by the public and all its interests treated in a commercial way. This, we believe, has more thoroughly prevailed during the past year than ever before and has been an important factor in impressing the public that these systems of heating have come to stay, that the experimental era has passed, and that the purchasers of steam or hot-water heating apparatus can now obtain that which is perfectly reliable, efficient and durable.

Undoubtedly, in years past this industry has been largely handicapped by the numberless experimental devices which have in many cases been costly experiments to all concerned, but this experience has led up to a more perfected apparatus in its every detail, until to day both low-pressure steam heating and hot-water heating systems are recognized, we believe, in the fullest commercial sense by both manufacturers, dealers and the public.

FUTURE PROSPECTS.

The universal expression among all the trade, as far as we can learn, is that the prospects for the future were never more auspicious than at present. There is no possibility of the trade being diminished in volume, excepting from some financial crisis, which would affect every business alike. The actual annual growth of this industry cannot but be very large, and we think the trade should justly appreciate the situation and endeavor to meet these demands.

The leading manufacturers of boilers, and radiators also, have this past year been pushed to their utmost to fill their orders. In fact, many of them have been literally "snowed under" at times. Consequently the trade and the anxious customers have had to exercise considerable patience, if not actually suffer loss. When we realize that this is the case with manufacturers who have, from year to year lately, increased their facilities by additions to their works, so that their output has been increased to an amount that would, in their judgment, meet the natural demands upon them and yet have fallen short, simply proves that the possibilities of this business are not generally recognized by the manufacturers of this class of goods.

UNIFORM PRICE ON RADIATION.

One thing that has apparently benefited the trade, and especially the local dealers, has been the uniformity in price on radiation. The universal expression seems to be an approval of this wise policy, and the recent action of the boiler manufacturers in organizing an association with the apparent idea of reducing the cost of manufacturing to a minimum and thus giving uniformity in price, will surely be beneficial to the trade and satisfactory to the public if it raises the standard of workmanship on this class of goods and still holds to a uniform minimum price. By these methods the cutting in prices will be avoided, which has proven the ruin of every line of business that was ever engaged in, and we hope that the wisest counsel will prevail in this direction.

NEW BOILERS.

During the past year there has been quite a number of new boilers brought out and many patented which the public as yet know nothing of. This is but natural in an industry as young as the steam and hot-water heating industry. Those who have an idea of a peculiarity in device will avail themselves of the liberal patent laws to protect their ideas; but those who have had experience in this business realize that, practically, there is so little difference between the new ideas and those of reputation established by use that little can be expected from the new enterprises which will naturally spring up. In fact these new enterprises will naturally help the business by bringing more thought and enterprise into it, but it is not preaumable that the demands for this line of goods will be able to afford a profitable business for all the manufacturers, both old and new.

GOOD WORKMANSHIP REQUIRED.

Where skilled mechanics are employed in erecting the apparatus we know of no failures that are worthy of mention. Both manufacturers and dealers in this line of goods can greatly benefit themselves and the trade by fostering a higher standard of work in every department. There, perhaps, is no one thing that has tended to retard the growth of this business so much as incompetent mechanics. This is shown in the manufactured goods, and is especially glaring in the pipe systems throughout the country. This comes largely from the local plumber or tinsmith, who, believing that there is money in doing work of this nature, intrusts the erection of the job to his mechanic, who may be skilled as a plumber or as a gasfitter, but who obtains his experience in steam or hot-water work at the expense of the local dealer and grievous disappointment and annoyance to his customer. No mechanic should be intrusted with the erection of this class of work unless he has had experience as helper, as it is detrimental to the best interests of the business to impose upon customers by putting in apparatus that has to be overhauled and corrected before it works satisfactorily. While we believe that local dealers in small towns can handle the work satisfactorily, they should not allow themselves to do so until they are confident of having in their employ a man fully competent to erect the same successfully without experimenting. While every manufacturer of either boilers or radiators is perfectly willing to give whatever information he can in regard to what the pipe system on any particular job should be to obtain best results, an unskilled mechanic, owing to lack of experience, is rarely able to carry out the instructions, and the result of his work invariably is dissatisfaction to the customer and pecuniary loss to the dealer. In many cases the dealer becomes so disgusted with his experiences that he condemns the systems, when in proper hands everything would have proven satisfactory.

STEAM VERSUS HOT WATER.

As the popularity of steam and hot-water heating increases, many inquire which system is best or which is most used. Both of these questions are difficult to answer, as each system has so many points of excellence; without question, however, the trade in steam boilers and steam radiators has been, the past year, largely in excess of that for hot water, but that the trade, in the smaller sizes of apparatus adapted for residences, is growing steadily with a tendency toward the hot water system, we candidly believe. Each system has a strong following of public approval, based upon their experiences with it, and deservedly so, as either of them, under ordinary conditions, will be found entirely satisfactory.

With the present outlook for 1893 there is every reason to hope that manufacturers and dealers throughout the country will work together for the best interests of this industry and elevate it to a standard of excellence that will merit the confidence and patronage of a discriminating public.

HEATING NOTES.

GEORGE C. BLACKMORE of Newark, N. J., is the patentee of a new form of radiator valve, the object being to furnish a construction of hot water radiator valve by which the valve may be opened or closed with a very slight movement of the hand piece. The invention consists of a flat seat and perforated disk pivoted upon it, with the seat secured in the bottom of a suitable casing and a concealed stuffing box secured in a recess in the top of the casing covered by a circular hand piece.

THE SCHUYLKILL VALLEY stove and heater manufacturers and dealers have had an extraordinary run of business during the past six months and are making extensive preparations for the coming year. In Reading, we are informed by the superintendent of the Keystone Steam-Heating Works that it has been almost impossible to meet the demand for prompt work. Work that ought to have been given out in the early summer was de-

layed until August and September, and although they put in as much overtime as the men could stand, they were constantly behind with their orders. From the same source we learn that about one-third of the work was hot water and two-thirds hot air or steam. An important adjunct to this class of business is ice and refrigerating machinery. The Keystone Steam-Heating Works have a number of orders of this character on hand and expect to be as busy on that work as they have been on the first-mentioned.

E. S. Bomstead & Co. of Colorado Springs, Col., have recently closed a contract for heating the Presbyterian Mission School in Santa Fé, N. M. The building is a large two story structure and will be heated by hot-water circulation. The device used will be the Spence hot-water heater, of which a number have been installed by the firm named in Colorado Springs, and which are said to have given entire satisfaction.

In a note in *The Metal Worker* of December 24 relating to the Fowler Radiator Company, we inadvertently gave the address of their foundry in connection with the name of the concern. We should have mentioned the Fowler Radiator Company of 435 North Broad street, Philadelphia, Pa., which is their business address, and to where all mail should be sent.

John A. Flajole, Bay City, Mich., is the patentee of an improvement in steam heaters, the object being to provide a cheap and easily operated apparatus, and at the same time provide for the full utilization of the heat developed by the combustion. Another object noted in the specification is to provide a combustion chamber and fire pot not liable to burn out and in which all the surfaces in contact with the fire are water surfaces. The type of boiler illustrated has the water space above the fire in horizontal water tubes.

We would express our obligation to the Matthews-Northrup Company, 179–181 Washington street, Buffalo, N. Y., for their new specimen book entitled "Some Proofs," with a copy of which they have favored us. The book is gotten up with the object of demonstrating what has been done, in the various styles of engraving, at the Complete Art-Printing Works of the company. While, of course, primarily intended as an advertisement for their business, the book is one which is of value and interest to any one with a taste for engraving and printing. It contains about 50 pages of engravings, with comments and explanations. The first page presents a colored map of the city of Buffalo, with small views of Niagara Falls, the Buffalo Library and the Matthews-Northrup Company's establishment. These illustrations are executed by the different systems used at the works, and show five separate kinds of engraving on one page. Throughout the work, we are told, specimens are given only of work actually done in the establishment in the regular course of business, no engraving having been specially prepared for the collection. The subjects cover a wide field, and include some exquisite work in wood engraving, metal engraving, phototype, or half line, zinc etching and wax, or relief line engraving, which would be a delight to collectors. The price of the work is $1.

Grand Master T. V. Powderly has bought a farm of 71 acres near Hyattsville, six miles from Washington, for himself and a syndicate of workingmen, with a view to establishing a group of factories and a co-operative workingmen's town. The site chosen is convenient to both the Pennsylvania and Baltimore & Ohio roads.

New York Trade Schools.

The twelfth season 1892–93 of the day classes at the New York Trade Schools, 1260 First avenue, New York, begun Tuesday last, and the usual opening exercises took place in the lecture rooms at 4 p.m., January 4.

It was the first term since their incorporation and the first opening of the day classes at which their founder, Colonel Auchmuty, was not present. In his absence the result of his work was very apparent in the order, routine and discipline he has originated, which, however, did not compensate at the moment for the want of his presence.

In addition to the day plumbing class, whose number is now 98 and which number will be increased to 110 in a few days, there is the bricklaying and plastering class, carpentry, house and fresco painting, and sign painting, as well as the day printing class, which has been at work since November and will continue until May, 1893.

At 4 o'clock the students of the various classes assembled in the lecture rooms. Every seat was occupied and numbers had to stand.

The proceedings were opened by Henry Brill, the secretary of the schools, who spoke as follows:

For the first time in the history of these schools, Colonel Auchmuty, their founder, and through whose benevolence they are maintained, is unable to be present at the opening session of the day classes. That he is obliged to be absent is a source of great regret to him. For some time past he has been confined to his home by illness, but that his thoughts are with you and your work, and that he thinks of your welfare, is shown by a letter he has written, and which will be read later on. I understand that not a few among you have come to the schools on the recommendation of former students, and thereby have heard of the interest he takes in young men. It is seldom that a graduate, when speaking of this institution, does not dwell on the kind treatment received and of the care bestowed by Colonel Auchmuty on those who come to the school. His interest in your progress is not lessened because of his inability to be among you, and it will be a great satisfaction to him when he hears of your well doing.

I have assembled you together this afternoon for the purpose of explaining the system under which you will work for the next three months. Before I begin, I want to welcome to New York all of you who are strangers here, and to all I extend a welcome to the New York Trade Schools.

Continuing, Mr. Brill described the courses of instruction which guide the manual and theoretical work of each of the departments, and explained the banking system in vogue of caring for the money the pupils bring with them and deposit in the office. He also told what medical attendance Colonel Auchmuty had arranged to provide should any of the students become sick, and concluded by introducing John Stanley Thomas of the Union Theological Seminary, under whose charge the Trade School lodging house is conducted. At Colonel Auchmuty's request Mr. Thomas read the following letter:

"*To the Members of the Day Classes:*

"I regret that I am unable to meet you this afternoon, and, as I may be confined to my house for some weeks yet, I send a few lines, which I have asked my friend, Mr. J. Stanley Thomas, to read to you.

I would ask you to remember that you have come here, many of you at considerable expense, to learn a trade; that to get the full benefit of the short course of instruction there is not a day nor an hour that can be wasted, and that the courses of instruction you will follow have been carefully prepared and can produce remarkable results, provided you are as anxious to learn as your teachers are to teach you.

"I would also most earnestly ask those of you who are strangers in New York to avoid saloons and making acquaintances in the streets. Those who seek your acquaintance do not do it for your good. I would also ask you not to indulge in practical jokes or in "chaffing," either in the school or in the lodging house. Although no harm may be meant, unkind feelings are sure to follow which will mar the pleasant relations which should exist among you.

"Mr. Thomas is living in the lodging house. You will find in him a friend to whom you can look for information or advice.

"Many anxious hearts will wonder this winter, are thinking now, how loved ones are spending their leisure time among strangers in this great city. May God grant that no evil befall you and that besides learning a trade you may learn the most valuable lesson in life—that by resisting temptation and turning from evil you can trust yourselves.

"Richard T. Auchmuty.

"New York, January 3, 1893."

Mr. Thomas then addressed the students as follows:

ADDRESS OF J. S. THOMAS.

Would that the thoughts and sympathies which stir my mind and heart could be put into words. There are groanings and impulses and holy purposes which live and move within the human breast that language cannot express. Like the ocean's wave they rise, and roll, and break, and die into a silence as deep as eternity. There are doubtless feelings untellable which exercise your minds as you enter upon a course of study and instruction in this great and growing institution.

Your presence here means that you have a noble desire for advancement in the scale of living. Every true man honors and applauds the worthy ambition of young men. May the highest aim which burns in your souls be splendidly realized is my sincere wish.

In entering upon a course of instruction in the New York Trade Schools you are associating yourselves, you are aware, with a celebrated school, standing pre-eminent among similar institutions. It would be out of place for me to attempt to pay tribute to the "Auchmuty System," so well known on account of the remarkable results produced through thorough application and skilled instruction in the manual and scientific branches of the trades taught. The rapid growth of the New York Trade School during the past 11 years is a living monument of its value and influence. The progress and positions of her students proclaim the expediency and success of the system used.

Sirs, it seems to me a credit to the judgment of any man to become a student in this school. Well may you entertain and cultivate a just pride in being members of the different classes.

I am heartily glad that the false and inconsiderate impressions concerning the trades are fast becoming things of the past. The idea that gifts and education belong only to the stated professions is a false one indeed. The advanced and advancing civilization of to-day declares wisely for more skilled artisans, and our great country, speedily progressing, demands the schooled workmen to meet the requirements of the hour's upward strides in the industrial world. The trade school system is supplying a great necessity of this enlightened age. Surely the founder of this school deserves all the rich and magnificent encomiums given his labors and enterprise. And may God bless him in his works of love, granting renewed health and strength, that he may continue to do good in upbuilding the aspirations of young manhood and to augment the beneficial influence of his thought and life upon the world. This thought reminds us that, by some special providence, men are raised up and endowed to create and promote certain schemes of beneficence. In the minds before me there may be a divine spark of achievement which

shall some day bless and irradiate the trade of your preference. May it be so!

So, gentlemen, let the spirit of earnestness which prompted your coming to the New York Trade Schools be incited by the anxiously guarded motive to do well in your work and studies as one of its members. Whatever success you accomplish the progress you make will not only reflect credit on yourselves, but will be an honor to the instructors of the institution we all represent.

Believing that each one of us shall feel a just pride and interest in the school, its welfare and increased popular reputation, I beg to humbly offer a few hints as we begin our life together in this great metropolis city.

Many a time have we seen bright playful children with cups and pipes blowing soap bubbles. Happy beings! Laughing and their young hearts leaping with merriment, they would blow into the air bubbles of beautiful colors glittering in the heaven-sent sunlight as they rolled out of the cups. You know how easily the orb-like beauty of them bursts in the twinkling of an eye. Just so there are many glittering fascinations of worldliness amid the restless dash and activity of this city that burst into empty nothings. In a heart-throbbing center where are gathered all conditions of humanity there exists the most appalling scenes and horrors of worldliness which thrill and sadden the heart. The temptations of New York life are awful and seductive. Evil in a hundred forms greets the eye and ear and presses hard upon young men to do wrong. Casting our lot here as students, let us beware of the insinuating grasp of worldly desires so subtle and magnetic, so destructive and fatal. The dazzle and glare of gay scenes and revelry are overrated by those who ha ve not experienced them. All is not gold that glitters, and a few hours of recklessness have produced an avalanche of despair, a whirlwind of soul-trouble, a manhood blackened and contaminated for a lifetime. Oh! that men would remember the toil and love of mothers' hearts. There are men who gratify personal desires for a little short-lived sport, and change bright prospects of a successful business career into disappointments and miserable failures. Gentlemen, while the terrible reality of life presses hard upon us, and the drumbeat of time's hurried step in this material world of hustling is heard, let us look above trifling things unto nobler thoughts and feelings and actions.

As each day seems to tick a second on the clock of time, may we push onward and upward, beholding the grand, all-glorious drapery of the universe; proclaiming unending gifts for man's appreciation and enjoyment. In this immense city there are numbers of fine places and sights for amusement free or at small cost. Let us take in these, and we shall enjoy pleasant, healthful and interesting entertainment.

Students, in all candor, let us cultivate the spirit of brotherly feeling, and share the joys and advances of fellow-students in the struggle to attain larger experience and knowledge of the several trades. It seems to me that we ought to delight in cordial conversations and congenial games to enliven and beautify the longing and thirsting of hearts for agreeable associations and companionships. Let us take in the proper entertainments and recreation while away from home—the grand central depot of all our hopes and fears and loves—that we may think the right, feel the right, do the right.

It is my heart's burning desire to be a friend in any way, day or night, in sympathy and word and act.

My rooms in the students' dormitory are open to all students and their friends, who will be most cordially welcome.

And brother men, I do earnestly hope that your progress in the different trades, that your private lives shall give you that satisfaction and happiness which comes from the consciousness of duty done.

William L. Thatcher, secretary of the Students' Movements, invited the students of the Trade Schools to the use of the club house on Lexington avenue near Twenty-ninth street.

A general conversation with the usual light refreshment brought the proceedings to a close.

The following is a list of the members of the day plumbing class:

DAY PLUMBING CLASS, 1892 AND 1893.

Thos. L. Tolan, Hornellsville, N. Y.
Albert E. Weiant, New Britain, Conn.
John A. Mangold, Moundsville, W. Va.
D. Leon Roberts, Moundsville, W. Va.
Edward Weikert, Canton, Ohio.
Thos S. Cochrane, Jr., N. Y City.
Wm. B. Freehsee. Lockport, N. Y.
Edw. Lohr, Johnstown, Pa.
Royal W. Pearson. Calumet, Mich.
Geo. L Roberts, Tunkhannock, Pa.
Frank Drake, Clinton, Iowa.
Hamilton E. Claflin, Hillsborough, N. H.
John S. Huestis, Crown Point, N. Y.
Robert MacNish, Peekskill, N. Y.
Wm. Haun, Lyons, Iowa.
John H. Kelsey, Lowell, Mass.
Walter F. Worth, Davenport, Iowa.
Ransom S. Sholes, Jr., Norwich, Conn.
Fredk. W. Herrich, Beverly, Mass.
Wm. H. Fox, Eau Claire, Wis.
Jas. D. Fellows, Belvidere, Ill.
Fred. A. Stebbins, Williamsburg. Mass.
T. Brainard Rouse, Colorado Springs, Col.
Chas. C. Howard, Mt. Vernon, N. Y.
Chas. W. Kreader, Tiffin, Ohio.
Christian B. Murhead, Portland, Ore.
Abiel H. Wordell, Fall River, Mass.
Geo. Holtz, Jersey City, N. J.
Aaron Serfass, Ashley, Pa.
Robt. W. A. Rodman, N. Y. City.
Bernard G. Dorscher, Charleston, S. C.
Gurdon Potter, N. Y. City.
Edw. M. Law, Fall River, Mass.
Edw. P. Fagan, Saybrook, Conn.
Hezekiah M. Clements, Liberty, N. Y.
Walter L Bell, New Rochelle, N. Y.
Wm. M. Mitchell, Springfield, O.
Chauncey R Morris, Falls Village, Conn.
Alfred E. Studley, Worcester, Mass.
Chas. E. Beardsley, Dunkirk, N. Y.
Geo. D. Herring, Yonkers, N. Y.
Harry D. Bertine, Mt. Vernon, N. Y.
Erneat C. Rosenthal, St. Louis, Mo.
Edw. J. Crowley, Ansonia, Conn.
Thos. H. Horwell, East Liverpool, Ohio.
John W. Onellett, Westbrook, Maine.
Jas. McConbrey, Green Island, N. Y.
Jas. D. M. Hall, Owego, N. Y.
Richard Evans, Lyndhurst, N. J.
Frank Schwarz, Corona, L. I.
Dan'l Merkel, Jr., Carlstadt, N. J.
Frank J. Hauser, N. Y. City.
John H. Demarest, Hackensack, N. J.
Irving G. Dimond, Penacook, N. H.
John Richards, Jr., Morrellville, Pa.
Robert Hoffmann, Milwaukee, Wis.
John V. Denise, Freehold, N. J.
Dennis F. Donovan, Bayonne, N. J.
Harry Wagner, Bayonne, N. J.
Irving Schondel, Highland Falls, N. Y.
Chas. G. Fisher, Catskill, N. Y.
Geo. S. Shumway, N. Y. City.
Charles F. Rudenauer, Wilkesbarre, Pa.
Albert K. Hood, Newport, N. H.
Benton R. Dibble. New Britain, Conn.
Alexander D. Perry, Belvidere, N. J.
Frederick Zulch, Norwich, Conn.
Alphonsus Cassidy, N. Y. City.
Ralph F. Putnam, Danvers, Mass.
Samuel E. Rights, Salem, N. C.
Otto A. Hotopp, Hoboken, N. J.
Chas. A. Babcock, Los Angeles, Cal.
Charles F. Kukuck, Hohokus, N. J.
Louis J. Schultz, Toledo, Ohio.
George. D. Adamson, St. Paul, Minn.
John Fox, New Britain, Conn.
John H Burkhard, Brooklyn.
Frank H. Higgins, Ithaca, N. Y.
Henry Whitehead, Los Angeles, Cal.
Levi V. Gillespie, Pine Bush, N. Y.
William B. Leavy, Bridgeport, Conn.
August Heimann, New Haven, Conn.
Geo. Everard Bauer, New York.
A. A. Gutfleisch, Lancaster, Pa.
Chas. W. Feeny, Paterson, N. J.
Edward D. West, Oberlin, Ohio.
Geo. Edgar, Hyde Park, N. Y.
James L. Kearney, Meriden, Miss.
Henry C. P. Eckhardt, Bethlehem, Pa.
Halcombe A. Fairchild, Riverside, Cal.
George Ruppell, N. Y. City.
Amos J. Reed, Pen Argyl, Pa.
Henry MacKrell, Paterson, N. J.
Henry Nazare Prunier, Burlington, Vt.
Ora D. Dutcher, Middlesex, N. Y.
Terence Riley, New Britain, Conn.
Chauncey S. Meeks, N. Y. City.
W. H. Griffith, Chicago, Ill.

Sheet-Metal Manufacturers and Machinery.

Manufacturers of sheet-metal machinery, tinners' tools, &c., have in general experienced a year's trade which has gone beyond their expectations. The demand for heavier metal-working machine tools is increasing so fast that many concerns have been forced to make large extensions of plant to meet the requirements of their customers. Some of the leaders in this line of manufacture have extended their business to double its capacity during the year. Competition is not noticeably greater. In fact, the consolidation of some of the larger makers of sheet-metal tools has, in a measure, decreased competition. But smaller makers of presses, dies, &c., have lately come to the fore, and have secured some of the local trade of the cities in which they are located. Nevertheless, we are told by a company operating in New York State that "business has increased more than double of what it was last year; and since the latter part of the year we have taken in so much work that we shall be busy until spring, even if we do not get another order."

Another large concern, in the same line of business, who have recently made great expansions of facilities, state: "All our departments have been well filled with orders during the year. The prospects are thoroughly good, and we expect to make further extensions."

TINNING MACHINERY.

Some business is now being done in the manufacture of tinning machinery; and this is likely to grow to be an important branch of trade as the American tin-plate industry progresses and the demand for improved methods of operating the tinning process becomes more urgent.

Can-makers' tools have not been in such request as usual this year, owing to partial failure of the fruit crop; but canners are calculating on a proportionate increase in business this year which will make up for past deficiencies.

SHEET-METAL WARES.

Manufacture of sheet metal goods has progressed steadily, with sharp competition to combat and prices down to a low ebb. For the general trade and jobbing interests the outlook is regarded as good, and no unusual developments are looked for.

From the Pacific Coast come complaints that Eastern competition is considerably keener.

THE TWO PAGE ANNOUNCEMENT of the Mason Regulator Company of Boston, Mass., illustrates and describes a number of devices of much interest to steam users. Among the goods noted are the Mason Reducing Valve, the Mason Pump Pressure Regulator, the Mason Pump Governor, the Mason Steam Damper Regulator, the Mason Balanced Valve, the Mason Elevator Pump Pressure Regulator, and many other devices as well. Illustrations are presented and descriptions, with table of sizes and price-lists, are given in many cases.

THE PROMINENT ANNOUNCEMENT of J. F. Pease Furnace Company, Syracuse, N. Y., contains interesting references to their heaters, cuts being shown of their Hot Water Heater, Combination Hot Water and Air Heater and the Steel Plate Warm Air Furnace. This company make three patterns of steam and air combinations; five patterns water and air combinations; one pattern hot water heater and eight patterns warm-air furnaces.

TIN PLATES.

The American Tin-Plate Industry.

Even a casual retrospect of the American tin-plate industry in its progress during 1892 cannot but convince the most skeptical of the fact that such an industry does exist in this country; that it has attained very respectable proportions, and moreover that its advance has been rapid and gratifying in each quarter of the past year. This has been most noticeable during the quarter ending September 30, the last one for which we have official returns.

The report of Col. Ira Ayer, Special Agent for the Treasury Department, which was printed in *The Metal Worker* of November 5—a report based on the sworn statements of manufacturers, and therefore presumably authoritative and reliable—showed very clearly the large stride made in the manufacture of tin and terne plates in the United States during that period, as compared with the corresponding quarter of 1891, as well as with the first two quarters of the year 1892. The output of American tin plates for the three months ending September 30, 1892, is given in the document in question as having reached a total of nearly 11,000,000 pounds, as against 827,000 pounds in the corresponding quarter of 1891.

ABSENCE OF MERE SPECULATION.

The comparative absence of mere speculative business in connection with the American tin-plate industry is a very healthy feature. The great majority of those concerns who have embarked in it are in it with the intention of staying. True, a few of the firms noted as producers of tin plates in Mr. Ayer's last list may be doing so merely in a tentative way—running a pot or two experimentally. But even these are solid firms, most of which may be counted upon to enter more extensively into the business so soon as they are fully assured of the ground they stand upon. Not more than two or three producing concerns at the most have dropped out or suspended operations during the year. These were probably such as had entered unadvisedly into the business, without sufficient capital or experience to warrant them in doing so. But, on the whole, as compared with what has usually been the case during the inauguration of other novel industries, the proportion of bogus or shallow concerns engaging in the tin-plate manufacture was surprisingly small. The great majority are not merely nominally producing American tin plates, but are doing so in fact and to a very considerable extent. They are pushing the business with vigor and determination.

STEADINESS OF ADVANCE IN THE MANUFACTURE.

Many concerns are extending their plants, and most of them are constantly increasing the number of their stacks—adding new and improved tinning machinery; and in every way showing that, so far as they are concerned, the tin plate manufacturing industry has come to stay in the United States.

That such is the general feeling and determination among producers is evidenced by the reports of the recent meeting of the Tinned Plate Manufacturers' Association at Pittsburgh. Their unanimous intention of pushing forward and taking no backward steps was there voiced with no uncertain sound, spite of the prospect looming in the distance of a reduction of duties by the new Administration and the presumable advantage accruing to foreign competitors.

PROSPECTS FOR THE FUTURE.

The development of the industry in this country may possibly—and naturally—receive a temporary check from the uncertain and unsettled feeling now abroad. Projected extensions of plant and new works which were contemplated will, in some instances, be postponed until such time as manufacturers feel they have more solid ground to go upon. We learn that this has been the case with two or three concerns who had contemplated a large outlay in the erection of tinning plants, but who have now delayed, or temporarily abandoned operations, waiting the outcome of future legislation.

Although we cannot expect the industry now under consideration to be fully grown within a year or so after its inauguration, we may expect that it will not take so long to establish as was the case before it reached its maturity on the other side of the water, considering the advantages gained from the experience of others with which we start.

In no field of endeavor is anything worth doing achieved without struggle and difficulty, and so our newest industry will undoubtedly have to root itself and flourish through checks and probable discouragements which resolution and patience alone can conquer.

And we believe these qualities are not wanting among those concerns who are now using their best efforts in this direction.

POSITION IN EASTERN MARKET.

As to the position of American tin plate in the Eastern market we gather that, while there is a fair inquiry for all kinds, the demand for the better grades of domestic tin and terne is on the increase. The representative of a large tin-plate firm, who are both manufacturers and importers, recently stated that numbers of their old customers, who were of the most conservative, have of late discarded the foreign material, which they had always considered as the only kind suitable for their purposes in favor of American made tin plates, after a trial of the latter. He added that this is the general experience; for "that when once a customer is induced to sample a box and test its merits, he almost invariably adopts the use of the native article in preference to the imported." Consumers would appear to be becoming alive to the fact that not a little of the Welsh tin plates now being shipped to this market are not up to their original and ostensible standard, nor to the standard attained by similar grades of home production. Most concerns manufacturing American tin plates to-day report that they find a ready market for all they can produce, even though they ask, in most cases, slightly higher prices than are quoted for imported material. Little or no stocks are piled up.

QUALITY OF AMERICAN TIN PLATES.

That the average American plate is of a high excellence is admitted even by foreign competitors. It is this high standard that will make it win its way, provided such standard is steadily maintained. For certain guaranteed brands of American roofing plates there is a steadily growing demand in the Eastern market, which it is said to be difficult to meet; and the same is noted for the best qualities of bright tin plates, which for certain manufacturing purposes are in considerable request.

It is true that a large proportion of the tin plates at present sold as "American," have been made from imported black sheets tinned in this country, but coming within the meaning of the act as native production. That proportion is, however, steadily diminishing. More black sheets are being rolled in this country monthly for tinning purposes, while, judging by the official list of concerns who are already putting up mills for this purpose, or who intend doing so shortly, it cannot be doubted that we shall eventually have an ample sufficiency of this staple to meet the requirements of all the tin-plate makers in the country. Little attention has as yet been paid to the production of the cheaper grades of plates, and in these the imported article still rules the market unassailed. These will, no doubt, come in time, and some little attempt has already been made in this direction in one or two quarters.

DEALERS' OPINIONS ON THE SITUATION.

The opinions of a leading tin-plate merchant in the East are worthy of repetition in this connection. The individual in question states it as his conviction that "the higher grades of American tin and terne plate, which form the bulk of the present home production, are better in quality than the corresponding grades of imported plates—they are more carefully finished and evenly coated and are altogether handsomer plates; but," he adds, "I question whether they can yet be sold at a profit to the manufacturer in those cases where the price is brought down to the equivalent of foreign plates. The plates certainly cost more to make than the imported plates cost. The workmen's wages are much higher here than on the other side of the water, and other expenses in connection with the manufacture are in proportion. The plates are more carefully prepared and at a larger expenditure of time and material, and consequently of money, than are the imported plates. Then the main items—the black sheets—are dearer to produce here than they are abroad. If, however, the present high standard of quality is consistently maintained in our American-made material consumers will in time be educated into using the home product even at a slightly increased cost, for it is well known that many of the foreign tin plates of the best reputation which have lately come to this country have not been up to the standard claimed.

ADOPTION OF AMERICAN MATERIAL.

"At present, however, a buyer does not care to pay an advance of 25 to 50 cents per box on American tin unless fully assured of its superiority over the imported

article. Patriotism is a good thing, but it seldom much affects a man when it gets down squarely to a question of the pocket. If you were to put two boxes of tin plates, one of native and the other of foreign make, before your customers, price and quality being guaranteed equal, the majority would probably take the American material, but there would be a considerable number of conservatives who would prefer to use the foreign brands they had known and tried before. It will take a little time for this prejudice to die out; but when prices are equalized—provided the home-made plates keep up to their present standard—there is no question but that the American tin plates will attain general adoption and eventually oust the foreigner from the market. Some of the black sheets now being rolled in this country for tinning purposes are really superior to those imported. The quality of the latter have, I think, deteriorated lately, while the home-rolled sheets are getting constantly better."

PROSPECTS OF MANUFACTURERS.

"I do not think any lasting check will be given to the manufacture of tin plate in this country. Unless an extra session of Congress is held and prompt measures of change inaugurated, which is extremely doubtful, no changes in tariff are likely to be made before 1894. Meanwhile the industry will be growing and strengthening, and it will then be better able to stand alone than is the case even now. The prospects of a removal of duties may result in a weeding out of any bogus concerns, and will probably quash any that may be projected on unsound bases, but the *bona fide* manufacturers who are in to stay will, I think, go right along; and I have no doubt means will be devised to reduce the cost of production. Plates for plates, I am of the opinion that better ones are being made in the United States to-day than are turned out from any Welsh works, judging, be it understood, from the samples of their production sent over to this country."

POSITION OF EASTERN AND WESTERN MAKERS.

Another well-informed merchant, who is considered a good authority, says: "It is sincerely to be hoped that any future legislation may not so far discourage the pioneers of the new industry as to cause them to take any backward movement, spite of their assurances to the contrary. But for the present it is impossible to foretell what effect a reversal of the protective policy under which it was fostered may have on this manufacture. The removal of the present restrictions on the importation of tin plates may render it advisable for the Eastern makers to call a temporary halt in production, or even to suspend altogether for a time. In any case they would naturally be inclined to proceed cautiously for a while; and this I presume will be the course of most of them until something definite is known. Western tin-plate works, however, should have no necessity to interrupt their progress. The advantages gained for foreign tin plates in a reduction of price consequent upon lessened or removed duties would in the Western territories, I think, be almost neutralized by the cost of freight. So that they could not probably be placed upon the local markets at much, if any, cheaper rate than the home-made plates. The possible freer admission of foreign tin plates should not, therefore, much affect makers in the western part of the continent."

SUMMARY OF SITUATION.

To sum up, at present there are some 35 or 36 firms actively engaged in making tin and terne plates in the United States, while others are well forward in their preparations for commencing this industry—some of them independently, and others in connection with rolling mills or other works. Some of the new tinning establishments are among the largest and finest in the world, two or three of them, indeed, are said to be unexcelled by any in the Old World, with an estimated capacity of from 8000 to 15,000 boxes a week each. Tinning pots are being put in operation in all parts of the country, and the supply of native-rolled black sheets is increasing. As for labor, it has been proved that our own supply, in the shape of American youth, is quite sufficient, with brief tuition, to run all the possible tinning establishments likely to needed in this country. We'sh labor is not a necessity, for many works in the United States to-day are running successfully and even advantageously, independently of such help. There is nothing occult about the process of dipping and coating tin plates, and no secrets which cannot be mastered by the average intelligence. The raw material is, or will be, all at hand, with the exception of the pig tin. But that is a comparatively unimportant part of the manufacture, comprising but some 4 per cent. of the material in a bright tin plate, with less in terne. Besides, this metal can be obtained from the Straits and Australia as cheap as it can be delivered in the British market.

Taking all these conditions into consideration, and weighing the two sides fairly, we must put faith in the ultimate secure establishment and success of the native tin-plate manufacturing industry. Our esteemed sage, Mr. Josh Billings, advises against prophesying unless one knows. But we believe the prediction above expressed is warranted, although no one can really speak with absolute certainty on this question just now, as we are ignorant of the precise conditions under which manufacturers will find themselves—say in 12 or 18 months' time.

Speaking generally, it is difficult to look upon the much-discussed "Tin Plate Question" from a point of view entirely unclouded by political predilections. But we have tried to give herewith an impression of the situation as it appears from an unbiased standpoint, drawing our inferences from reports received and from the expressed opinions of competent authorities in the trade.

TIN PLATE.—IV.

Tinning and Cleaning Machinery.

The Rogers Tinning Pot.—Rogers' machine, Figs. 37 and 38, is a much more elaborate affair. It consists of a flux box, C, and grease box, B, fitted to the top of the tinning pot. The plates are fed on to the cradle H, clipped by the spring nippers D, dragged down into the coating metal and directed through the finishing rollers. On emerging from the top pair of these they are seized by the fingers N and automatically transferred to the revolving rack E, standing in front of the tin set. The bars carrying the clips D run at their lower ends in guides and they are given an up and down motion by side levers operated by a crank, F, the levers being balanced at their longer ends by weights. The plate to be coated is passed through the flux box between the guide plates G and caught by the spring clips. It is carried by the clips down into the molten metal, and is caused, by the bars of the cradle H bearing against it, to assume a vertical position, so that when it is afterward raised its top edge will be guided by the ribs M and the guide box I into the finishing rolls. The rack E consists of a pair of cast-iron bosses covered with a sheet of india rubber to prevent injury to the plates as they are dropped, and carrying a series of radial arms, between which the plate may be placed by the pick-up gear. At the moment when the pick-up gear is dropping a plate the rack is stationary, and a mechanical appliance causes it to revolve intermittently. By this means the plates are kept on edge, and separated, until they have cooled enough to be removed to the scouring machines without damage.

The machine is well designed and works with a surprising smoothness and precision. Of all other machines it has the advantage of least parts moving in the molten metal. By its use the wages of the washman and riser are saved, and the plates have simply to be fed one by one by a careful attendant. The output of IC 14 x 20 is about 80 boxes in the day of 24 hours.

Rogers also has a machine for coating large quantities of plates by means of a rack traveling continuously through a long metal pot. The plates, placed one by one in the rack, are dragged through a flux box and immersed edgeways and longitudinally in the coating metal for a greater or less time, depending on the quality of plate desired and the speed of the traveling rack. The rack delivers the plates into a receiving rack, from which they can be taken one by one and passed through the grease finishing pot. By this arrangement a given amount of labor will coat a very large quantity of plates; the weight of tin in the bath is small in relation to the output, and a uniformity of speed obtained in the movements insures a perfect uniformity of coating.

The above machines embrace all those which are typical of what may be called the vertical pot. The half round pot, by which the plates are dipped with a circular motion into a basin shaped vessel, has also met with considerable success. Such a form does away with a cradle and a similar gear rocking in the metal. On the other hand, it has the disadvantages that feeding rollers moving in the metal have to be provided, and these lick up a certain amount of tin, which is lost; there is a larger surface of palm oil open to evaporation; there is usually more than one firing grate necessary, and, finally, there is perhaps a slight tendency to coat more on one side than the other.

The best known machine of this type is probably that of Daniel Edwards, of which Fig. 39 is a diagrammatic view. In the tinning pot are several guides forming a rack, in which three plates at a time may be immersed in the metal. The plates are forced with the tongs into the nip of two pairs of rollers immersed in the flux box (the rollers being worked by intermediate gearing and worm and worm wheel), from which they are withdrawn, and forced under an arched guide into the nip of a pair of rollers immersed in a third vessel containing coating metal, and from thence up through the finishing rollers in the grease pot. The machine has an output of from 80 to 100 boxes in 24 hours, and the wages of a washman are saved.

R. B. Thomas' machine is very similar in idea, as indeed are a number of others. For ternes a very large number of simpler machines are in use, consisting of a half-round pot with one pair of exit rollers.

The Thomas Tinning Pot.—To complete this subject one other machine of this type is shown in Figs. 40 and 41. It is that of John G. Thomas, and is of such a form as to surmount many of the objections enumerated above. The grease pot is connected with the metal pot by a narrow gate or neck into and from which the plates are guided by rollers in the usual way. The difference in temperature of the two pots may easily be maintained as the connecting neck is so small. In the middle of the guides C which conduct the plates through the flux to the first pair of rollers are a pair of asbestos brushes set at an angle so as to clean the surface of the sheet of any

scruff or dross that may be adhering to it. The rollers are so arranged in bearings as to admit of their being adjusted and closed when required, and they are held together with arrangements of spring levers. Each roller is provided with a scraper, the position of which is regulated by rods passing in this country for a labor cost of from $1 to $1.50 per 100 boxes.

It is not unusual to find that the plates, after a preliminary scouring by hand, are passed by india rubber feed rollers between pairs of rollers covered with sheepskin and revolving at a high speed, a method which table at the moment of passing over a third drum. The action is illustrated by the diagram, Fig. 42. By this method, as will be seen, the plate is not plunged immediately into the bran, but in its passage has time to cool and harden, and it is turned completely over between the first and sec-

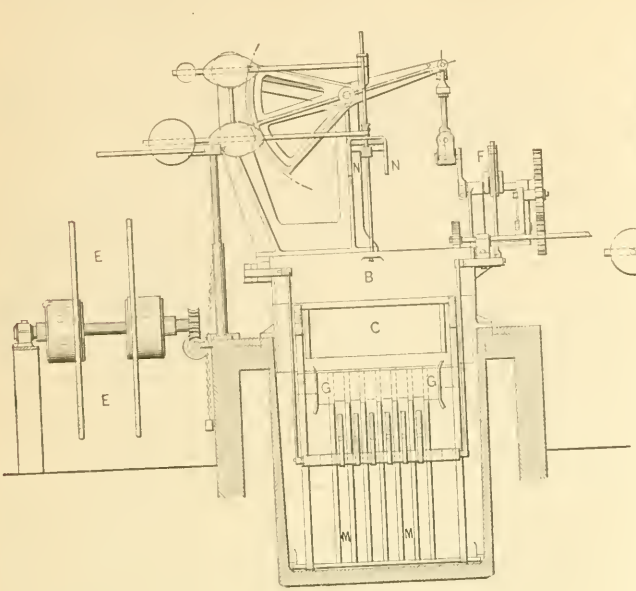


Fig. 37.

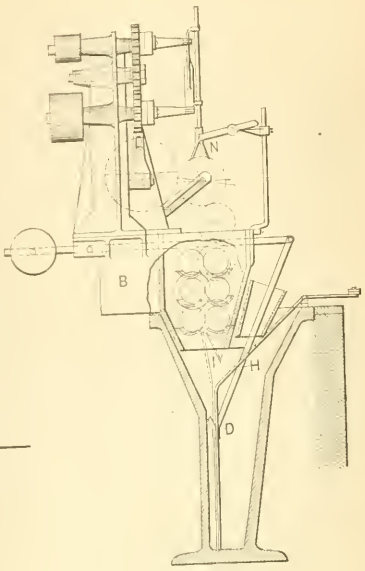


Fig. 38.

THE ROGERS TINNING POT.

to the top of the pots. The scruff which may collect on the top of the outgoing guide P may be removed by a scraper, R, shown in both views. At the surface of the metal, and where the grease rests upon it, are a pair of scruff doors, O, which practically inclose the guide P and retain the floating dross. The sweeping motion is given to these doors by connecting them with rods to the framing L. The levers shown have fingers which are acted upon by tappets fixed to the sliding bar B, and the doors are kept in their normal position, shut, by the spring Q.

Whatever machine is used, in order to keep the labor cost at the lowest possible point, arrangements should be made to deliver the plates one by one as they leave the finishing rolls on to a traveling endless belt or upright rack by which they may be carried to the scouring machines. Such a contrivance, though by no means generally used, will present no mechanical difficulties.

The oxide and scruff that is removed from the surface of the metal and grease from time to time is collected and melted in a cast-iron pot, the fining being done in the usual way with stirrers and chips of oak. Although ferruginous and not good in color, the ingots obtained may be used for ternes or the first coating pot. Zinc or other valuable elements in the flux are not usually recovered.

Cleaning and Dusting.—It is unnecessary to describe the well-known operations by which the plates are freed from grease and polished with bran and sharps and sheepskins, but it may be remarked that the appearance of the plate is not at all an unimportant matter to the seller and this department should receive much attention. When cleaned by hand, it is done gives a polish much superior to that obtained by hand and frees the plate of dust. Such dusting machines are commonly used. But scouring machines are not used to the same extent.

The Thomas Machine.—Thomas' machine may be described as follows: The plates, as they are removed from the grease ond bran boxes in such a way as to insure the proper cleaning of both sides. The cant given the plate in leaving the bran causes little of the latter to be carried away and wasted. The whole machine may be mounted on a wooden frame, inclosed on the sides, and it works with great precision.

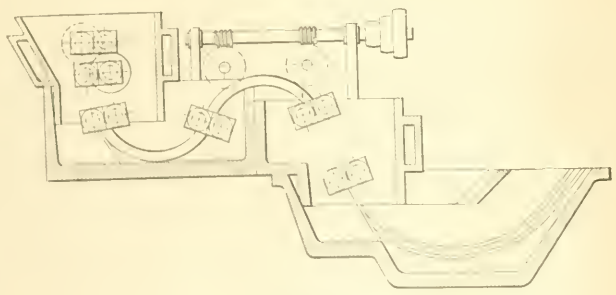


Fig. 39.

THE EDWARDS TINNING POT.

finishing rollers, are placed one by one on a fixed inclined cradle, from which they are taken immediately by fingers attached to an endless chain band traveling in a horizontal direction into the first bran box. The chain is turned over a drum in this box and travels again horizontally toward the second bran box, over another drum toward the far end of the machine, and the plate is dropped by gravity upon a

The Abbott Machine.—Abbott's machine consists of a pair of drums revolving in opposite directions in semicircular boshes and mounted with parallel axes sufficiently near to each other to allow the cradles or fingers on the periphery of the first drum to engage with those of the second. The plate from the tinning pot is placed as before on an upright inclined cradle and automatically released at the

proper moment so as to drop into the slow-traveling fingers of the first drum, which seize it across the edges with a claw-like action and drag it edgeways around the bottom of the semicircular bran tub. At half a revolution the claws disengage and those of the second drum, traveling in the opposite direction, carry the plate through the second branning, the upper side of course now being underneath. The distinct advantage of this machine is that the plates are held edgeways throughout and cannot be injured. On the other hand, the fingers require very nice adjustment, and too often foul the plates in the most disastrous way. There are a considerable number in use, but machines requiring such absolute mechanism cannot be considered satisfactory.

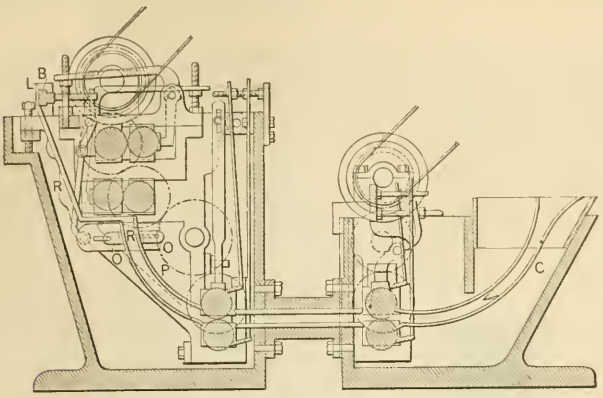


Fig. 40

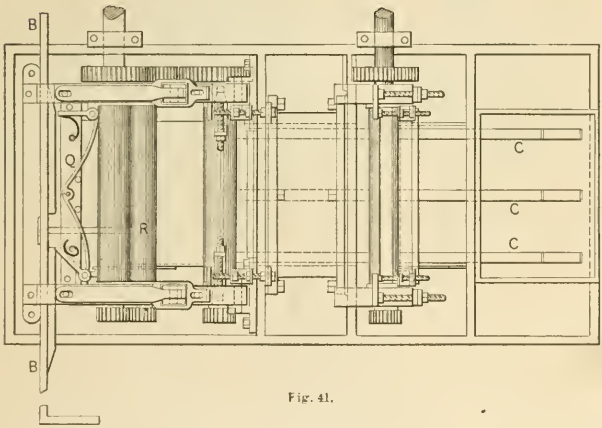


Fig. 41.

THE THOMAS TINNING POT.

The Hopkins Machine.—The claws in Abbott's machine are done away with in that of Hopkins', Figs. 43 and 44, which is otherwise very similar in idea, namely, fingers traveling in a semicircular bran tub, save that the second tub is entirely omitted. In this machine the plate A is placed by the riser in the box B, which has doors, E and F, opened periodically by tappets, C, acting on the lever D, Fig. 44. A drum revolving in bran has four nippers, G, opened and closed at the proper times by the ring cam H, through the rods I. The plate drops at the proper moment into the open clip, is taken through the bran and is released at such an angle as to slide quietly down the table leading to the finishing rollers. These consist of alternate pairs of feed rollers covered with india rubber and sheepskin rollers, the last pair of the latter being cleaned by flying rollers running in the opposite direction.

The Rogers and Player Machine.—Large as is the saving of labor and material in such machines, they have a natura tendency to clean in streaks as the wool rollers wear, and it goes without saying that the best results will be obtained by a machine giving in addition a reciprocating motion. Figs. 45, 46 and 47 give side and end elevations and plan of the Rogers and Player machine, which has such motions. In these figures, C C, &c., are pairs of feed rollers to carry the plate from right to left, and they are driven by the gearing shown in Fig. 46. Upon the frames L L, and parallel to them are mounted pairs of reciprocating frames moving on rollers, M M, and actuated by two pairs of eccentrics on the first motion shaft. The bran troughs B, the dusters D and the brushes C being mounted on the reciprocators, share in the motion, which, as between the upper and lower, should be in opposite directions, and the bran troughs B B are divided horizontally so that the plate passes throughthe descending stream of bran. The upper halves of the troughs have brushes, *n*, on their exit side to prevent an excess of bran being carried off. The lower halves have also brushes inclined at an angle to hold the plates up against the top weight of bran. The three pairs of dusters D are covered with sheepskin, and though free to revolve they have no positive motion except a rhythmical step-by-step motion by ratchets and pawls (not shown), in order to prevent the sheepskin wearing into flats. The bottom dusters move in the same direction as the plates and the top dusters in the opposite direction. The bran escapes from the troughs into the hopper K, and is circulated by the traveler H and elevator F.

The finished plates are delivered on to the table X. The inventors of the machine claim that "the reciprocating motion of the bran troughs and dusters in opposite directions and transverse to the travel of the plates through the machine, while thoroughly cleaning the plates, offers such slight resistance to their passage that the finest gauges are operated on without damage, as there is nothing to interfere with the action of the bran, all the grease is removed before they come to the dusters, and they are finished free from scratches and buckles."

The cost of cleaning and dusting by machine, with an allowance for motive power and interest on $800, is no more than 60 cents per 100 boxes, labor being confined to one man at $2 per day. This, like many other departments, may perhaps be suitably let by contract to a responsible man, who, if he were paid 35 cents per 100 boxes on the output of a four-mill plant, should make a very good thing of it. There is no doubt about the economy effected by machine dusting.

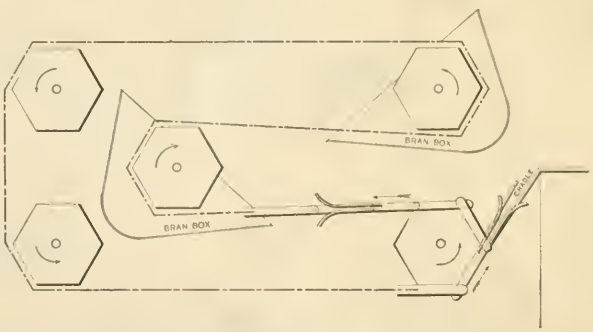
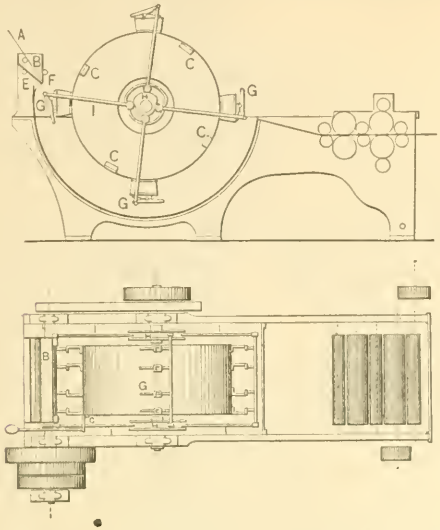


Fig. 42.—THE THOMAS CLEANING AND POLISHING MACHINE.

Among recently authorized corporations in Illinois are the following: The United States Stoker & Anti Clinker Grate Bar Company, Chicago; capital stock, $1,000,000; incorporators, Charles E. Bean, Fred. S. Bean, Watson Ryder and Frank W. Blair. Charles Kaestner &

Co., Chicago; capital stock, $300,000; for the manufacture of machinery; incorporators, Charles Kaestner, Robert L. Tatham and Timothy F. Mullen. Chicago Facing Mills, Chicago; capital stock, $50,000; incorporators, Samuel J. Sloan,



Figs 43 and 44.—THE HOPKINS CLEANING MACHINE.

Carroll B. Kinsey and Arthur F. Leslie. The Snow Windmill Company, Batavia; capital stock, $50,000; incorporators, Franklin L. Chase, Joseph W. Eliel and W. C. Hawley. The Caloric Furnace Company, Chicago; capital stock, $500,000; incorporators, Charles K. Pickles, E. J. Stannus and Aug. Borlinghaus. The Dealers' Steel Fence Company, East St. Louis; capital stock, $300,000.

Miscellaneous.

Lying outside the immediate circle of the leading trades, to whose interests *The Metal Worker* is more particularly devoted, are a number of different industries, the products of which are used by those trades, or which are themselves in some way brought into relationship with them. From representatives of these various industries, who we count among the supporters of this journal, we have received reports in relation to their business which will be of interest to many of our readers. It will be noticed by a glance at the following notes that it has been almost uniformly the experience of the different concerns that business has been brisk, but profits either stationary or less in margin, owing to the excessive competition which appears to exist in all lines of manufacture:

ELEVATORS.

Elevator builders in New York, Philadelphia and Chicago apprise us of rather larger business during the last 12 months, but without corresponding profit on sales. The competition in this branch of construction is stated to be very keen, involving so material a reduction of prices as to leave but the minimum of gain to makers. Improvements in action and construction are noted, which bring these appliances up to a very high standard of excellence. The increased adoption of lofty buildings in most of our large cities has called for a larger supply of elevators, and orders steadily grow in volume.

SPEAKING TUBES.

A maker of speaking tubes and electrical supplies, in one of the Eastern States, gives similar testimony to the above as to competition. Although the quality of goods is constantly being improved, and a good and growing demand exists for these specialties, the prices are cut so fine that the margin of profit has been less than in former years, and tends to decrease still further. For volume of business the outlook is considered very good.

PORTABLE FORGES.

An Eastern manufacturer of portable forges speaks of much greater bulk of business, with but the same net profit in dollars and cents as in 1891. He places the shrinkage in gains on individual sales at 10 per cent. The expectation is expressed of doubling his output this year, owing to increased facilities.

NICKEL PLATERS' SUPPLIES.

Increased competition again comes to the fore, in the report of a prominent firm, making a specialty of nickel platers' supplies. The margin of profit is said to have been much less, and, although far more business was taken than in 1891, the net gain was but a trifle larger. The concern in question writes as follows regarding competition in this line of business: "Small houses, without adequate means, and obliged to borrow to meet obligations, sell at a loss, giving a downward tendency to trade. Also the well known fact that some houses pay a commission to purchasing agents, and pay the workmen, makes it harder each year for those who are opposed to such practices." As to prospects for 1893, it is noted that: "From

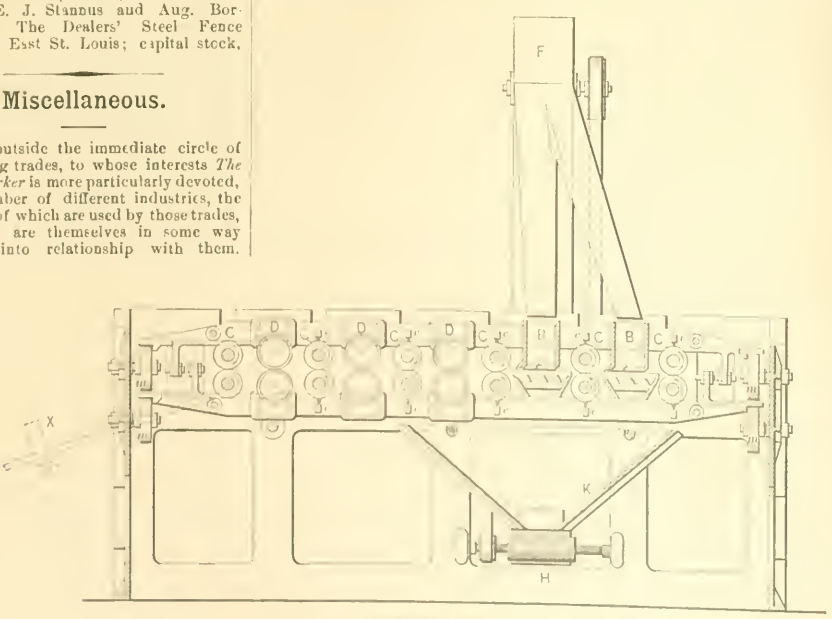


Fig 45. Elevation.

THE ROGERS AND PLAYER CLEANING MACHINE.

reports of customers, and orders received, it does not promise to open as briskly as last year, although trade is continuing to be pretty active up to the end of this year. We have not as many orders as usual for deliveries after January 1." Raw material is reported to have been delivered in a purer and better state, tending to improve manufacture, and decrease in cost has been secured by the adoption of better machinery.

HOLLOW WARE.

Hollow ware manufacturers give an estimate of 10 per cent. increase in total sales, but no corresponding advance in net profits. Prison competition is said to be a leading cause of the drop in prices. Makers of this line of goods are reported as booking orders ahead at little or no profit in order to make sales.

GRAPHITE.

Stress of competition and consequent low prices are experienced also in the line of graphite products. A concern engaged in this business notify us as follows: "We have been obliged to improve our appliances, buy goods cheaper, discount our bills as much as possible and economize in that direction so as not to reduce wages." Volume of business is reported as largely increased during the past year, and prospects are regarded as good for the present year.

MICA.

Manufacturers of mica goods report very largely augmented business for 1892. The cost and scarcity of raw material has, however, caused a contraction of the margin of profit.

PAINTS AND CEMENTS.

From a leading manufacturer of paints and cements, in this State, we receive the following information in regard to his business of last year: "Business in general has been as good as for several previous years, and, although collections have been slow in some sections, the general result has been satisfactory. Competition has been of a more healthy tone than for some years past, as producers and manufacturers find it to their best interests not to sacrifice reputation and quality by competing with houses of mushroom character, whose cry is that they sell the cheapest goods in the market. Buyers, as well as consumers, are looking more closely into qualities, as well as price. My business has been more profitable this year, from two circumstances—viz., increased demand for my goods, and large purchases of material which I was able to make for cash, although my standard of quotations has remained as high as formerly. The prospects for the ensuing year are very flattering." Another firm, engaged in similar business in a neighboring State, apprise us that 1892 yielded to them a larger volume of sales than any year since 1862. They complain, nevertheless, of great and growing competition, with annually increasing expenses, which reduces their profit on sales very much. No improvement is anticipated in these respects during 1893.

VARNISH AND JAPAN.

A concern manufacturing varnish and japan in one of the Western States announces considerably greater trade, but with less profit, owing to sharper competition.

STOVE POLISH.

We hear from Eastern producers of stove polish of 50 per cent. increase in sales, and a steady growth of business during 1892. At the same time competition is stated to have increased 100 per cent., causing a reduction of profit on sales. The outlook in this trade is regarded as bright.

ENAMEL.

From a western iron enamel company news is to hand of 20 per cent. larger volume of business done last year than ever before, with unchanged conditions as regards competition and profit. A tendency to cheapen goods in this line is noted, making it a hard fight to maintain prices and augment sales of staple productions.

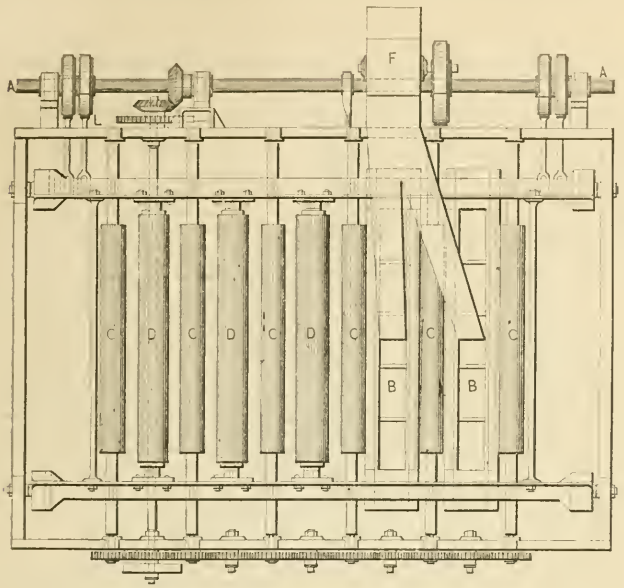


Fig. 46.—Plan.

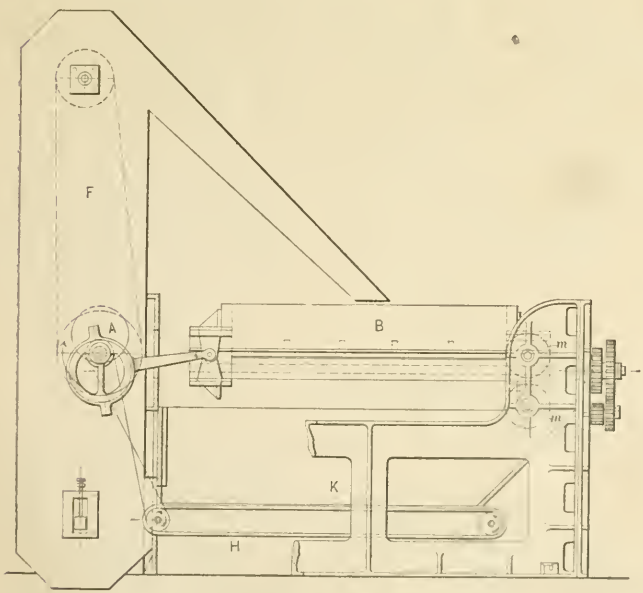


Fig. 47.—Side Elevation.

Figs. 46 and 47.—THE ROGERS AND PLAYER CLEANING MACHINE.

Price-Lists, Circulars, &c.

THE ST. JOSEPH PUMP COMPANY, St. Joseph, Mo.: The Perfection Water Elevator and Purifying Pumps. In their catalogue No. 5, 1893 descriptions and illustrations of the Pumps are given, also reasons why dealers should handle the Perfection Pump The aim in presenting the catalogue is not only to acquaint the trade with this style of pump, but to present to the public the facts showing the necessity of using pure water and how to obtain it.

E. C. MEACHAM ARMS COMPANY, St. Louis, Mo.: Catalogue No. 524, to dealers only. Illustrations are shown of Guns, Rifles, loaded Shells, Traps, Hunting Coats, Gun Implements, Bicycles Roller Skates, Tents, Foot Ball Goods, Cartridges, Revolvers, &c.

STOVE TRADE NOTES.

The Stove Trade.

IN ESTIMATING the progress and results of the stove trade during 1892 it can unhesitatingly be said that they have, generally speaking, fully realized the favorable opinion as to its prospects formed at the opening of the year by the majority of stove men, and expressed in *The Metal Worker* at that time.

With the exception of some sections of the South, we have received excellent reports of the volume of business done last year, compared with previous seasons. With one voice Western manufacturers acknowledge having passed through an exceptionally successful campaign. Eastern stove men, with but few exceptions, testify to increased sales and a gratifying growth of business, varying from 5 to 75 per cent. over that of 1891, while expectations are entertained that 1893 will yield results at least equal, if they do not exceed, those of the past year. And, although the majority of reports from Southern stove men do not present as satisfactory a picture of the trade in their neighborhoods as could be desired, yet, even from thence comes intelligence of a decided improvement in general business conditions now setting in, which conveys hope and expectation for something better in the near future. We hear, furthermore, few or no complaints in regard to collections. On the contrary, the evidence received tends to show that in most territories collections have been unusually easy during the year.

Higher Qualities of Goods.

The growing demand for the better class of goods and specialties, as against cheaper articles, is a healthy sign, which gives assurance that the public are becoming alive to the advantages of good workmanship and materials and are willing to pay for them. A correspondent in the West writes to us on this subject to the following effect:

If the stove manufacturer could only be made to realize that his business was more like the coffin business, it would undoubtedly increase his profits. That is to say, like coffins, a stove will not be bought until necessity compels the purchase, and two stoves will never be bought simply because the price is reduced, when only one is wanted.

This, we think, puts the case in a nutshell. If manufacturers, taking hold of the present opportunity, where a large and growing demand for higher grade, and, consequently, higher-priced goods, undoubtedly exists, would take advantage of the conditions and adjust their prices to a profit-paying basis proportionate to the improvement in quality of their productions, a much more healthy and satisfactory condition of things would unquestionably result.

As it is now the makers of high class stoves, who lose no opportunity of improving their goods, find the cost of production seriously augmented by disbursements for new patterns, more expensive trimmings and increased cost of labor, without, in most cases, any corresponding gain in higher prices. The margin of profit is, therefore, worn down almost to the vanishing point. This is a serious consideration with many stove men, and one that will have to be adjusted before long, for all concerns cannot expect to do such an immensely increased volume of business, as is now imperatively necessary if a fair and legitimate percentage of gain on capital invested is to be obtained.

Increase of Business.

A moderate estimate of the average of increase in volume of business and in output from foundries during the past year places the amount at from 10 to 15 per cent., taking the Eastern manufacturers as the standard. Western concerns show a volume which is nearly as much in excess of this figure as that of the Southern trade falls below it. But even taking the lesser amount, which is about on a par with last year's results (and the balance of opinion is that 1892 has decidedly overstepped its predecessor), the trade is to be congratulated upon a good and healthy year's business, which on the whole leaves little or no cause for complaint, except in the South. We do not, however, lose sight of the fact that with the increase of business other factors have kept step, which prevent manufacturers from realizing as satisfactory profits from their sales as was formerly the case. Competition is, if possible, keener than ever, and prices have been in some quarters so reduced as to leave a very small margin of profit to the maker. That margin is being steadily reduced, so that a very considerable and constant augmentation in the volume of sales is necessary to maintain the same net profit as was secured on a much smaller output but a few years ago.

One circumstance has specially helped the stove manufacturer by reducing the cost of production. The very low prices of iron which have ruled for some months enabled those who had been cautious in their purchases of pig metal in the early part of the year to obtain it at a very cheap rate later in the season. This advantage is one which will have tended toward a better showing on the balance sheets of foundries than would otherwise have been the case; but it has been to a certain extent discounted by an increase in the price of labor, as well as some rise in foundry supplies.

The Fall Trade.

The backwardness of the season caused the fall trade to be a good deal later in beginning, but when it did take a start business was extremely brisk. So much so that many foundries East and West were soon entirely sold out, and became unable to fill the orders which crowded in, and which far exceeded their expectations. Orders for forward deliveries, too, were carried a good deal further ahead than usual. Many dealers who had hitherto generally placed them for August, September or October deferred the date of delivery a month or two months later. The orders received by foundries were, as a rule, for smaller lots than heretofore, but these orders were more frequently recurring, showing that dealers were disinclined to carry large stocks, but supplied themselves with only sufficient goods for current demand. This hand to-mouth method of purchasing is becoming more generally adopted in the trade, in spite of the inconvenience it occasions to the manufacturer.

Maintenance of Prices.

Prices have been fairly well maintained, particularly for high-class goods. The cutting has been confined generally to the cheaper lines of stoves, and to those of old pattern, of which the makers were anxious to rid themselves at any figure. But with the larger makers, and for standard goods, prices have been kept firmer, on the whole, than usual. The better understanding between stove makers, nourished by such conferences of stove foundrymen as have taken place in New England and Eastern Pennsylvania, &c., have tended to the steady maintenance of prices by many, especially of the larger manufacturers. This understanding has also mitigated the keenness of competition in more than one quarter, and rendered it less of a "tooth-and-nail" scrimmage, and more of a natural, business-like rivalry.

The "original sin" of the stove man—improvident sales and low prices—is not yet, however, eradicated. Some concerns still have a mania for making sales at any price, without calculating the cost, and these are the "demoralizers" of the trade. The large majority however are, we believe, well impressed with the necessity of maintaining fair prices, and are resolved to do so while giving good work in exchange. Nearly all concerns speak of improvements, of one kind or another, in plant or goods, which have been effected during the year. The enlargement of foundry capacity in growing and thriving works and the addition of new patterns and machinery are necessary conditions to those concerns who would be abreast of the times. There is little "unearned increment" in the stove business now-a-days. The "live" and "bustling" concerns are those which show the best results when books are balanced; and such is evidently the condition under which success is to be obtained in the stove business in common with most other branches of trade in the future.

Prospects.

From several quarters, both East and West, it is reported that stocks now on the customers' hands are less than ever before, and the demand for stoves is steadily increasing. The same appears to be the case pretty generally throughout the country in which building is going on and in prospect. Good business, accordingly, is looked upon as well assured for, at any rate, the earlier portion of the year, but opinions differ materially as to the outlook for the year 1893 in general. Many hold that prospects of changes in fiscal policy of the new Administration will tend to disturb trade generally, and so, more or less directly, affect the stove business. But the balance of opinion—notably in the West and South—inclines to more favorable conclusions. On the whole, it would seem, that indications point to 1893 as likely to be, at least, as prosperous a year for the stove trade as has been the year through which we have just passed, while

for the Southern branch of it there is every prospect of a decided return of prosperity, with the better financial conditions now developing in that quarter. Should 1893 prove to be as good a year for stove men, take them all round, as was 1892, we see as good reason to congratulate the trade on the outlook as we now do on the results achieved in the past year.

The brief summaries of reports and extracts from letters which we present below will give our readers an intelligent idea of the present situation of the stove trade in different sections of the country.

New England.

MAINE.

From the State of Maine we have reports of a larger volume of business done, with unchanged margin of profit. Competition sharp. The outlook for the present year regarded as promising.

CONNECTICUT.

Connecticut manufacturers write of larger sales than in any previous year, notwithstanding increasing competition. Expenses enhanced in order to compass the same business as formerly done. Similar news reaches us from New Hampshire.

MASSACHUSETTS.

From Boston and vicinity come tidings of increased business, variously estimated at from 5 to 25 per cent. Competition stronger than ever, and profits tending to decrease in margin. General improvements have been made in goods and appliances, showing, collectively, a distinct step in advance of last year. An old-established stove foundry company write, under date December 22, as follows: "Our business compares very favorably with last year. We never knew such good prospects. Have sold, up to the present, all the ranges it was possible to put together with our force. In the parlor stove line the warm season operated disadvantageously, leaving more of that stock on hand than usual. But, on the whole, business has been very satisfactory. Wish we could be confident of its continuation." Several young concerns report great encouragement from the year's results.

RHODE ISLAND.

A correspondent states business to October 1 to have been much larger than for some years, but a drop in the fall trade, attributable to the mild season, somewhat discounted the earlier gains. A good year is forecast for 1893.

Middle States.

NEW YORK.

In New York City the stove trade has held its own, and more. Though makers generally do not speak of very large increase of sales, a steady and moderate gain on conservative lines has ruled. Competition has been keen. A year of good business in stoves is looked for in 1893, provided cholera or other unforeseen impediments to general business do not intervene.

From a number of stove manufacturers throughout the state, we learn that the volume of business has increased in nearly every case; although competition is steadily increasing and profits becoming proportionately lower. The increase in sales for the past year is variously estimated at from 5 to 40 per cent. Prospects for this year are regarded as excellent. A leading firm from the northern part of the State advise us as follows: "The heating trade in general has been very satisfactory to the manufacturers this year, and we see no reason for any change in the coming season. Our business has been subjected to a healthy increase every year since we started." The representative of a prominent stove factory in a neighboring city reports business as "25 per cent. greater than in any previous year, although competition was sharper on both prices and terms and margin of profit less. We consider the prospect as good, stock in customers' hands being smaller than usual."

A Hudson River concern tells of trade which was double that of any season for the last seven or eight years, and difficulty in supplying their customers' wants. Business "booming" and competition not felt. Collections are reported as good.

EASTERN PENNSYLVANIA.

From a large number of Philadelphia, Reading and Schuylkill Valley foundries we receive cheerful reports of the condition of the stove trade in that section. Although a few speak of stationary business, the large majority mentioned sales showing a considerable advance on 1891—5, 10 and even 25 per cent gain is specified, the last figures being given by one of the largest concerns in Eastern Pennsylvania. The press of orders toward the close of the year was beyond even the capacity of some of the largest producers. A Philadelphia firm of long standing mention a larger business than in any previous year. Since October 1 they have been, for the first time, behind their orders. The same tale is told by one of the most prominent concerns in the Schuylkill Valley. "Our orders," say they, "were ahead of our capacity; hence we lost some trade that was offered us. Competition did not touch us. Although some parties were offering at cut prices, legitimate business was, on the whole, but little interfered with. Margin of profit is probably a little better than last year, owing to lower prices for iron. Outlook for 1893 is promising, as the trade we visit appear to have cleaned out their stocks pretty well."

Collections are, by some, said to have been a little slower; but, aside from that, business is healthy. Some authorities, however, do not take an altogether favorable view of the outlook. A Philadelphia manufacturer, standing high in the trade, gives it as his opinion that "buying will be done in a very conservative manner, although I do not think prices will be lower. Uncertainty as to legislation will, I presume, keep buyers from anticipating their wants, causing them to purchase only for current needs."

Considerable extensions of facilities have been carried out in various quarters, with general improvement in manufacture.

Southern States.

MARYLAND.

Those of our Baltimore correspondents whose trade is generally confined to their own neighborhood report an unusually gratifying season. Local sales have uniformly exceeded those negotiated for some years past. This is accounted for by the great impetus given to industrial enterprises and municipal improvements in the city during the past year. A large amount of Northern capital has been invested in manufacturing ventures in and around Baltimore, and building operations have been exceptionally active, giving an upward tendency to trade of all kinds. A continuance of this improvement is considered assured during the year now begun.

One of the leading stove companies intimate an increase of one-third in the volume of their business for 1892, with very encouraging prospects before them this year. They add: "From our personal knowledge we do not see that any stove manufacturers have cause for complaint, as we know orders could not be filled, and every foundry seemed to be sold out."

On the other hand, those concerns who trade mainly with the more southerly States are not able to speak of favorable experiences during the past season, although generally hopeful of better results in this year. One of the firms who stand in this position write: "The business for 1892 will be fully 15 per cent. less than that of 1891, and 10 per cent. less than in 1890, owing to the extreme dullness of trade in the South."

SOUTHERN FOUNDRIES.

Business done by Southern stove men in 1892 has been even less than that of the previous year, which was by no means a brilliant one. "Hope springs eternal in the human breast," however; and our reports, although generally of a somber nature as to late achievements, take a much more cheerful view in regard to future prospects. The amelioration of existing conditions is thought to be guaranteed this year by the better state of the cotton market and improved feeling in iron. Recovery from the disastrous effects of wild land speculation in Virginia is taking place, and a much healthier tone prevails generally than has been the case for some time past. The sentiments of stove men as to the outlook in various sections of the South are expressed in the following terms: "We expect one of the best years we have ever had." "We can see a splendid year's business looming up." "Prospects very favorable." "A good year's business promising." "We look for certain increase of trade this year," &c. But even in the South all have not been equally unfortunate, for from one concern we are advised that the volume of orders since November 1 has been so large as almost to counterbalance the slackness of the rest of the year.

TENNESSEE.

Leading manufacturers in the State report generally a shrinkage in the volume of orders during the year, owing to dullness of trade and lack of money. Competition keen for such business as was about, and profit smaller than ever, on account of the necessity of making material concessions to effect sales. More confidence, however, now prevails, and the outlook is favorable.

KENTUCKY.

Stove foundrymen in Kentucky give poor accounts of the trade up to within a month or two of the end of the year. Competition was unusually severe, and improvident sales by some parties had demoralized legitimate business. Things were looking much healthier in this district, however, by last accounts.

Western States.

OHIO.

A "banner year" is announced by one company in Cleveland as the result of last year's sales. The business in December exceeded that of November, which was an unprecedented occurrence. Competition in the cheaper grades of goods is noticed to be greater, but in the higher class it has been less keen.

Competition has been less felt in Cincinnati, as all producers have had as much business as they could manage. The expectation in that city is for a good, healthy business of fair proportions during the year now opening.

Reports of varying tone as to future prospects come in from a round dozen of towns in Ohio. All, however, agree as to the satisfactory nature of last year's business in the stove line. Large estimates of increase are presented: "Double," "105 per cent.," "much larger," "the best year on record," "20," "15" and "10 per cent." are given, the last being the most moderate figure.

MICHIGAN.

From a letter from a correspondent in Detroit, we quote: "Our volume of business this year will show an increase of 10 per cent. Competition has not been as noticeable, I think, or any more so, the past year than in previous years. Prices have been more substantial among our leading manufacturers, and there has not been so much of a tendency to cut them as formerly. In regard to prospects—of course we in the West, and in fact the entire country, depend a good deal upon the crops and their favorable condition. But I do not see anything at the present time to lead us to suspect anything disastrous during the coming year. It may be that this being World's Fair year, business may be a little affected, but I cannot see any good grounds for concluding that this is going to have a bad effect upon general trade. It should, in certain localities, even benefit it."

IOWA.

Iowa stove men tell of good business and flattering prospects in the stove trade, while from Illinois centers we learn of gains in business by various stove foundries, averaging from 5 to 20 per cent., with fair profits on sales and a promising outlook.

INDIANA.

Improved agricultural conditions are stated to have quickened the trade in Indiana, causing a noticeable growth in the volume of orders for stoves and ranges; but a tendency to cut prices has been felt, with consequent reduction of profits. The situation is regarded as favorable for at least normal business in 1893.

WISCONSIN.

Sales fully up to the average of 1891, which was an exceptionally bright year in this district. Competition not excessive and prospects hopeful.

ST. LOUIS, MO.

The makers of a high class of goods in the stove business are said, by an authority in the trade in St. Louis, to have been making from 10 to 15 per cent. more sales during the past season than in any of the previous five or six years. But the volume of business with those turning out cheaper qualities has not increased. Competition has not been so fierce with the former class, although more active than ever among the latter. The writer states that the prospect for increased consumption of stoves was never better than in this year, and he considers that no class of manufacturers has a better opportunity to make money than the stove men, if they will only adjust their prices on a reasonable, profit-insuring basis.

KANSAS CITY.

In Kansas City the latter months of the year made a very good showing, although the first part of 1892 yielded but dull business in that city. Stocks in hand are very light and good prospects ahead.

COLORADO.

One of the pioneer stove companies of the Far West, located in Colorado, forward a report of doubled business last year, with good margin of profit. General conditions of trade encouraging, and every prospect of a further increase in 1893.

Canada.

Very satisfactory returns of the stove trade in Canada come to hand. An increased business, estimated at from 15 to 20 per cent., is recorded, although the farming interests have suffered severely during the year, more or less affecting all branches of trade. Strikes, during the earlier part of the year, had somewhat dulled competition, but it revived latterly, and is described as keen during the last months of 1892. The outlook for the present year in Canada is considered to presage a very fair business.

Hot Air Furnaces.

Furnace manufacturers, even in larger measure than stove makers, appear to have reason to congratulate themselves upon the returns of the past year, if we may judge from the letters of representatives in the trade which have reached us lately. From these reports we gather that sales of furnaces have in most parts of the country developed to an altogether unprecedented extent since the beginning of 1892.

Furnace men with a really good article to dispose of have found their sales remarkably facilitated. They can report, as quite a number of concerns do in fact report, a volume of business for 1892 doubling or even trebling that of any former season. The latest and most improved types of furnaces find ready sale, almost regardless of cost. "The public," we are told, "will have the best to be had in the heating line, and are willing to pay a good price for it." Quite a considerable percentage of sales throughout the country is composed of the larger-sized and higher-priced furnaces, which have been placed in fine residences, churches, schools and other large buildings. This is partially accounted for by the unusually large building operations which have been carried out during the last twelve months; but also, in a measure, by the fact that furnace heating has been adopted in many cases in place of or as an adjunct to stoves, especially in the average dwelling house.

The remarkable growth of so many Western cities during the year has given a healthy impetus to the furnace trade in that direction, and the prospects for the present year are generally considered to be very favorable by Western manufacturers. The World's Fair has induced a good deal of building in Chicago and the middle West; and, although makers look for no great increase of business in the cities and manufacturing towns this season, this is expected to be offset by a much wider distribution among the towns of lesser size. The Southern States in this particular, as in all other branches of trade, have fallen short of expectations during the past year. The depressing financial conditions which have prevailed in that section up to within the last month or two have been unfavorable to building operations or to outlay of any kind which was not absolutely imperative; and the tendency on such sales as have been made has been to give extended credit to purchasers or even to the cut prices which have ruled. Indications exist now, however, of a much better year for furnace men in 1893, the financial condition of the South having greatly improved, and promising to be still better this year.

Competition in the furnace trade has been stronger in the cheaper grades of furnaces, but is less felt by makers of high class goods and specialties, whose prices have been, on the whole, steadily maintained. A good many more or less ephemeral concerns, exploiting new forms of furnaces of a cheap class, have sprung up and died natural deaths during the year, but solid concerns have in all cases advanced prosperously and reports of enlargements of plant to meet the expected increase of business during 1893 come in from all sides.

Many new types of furnace and improvements on old patterns are noted. Makers all round are alive to the necessity of constant progress in the revision of old methods and the adoption of every system which will facilitate manufacture and enable them to put out better goods. The cost of raw material has been less, but that of labor having increased, together with greater expense in the sales department, the margin of profit on individual sales remains about the same as it has been. The largely increased business done, however, which we put down at from 20 to 25 per cent., means a very material balance in favor of the manufacturers for the year 1892 over that recorded for its immediate predecessors.

Gas, Oil and Vapor Stoves.

Our advices from makers of gas and gasoline stoves and heaters show the business done in this line to have been considerably larger than that of any previous year. The use of gas for fuel is becoming yearly more general; and manufacturers of gas stoves and ranges—while finding increased competition yearly—are able, as a rule, to dispose of all the goods they can produce. In some cases during the past year they were unable to fill all their orders.

Constant increase of facilities on the part of concerns engaged in this line of industry are taking place, and improved machinery for turning out the work has been very uniformly adopted; reducing the cost of manufacture, while improving the quality of goods. Progress has been marked along the line of design, utility, convenience and safety; so that the goods put out to-day reflect, in every way, the greatest credit upon their makers.

In oil stoves, trade has been very satisfactory during the year just closed, and considerably in excess of the business done in 1891. Improvements in the details of construction, and better appearance and workmanship, in the various lines of goods, are reported as having enjoyed the attention of all manufacturers of oil stoves and heaters during the year. Quite a long list of new stoves are announced for the coming season, which is confidently expected to be as much better than the last as that was an improvement on its predecessor.

Manufacturers of vapor stoves give us good reports of business done in their line last year. These goods have been improved, owing to greater experience in manufacture, and now present a much better front in quality of material and workmanship, as well as in operative merit. Still a good deal remains to be done to this the latest type of stove before the system is brought to the perfection it will eventually reach. Competition has not yet reached such a pitch in vapor goods as to cramp those makers who are now engaged in the business. Consequently, at present, a fair remuneration can be secured by those who are in the field.

In this line a distinct advance can be chronicled, with good prospects of a brisk and paying business for the present year.

Stove Patterns.

The communications which have reached us from stove pattern makers indicate a larger all round business during the past year, but with considerable activity in competition and smaller margin of profit than ruled formerly. A large concern engaged in this branch of manufacture in the West report "the largest volume of business we ever had," while others note increases of 10 and 15 per cent. over any previous year. Prospects for 1893 are generally regarded as favorable. New lines of stoves and re dressing of old lines are announced as disposed to be taken in hand all round before next season. Stove pattern men consequently look for plenty of work, with possibly a little better prices during the present year.

Stove Repairs.

A slight average increase is reported in 1892 business, by those concerns engaged in the stove repair trade throughout the country. The fall business is stated to have been exceptionally heavy, compensating for a somewhat light spring trade. In this latter respect a better condition of things is looked for in the early months of this year, as more than one concern speak of preparations for greatly augmented business in 1893. Competition is about normal, that is to say, lively, and profits are cut as close as possible.

Stove Miscellany.

Manufacturers of foundry facings, stove linings, nickel work and stove trimmings generally, give us an impression of steady business, with no very startling changes, either for better or worse, during the year which has just closed. On the whole the demand for their productions has been fully up to the average, and perhaps as much as 5 or 6 per cent. above it. Prices have been generally fairly maintained, in spite of close competition both in the metal and brick lines of supply. The undertaking of their own nickel work business by so many large stove manufacturing concerns—and the number is constantly increasing who do this—has curtailed the outside supply of nickel trimmings very materially. The prospects for the coming year are considered by stove foundry supply men to be hopeful for at least as good a business as during the past year.

Traveling Salesmen for 1893.

Supplementing the list of stove travelers for 1893, which was presented in our columns last week, we give the names of salesmen representing the interests of several additional concerns:

Duncan & Masters, proprietors of the Kansas City Stove Works, Kansas City, Mo., will be represented the ensuing year by C. A. Mann, who will travel in Missouri, Kansas, Oklahoma, Indian Territory and Texas; W. Masters, in Kansas, Nebraska and Missouri, and J. A. Duncan, in Colorado, Arizona, New Mexico and Utah.

The Bridge & Beach Mfg. Company of St. Louis, Mo., will make no changes in their staff, and it will therefore remain as for the year 1892. The company, it is evident, do not believe in frequent changes of travelers, as has been the rule of late years in the stove business, but their policy is to educate their salesmen by selecting them from among young men who have grown up with the company, who thoroughly understand their goods and methods and who become identified with them. As being of interest in this connection, however, we give the territory covered by each salesman: Ralph S Buck will cover San Francisco, Cal.; Leroy M. Dyer, Portland, Ore.; L. H. Booch will travel in Western Texas; Hugh McCallon, in Eastern Texas; James R. Henry, in Arkansas; B C. Arand, in Illinois; E. H. Clayton, in Northern Missouri; F. A. Goetz, in Southern Missouri; A. Weiskirch, in Northern Kansas and Nebraska; R. J Guthrie, in Southern Kansas, and E. H. A. Van Sittert, in Iowa.

The interests of the Chicago Stove Works of Chicago, Ill., will be looked after during 1893 by the following salesmen who will cover the cities and States named: P. J. Coppens, in Michigan; J. Y. Horn, in Indiana; R. F. Ingraham, in Illinois; J. W. Roraback, in Wisconsin; F. W. Lucas, in Minnesota and North Dakota; E. S. Kurtz, in Southern Minnesota; W. H. Lautzenheiser, in Northern Iowa; E. S. Ferguson, in Southern Iowa and Missouri; J. B. McKewon, in Northern Nebraska and South Dakota; Thos. F. Harrow, in Southern Nebraska; W. M. Everts, in Kansas; A R. Creigh, in Washington, Oregon, Idaho, Montana and Utah, and F. M. Baird, in Chicago.

The Ringen Stove Company of St. Louis, Mo., will be represented by William S. Ley, who will travel in Ohio, Indiana and Michigan; C. C. Hoppe, in Missouri, Arkansas and Texas; William A. Lockwood, in Kansas, Nebraska, Colorado, Oklahoma and Indian Territory; L. A. Buck, in Minnesota, South Dakota and North Dakota; A. X. Smith, in Iowa; E. G. Spindler, in Montana, Washington, Oregon, Utah, Nevada and Idaho; J. A. Preston, in Florida, and William Straube and J. C. Buckley, in Illinois and Wisconsin.

Terstegge, Gohmann & Co. of Louisville, Ky., will be represented the coming season by James R. Crawford, who will travel in Indiana; Thomas R Bryan, in Western Kentucky and Western Tennessee; W. J. Handley, in Northern Kentucky; Col. E. M. Hooe, in Central Kentucky; E. F. Evan, in Eastern Kentucky; W. H. Lyon, in Southwestern Kentucky; A. J. Terstegge will cover the trade in Louisville; Louis Drautman, in North and South Carolina, Georgia and Eastern Tennessee, and R. E. Finch in the State of Texas.

The interests of the Indiana Stove Works of Evansville, Ind., will be looked after during 1893 by Major J. E. Gorham, who will travel in Texas; Major W. H. Brennecke, in Illinois, Southeastern Missouri, Northern Arkansas and Western Tennessee; Col. F. O. Headly, in Missouri, Kansas and Oklahoma; W. F. Karges, in Iowa, Wisconsin and Minnesota; A. J. Shultz, in Indiana and Kentucky, and E. C. Speck, in Louisville and Mississippi.

The Estate of P. D. Beckwith, Dowagiac, Mich., will be represented on the road during the ensuing year by salesmen who will travel in the territory named: State of Michigan will be covered by John L. Parker; Wisconsin, Minnesota and Dakota by George T. Adams; Missouri, Nebraska and Arkansas by I. N. Beeson; Illinois by R. R. Elliott; Iowa by E. O. Adams; Kansas and Indiana by Charles Starrett; Ohio, Kentucky, Tennessee, Texas, Colorado and the Pacific Coast by H. L. Mosher. O. G. Beach, sales manager, will have general supervision of the territory.

The Stove Trade of Albany and Troy.

Judging from the opinions of experienced men long in the stove business, says our Albany correspondent, the past year has been a profitable one, and there is promise of good business for 1893. There are now in Albany four sizable stove manufactories, as through various misfortunes the Albany Stove Company have not been in operation the past year. The concern is now in the hands of a receiver, pending a petition for voluntary dissolution. Whether, when the property has been sold so that the receipts may be shared among the stockholders, the plant will be put in operation again by the purchasers is a matter of question; some are of the opinion that it will. Before the company's fire, which wiped out the entire plant some time since, after which a new one was erected, the concern had a good line of parlor stoves and ranges, and were doing, it is understood, a very fair business.

A representative of Rathbone, Sard & Co. said to *The Metal Worker* correspondent that business had increased during 1892, the plant here running pretty full during the whole season. The only shutdowns were during the terrific heat of the summer. A part of the time the plant of the company has been in operation up to 9 or 10 o'clock at night in order to supply stoves to customers. Most of the night work was in finishing goods and loading them into the cars. The stove man said that he was not prone to making predictions, but trade is influenced largely by many occurrences, and the company reveal their opinion that the coming season will be a good one when they make arrangements to handle an increased business, and such arrangements have been and are being made. During the year Rathbone, Sard & Co. added a blower to their plant, and have put a new elevator in their warehouse for raising and lowering stoves from the storage department to the shipping room. The elevator is fitted with all the latest safety devices. The company also brought out and placed on the market a long list of new patterns, including cook stoves, ranges and heaters, embodying the modern features and decorated in an artistic style.

The company wil offer a number of new patterns to the trade when the season opens, while a number of attractive advertising novelties are in preparation.

The Perry Stove Company have done an increased business all the year. They have offered a number of new patterns which have become popular. One of the largest features of the company's business is the immense quantities of heating goods which they send all over the world. Their representative told *The Metal Worker* correspondent that in their opinion 1893 holds a good trade in store for the stove men in this section, if general indications are to be relied upon. The company have, as usual, made improvements here and there in their plant during the year, and are able to turn out large numbers of all sorts of heating apparatus. They are now the only company in the city who make oil and gas stoves, and they have sold quantities of them and will have all of the latest patterns to offer for the season of 1893. Superintendent Liddle is constantly making improvements in the oil and gas stove line. During the year past he invented an entirely new gas stove and a burner for oil stoves which has numerous superior features. During the year the company have added extensively to their lines of ranges and heating stoves. Among these may be mentioned the pair which have proven so popular, the World's Argand range and the parlor stove of the same name, both of which were greatly improved for the season. The trade may expect some new goods from them in the near future.

J. Van Wormer & Co. have done a good business and hope to do more next season. Their brand of parlor stoves and other goods are well and favorably known, far and wide. The trade will probably receive some new and attractive goods from them in the future.

According to the report of the Littlefield Stove Company, they have sold all the West Shore ranges they could make during the year. They say business has been better in 1892 than the year before, and the outlook is considered good. They have added another traveling salesman and will during the coming season cover New York and the New England States thoroughly. They are now preparing patterns for three new sizes of the West Shore range. Not only this, but the company expect to largely increase their facilities in the spring. They are now considering the project of building a warehouse on the site south of their present building, part of the land occupied by their range foundry which was destroyed by fire.

The Fuller & Warren Company of Troy get out some very attractive goods, and during the year past have done a large business. They always keep their plant

abreast of the procession in the matter of improvements, and add from time to time such facilities as are called for. They will offer some of their new and attractive goods during the coming season. The prospect seems bright to this progressive concern.

Burdett, Smith & Co. of Troy have had a very good year's trade; in fact, they say better than for a number of years past. Their prospects and the prospect for trade in general are pronounced as looking good for 1893. They see no reason why it should not be as good as 1892, if not better. They have run their foundry eight weeks longer the past season than for the past three years, and hope this year to beat this record. In the spring and summer they expect to have some new goods for the trade. They have kept up with the procession during the year, and are deserving of success.

The Empire Stove Works—Geo. W. Sweet & Co., proprietors—Troy, have made extensive improvements throughout their stove manufactory during the year past. They found that their goods on hand sold well, and they did not therefore get up any new designs. Their best goods are modern and up to the times. Their trade during the year has been excellent. They have done better, in fact, than during any one year of the past five. They have not found it necessary to increase their capacity.

These reports from the stove men in this vicinity show that all are encouraged by the outlook. The industries hereabouts are growing stronger year by year, and are holding their own in the growing competition. No more attractive goods or more new devices in the stove line are turned out in any section than in this, and the manufacturers here are proud of it. The companies have thinking men with ingenuity and advanced ideas, and it is safe to say that the stove finishers in this section will hold their own during the seasons of 1893.

Changed Conditions in the Stove Trade.

By Stove Maker.

For several years the stove trade in the section around about New York has, owing to extraordinary conditions and elements unusually perplexing, been both unsatisfactory and unremunerative. Three or four years ago *The Metal Worker* was weekly filled with letters and articles asking "What can be done to improve the stove business?" Various causes were assigned for the conditions that existed and all sorts of opinions expressed as to the remedy. No real solution of the problem was forthcoming and no remedy every applied, for the reason that trade was undergoing fundamental changes which individual policies were powerless to control. The whole base of the trade was shifting.

At no period in its history have so many changes affecting the interests of the stove business occurred as during the years from 1882 to 1892. Slight changes in all lines of trade are constantly taking place that necessitate departures from established customs of the past, and the stove business is no exception to the rule, but the changes in this branch of industry during the decade referred to have been radical and revolutionary in character, and we find it to-day practically transformed in the *personnel* of its patrons and followers among the retailers from what it was ten years ago, with the channels it formerly followed closed and new ones opened. It needs but a few minutes' reference to old ledgers to substantiate this statement. Retirement from business, failures, death and the natural loss and gain of customers cause great changes in the names found on ledgers that did service ten years apart, but no comparisons for 50 years back will show such conspicuous difference in the names as the ledgers of 1882 and 1892.

It is as though a scourge had swept over the country during this period, carrying off the major portion of the inhabitants, and new concerns had started into being to replace those whose founders had been swallowed up; or one would be apt to received the impression that the ledgers represented different industries, so few names are alike. The reason is that the retail stove trade of the East has broken through its old lines and changed hands almost entirely.

CONDITIONS PREVIOUS TO 1882.

To get at the causes of this great change one must go back of 1882 a few years, for the purpose of examining the business condition of the country and the general policies under which the stove business was formerly conducted. Besides the regular stove and house-furnishing goods stores, a large percentage of the number of stoves distributed in the city of New York in former years was sold by tinsmiths; small jobbers and traders who had small stores for the display of samples, and a tin shop in the rear. From appearances on the surface, one would think they sold a stove about once a year; and wonder how, from the apparently limited business, they managed to keep soul and body together. A look at the cellar of the building, however, would give a different impression, for there, piled to the ceiling on both sides, would be ranges and stoves in all sizes and varieties, with duplicates and sometimes dozens of each. They bought from the wholesalers in July and August, giving their stock orders early so as to have the stoves blacked and piled away. When people wanted stoves they did not think of going anywhere but to stove stores for them and the result was a traffic among them any day of the season with which the activity in a stove store nowadays is like Sunday in comparison. When their stock run low they ordered more and, until the season waned, in quantities to be delivered by the load. When the demand fell off and single stoves only were wanted, they sent their express for them and paid the expressage without a murmur. In fact, the idea of calling on the wholesaler to deliver free a stove or two was one that could hardly originate with any dealer whose sanity there was no reason to question. If plates were found broken after stoves were delivered by the wholesaler in good order and a clean receipt obtained therefor, pieces were ordered and paid for and the stoves repaired, and claims for allowances thereon made only by very unreasonable dealers, a continuance of whose custom would not be sought for or specially desired.

They blacked their own stoves, assumed their own burdens of carrying unsold stock, fathered their own mistakes and generally demeaned themselves in accordance with the recognized principles of business and the established relationship between buyer and seller. They were practical men able to put up a stove, make the pipe and fire board, put on a chimney cap and do anything else necessary to make it work as it should without calling on the wholesaler to send an expert. They bought and sold for cash, and notwithstanding the immense amount of detail and anxiety that belong to the stove business at its best, it was rest to do business with them compared to the perplexities incident to the pursuit of business with the rank and file of the dealers of to-day.

Having thus briefly reviewed some of the old conditions that have suffered most in the changes that have taken place, we will look at the status of general business and the prosperity of the stove trade in years prior to 1882.

THE ZENITH OF PROSPERITY.

The zenith of prosperity in this industry was probably reached in 1872, when returns from money invested in it were large and flattering. In 1873, the year of the panic, a great slump occurred, and the percentage of profit was cut in two, followed in 1874 by a further shrinkage of 50 per cent. in the net amount of the profits of the year before. In 1875 there was a slight rally due only to favorable conditions of weather, and in 1876 there was another tumble, and profits were wiped out altogether. The next year brought no relief except the consolation that things could be no worse and values no lower than they were. The debit side of the profit and loss account still held sway with such concerns whose capital was large enough to keep them afloat, while thousands of weaker ones in all lines went down in the general business wreck. The year of 1878, which may be called the last of the panic series, found the stove manufacturers still struggling for existence. The tide had ceased to ebb, and instead of the great losses of the few years before, their balance sheets showed that they had about held their own, and the crisis had passed.

(To be continued.)

Broken Out Again.

"Curious thing about a stove," observed the exchange editor, as he came in shivering, took off his coat, hung it on its accustomed peg, sat down, examined the points of his shears to see if they could be depended upon in a sudden emergency, and glancing furtively over his shoulder at the financial editor, "curious thing about a stove is that it is always hottest when its coaled."

"Chestnut!—coal," remarked the financial editor, slowly, "is a grate deal more—"

"Now don't get out of your range," interposed the exchange editor."

"If I should," retorted the other, "you couldn't furnace me with any ideas on the subject!"

"But you might get stove up."

"You think you're a pretty large egg, don't you?"

"I don't want any of your slack, anyhow," said the exchange editor, breathing hard.

"If it doesn't soot you," snorted the man of finance, "you can lump it!"

"You needn't get so warm over it!"

"Then don't stir me up."

"I haven't bin stirring you up."

"It's mighty hod if you haven't."

"Such a remark as that coming from a man who is always getting scooped—"

"Or from a man who can't hold a cannel to—"

But here the railroad editor hastily interposed.

"Gentlemen," he said, "not another word, by chim'ney."—*Chicago Tribune.*

Horace K. Tallmage of Buffalo, N. Y., is the patentee of an improved form of furnace construction, a patent for which was granted on November 29. The furnace has a horizontal bottom ring or plate provided with inclined abutments and a dome provided with an inverted conical central portion with horizontal lugs arranged between it and the wall of the dome. The combustion chamber also has a series of upwardly converging flues secured at their upper ends to the conical portion of the dome and at their lower ends to the inclined abutments of the bottom ring. There are also vertical flues arranged in the combustion chamber between the converging flues and secured at their upper ends to the horizontal lugs of the dome and at their lower ends to the horizontal surface of the bottom ring.

The Western Stove Trade.

By Geo. W. Cope.

The columns of *The Metal Worker* have faithfully chronicled the course of events in the stove trade during 1892. Glancing over them, one will be reminded of many things that have happened which are even now of general interest. We see announcements of new enterprises about to be launched on the great ocean of business, some of which were doomed to immediate destruction, while others were blessed with happier destinies and are now enjoying prosperous voyages over untroubled waters. Our accounts of fires and casualties have been pleasantly few, not many concerns having been burned or storm-swept during the year. Financial reverses have been still fewer, which speaks well for the financial outcome of the business of manufacturing stoves, albeit millionaires in the stove trade are as yet unknown. A considerable amount of space has been devoted to reports of improvements in plants, numerous manufacturers having found increased facilities necessary to meet the requirements of their growing trade. Personal mention has not absorbed so much of our space as might be imagined, because *The Metal Worker* is not given to mere gossip, but aims to furnish its readers with information having more than ephemeral interest. Our departed friends have received deserved tributes at our hands, but this service, we assure our readers, we are in no haste to render any of them. One of the most pleasant features of our references to trade the past year was the frequent occasion to note

THE PROSPEROUS CONDITION OF BUSINESS.

The two years preceding had been such busy periods that stove men looked forward with some misgivings to 1892, fearing that it would be almost too much to expect three good years to come in succession. But now that the year has ended, it proves to have been the best of the series. For a portion of the fall the demand for stoves was so heavy that the trade was only limited by the capacity of the foundries, according to the personal testimony of many in the trade who were interviewed on the subject. At the same time other manufacturers of heating apparatus were also highly favored with an active demand for their products. Oil-heating stoves were never before so popular, gas stoves sold very freely, furnacemen were driven almost to distraction by the importunities of their patrons, and the hot-water and steam-heating trade was exceedingly active.

The year was a phenomenal one for the vapor-stove manufacturers. All of them enjoyed the best trade they ever had. This business has been more concentrated in recent years, and is now almost wholly in the hands of those who make a specialty of vapor stoves, or else combine the vapor and gas stove or the vapor and oil stove business. Makers and jobbers of coal stoves have very generally relinquished the vapor stove trade, as they claim, much to their own satisfaction. The progress of the vapor-stove trade is well demonstrated by the statistics of sales published by the Ringen Stove Company of St. Louis, who advanced from 22,290 stoves in 1890 to 36,242 in 1891, and to 54,715 up to the beginning of December, 1892. Other manufacturers state that their trade has also increased remarkably.

The prosperous condition of the country inspires the hope that the new era of activity which has favored the stove manufacturers for three years has not reached its climax. No one will object to the increased work which an enlarged business imposes, and the preparations which have been made or are now in progress for doing a still heavier trade will, we earnestly hope, be found to have been necessary before 1893 has been far spent. It is interesting in this connection to note some of the

IMPROVEMENTS IN PLANT

which have been brought to our attention during the past year:

The Art Stove Company of Detroit, Mich., built a four story and basement brick and stone structure, 50 x 100 feet in size, to be used for offices and salesroom and for storage purposes.

The Columbus Steel Range Company of Columbus, Ohio, removed into a new three-story building, 84 x 108 feet, erected to meet their special requirements and used for offices, salesroom, construction department, pattern making and storage purposes.

Schwab & Sercomb of Milwaukee, Wis., erected an additional building, 40 x 76 feet, four stories high, to be used entirely for manufacturing purposes.

The Farquhar Heating Company, formerly at New Wilmington, Ohio, built a much larger plant at Wireton Park, near Chicago. Their building is 210 feet square, covering a full acre of ground, and is fitted with the most approved machinery, much of it of special design, for the manufacture of the company's specialties.

The Born Steel Range & Mfg. Company of Cleveland, Ohio, removed their city warehouse to a much larger building having five floors, two of which are used as sample and display rooms, one for offices and two for workrooms.

The Collins & Burgie Company erected a new plant at Marengo, McHenry County, Ill., the foundry being 250 x 150 feet, tumbling room 55 x 75 feet, mounting shop 75 x 200 feet, two stories high; engine house 50 x 75 feet, warehouse 100 x 200 feet, two stories high, and pattern house 50 x 100 feet.

The A. J. Lindemann & Hoverson Company of Milwaukee, Wis., put in machinery for the manufacture of gas, gasoline and oil stoves.

W. L. Sharp & Son of Steubenville, Ohio, completed new works to replace those destroyed by fire, the foundry being 72 x 326 feet, mounting shop 30 x 150 feet, two stories; enameling building and ovens 42 x 60 feet, stock and flask building 24 x 120 feet, two stories, and warehouse 50 x 100 feet, three stories.

The Cincinnati Steel Range & Furnace Company of Cincinnati removed to new quarters, the principal building being 26 x 100 feet, four stories, used for sale and ware rooms and office purposes, with the manufacturing department in a separate building, 65 x 65 feet, three stories, having an extension 30 x 65 feet.

S. S. Jewett & Co.'s Chicago branch erected a new warehouse three stories high, containing 86,000 square feet of floor surface and having storage capacity for 14,000 stoves.

The Lexington Foundry Company of Lexington, Ky., rebuilt their stove works which had been burned and purchased the patterns formerly used by the Miami Stove Works of Lawrenceburg, Ind.

The Brand Stove Company of Milwaukee, Wis., erected a five-story building, 102 x 153 feet, to be used for general offices, sample room and storage.

E. Bement & Sons of Lansing, Mich., added a three story building 80 x 120 feet, the first floor to be used as an addition to the molding department and the second and third floors for cleaning and mounting rooms.

Rathbone, Sard & Co. added to their stove works at Aurora, Ill., an extension of 150 feet to their four-story warehouse and mounting shop, increasing their storage capacity about one-half.

Buck's Stove & Range Company of St. Louis added to their molding shop a four-story structure 90 x 130 feet, providing more room for mounting, nickeling and storage.

The Aurora Vapor Stove Company of Cleveland, Ohio, removed to a new factory with much greater capacity than their old one.

The National Vapor Stove & Mfg. Company removed their plant from Cleveland to Lorain, Ohio, where they enjoy largely increased facilities for the production of their specialties.

Intimately connected with improvements in plant are steps taken for

EXTENSIONS OF BUSINESS,

among which we may note the following as events of some importance:

The Detroit Stove Works opened a branch house at Portland, Ore., to meet the requirements of their trade on the Pacific Coast.

The Superior Furnace Company of Little Falls, N. Y., arranged for a full stock of their furnaces to be carried at 84 West Washington street, Chicago.

The Front Rank Steel Furnace Company of St. Louis increased their capital stock from $5000 to $50,000.

The Brand Stove Company of Milwaukee, Wis., established a branch house at 57 Lake street, Chicago, in charge of De Witt Van Evera.

The Highland Foundry Company of Boston Highlands, Mass., established a branch office at 114 and 116 Lake street, Chicago, under the management of Rubel & Co.

The capital stock of the Quick Meal Stove Company of St. Louis was increased to $200,000.

The Ringen Stove Company of St. Louis increased their capital stock to $100,000.

NEW ESTABLISHMENTS

started during the year were not numerous. We have reports of the following:

The Milhuff & Gage Mfg. Company of West Superior, Wis., whose foundry made its first cast January 21.

The Huette-Barler Mfg. Company of Chicago, who began to manufacture oil stoves also in January.

The Steel Stove Company of Des Moines, Iowa, organized to manufacture steel ranges.

W. J. McKay & Co., who established themselves as wholesale dealers in stoves and furnaces in Chicago.

The Sioux City Stove Works, formerly the Daniel E. Paris Stove Company, whose new works at Sioux City, Iowa, were at length put in successful operation with good prospects.

The Minnesota Stove Company were incorporated at Shakopee, Minn., with a capital stock of $50,000.

SOME IMPORTANT CHANGES

occurred in the trade during the year. The Keokuk Stove Works of Keokuk, Iowa, were reorganized and resumed operations on a larger scale, with H. C. Hinskamp, president; L. C. Ingersoll, vice-president, and John W. Hobbs, secretary and treasurer. The Anshutz-Bradbury Company of Pittsburgh organized with W. J. Bradbury, president; Frank Anshutz, vice-president; Lewis A. Anshutz, treasurer; William McCullough, secretary, and L. M. Armor manager of sales department. The Harvest Stove Company of South Pittsburg, Tenn., having failed, the bondholders purchased the plant and changed the name to South Pittsburg Stove Works. The Klein Furnace Company, formerly at Rochester, N. Y., removed to Marion, Ind. The Joseph Bell Stove Company of Wheeling, W. Va., transferred their plant to Muncie, Ind., where they will shortly have their works in full operation under the name of the Joseph Bell Stove & Range Company. Henry C. Burgie retired from

the stove trade after many years of arduous devotion to business, and the management of the Collins & Burgie Company passed under the control of the Greenlee Brothers. W. M. Shaddinger, for several years manager of the Chicago branch of the Detroit Stove Works, was elected secretary of that corporation and removed to Detroit, being succeeded by B. W. Dodson, who united the duties of second vice-president to his function as manager. J. Breton Copp succeeded B. W. Dodson as manager of the Chicago branch of the Michigan Stove Company.

LABOR TROUBLES

were happily few, owing to the excellent understanding between the Molders' Union of North America and the Stove Manufacturers' Defense Association. An important conference was held in Chicago in February between representatives of these two organizations, at which an agreement was made touching all points likely to be in dispute between manufacturers and their employees. April 1 of each year was made the time for adjusting the rate of wages for the next 12 months. Apprentices were to be permitted in the ratio of one to every six journeymen, or one to every seven floors. Mechanical improvements increasing molders' output were to be recognized as due to manufacturers' enterprise and corresponding reductions in molders' wages were to be made so as to net the same per day as before; new molding work was to be done for the same price as old work of a similar character. These items formed the basis of the agreement, full details being provided for carrying them out to the satisfaction of both parties. The recognition of the union was so completely secured that no room was left for complaint by molders on that score. All stove foundries, however, are not operated under this agreement, as all manufacturers do not belong to the Defense Association. Among these some labor difficulties occurred, but they were not serious. We take very great pleasure in alluding to this agreeable condition of affairs, as other branches of manufacturing industry suffered considerably from strikes and lockouts in 1892.

THE DEATH ROLL.

Death reaped an unusually large harvest in the past year among stove manufacturers, beginning on New Year's Day with John M. Brown, treasurer of the Chicago Stove Works. On January 16 Marcus L. Filley died at Lansingburg, N. Y. In February the Baxter Stove Company of Mansfield, Ohio, lost their president, Thomas Baxter, Sr.; Frank H. Gohmann of Terstegge, Gohmann & Co., New Albany, Ind., died, and the Victor Stove Company of Salem, Ohio, suffered the loss of their president, Daniel Koll. In June the president of the National Association of Stove Manufacturers, Jesse Orr of Reading, Pa., died very suddenly, much to the regret of the entire stove trade, who esteemed him highly as a man and recognized his ability as a manufacturer. He was cut down in his prime, with the prospect of many years of usefulness still before him. In the same month also occurred the death of J. H. Roelker, president of the Roelker Stove & Plow Company of Evansville, Ind., a man who had by his own merit and energy advanced himself from the humble position of a stove blackener to the management of a large business. Another man of great prominence, Col. John A. Price of Scranton, Pa., died in August. In him the stove trade lost a student, a scientist and a prolific inventor, a man who left his impress on the times in which he lived. E. D. Seavey of the Seavey Mfg. Company, Chicago, died in September. Alden B. Knapp, superintendent of the Barstow Stove Company, Providence, R. I., died in October, the same month also terminating the earthly career of George W. Floyd, of Floyd, Wells & Co., Royersford, Pa. In December John O'Keefe of St. Louis died. Mr. O'Keefe had been superintendent of the foundry of the Excelsior Mfg. Company for many years. May we have fewer deaths to chronicle the coming year!

THE NATIONAL ASSOCIATION

has not of late played the conspicuous part in stove affairs that it once did. The annual convention was held in Chicago on May 4 and 5, and was quite well attended by members of the trade from all sections of the country. The meeting was a pleasant occasion, and its social features were keenly enjoyed. Opportunity was thus given for manufacturers to meet each other in a less formal way than would otherwise be possible, and to exchange views with one another on practical questions coming up for daily solution. There was a time, not very far back in the history of the association, when it was thought possible, by action through the association, to remedy the ills which occasionally afflict all kinds of trade; but that impression has faded. With it, in the estimation of some, has gone the hope of maintaining a strong association, as they argue that men need a pressing inducement to bring them together. This is not necessarily the case, and we look to see the association continued as a means of annually bringing the trade together for the purpose of comparing notes about business or keeping up acquaintanceship, if for no other purpose. The officers selected to serve until the next annual convention were as follows: Jesse Orr, president; E. W. Peck, first vice-president; George D. Dana, second vice president; Walter S. Stevenson, treasurer; D. M. Thomas, secretary; H. W. Buttorff, Lazard Kahn, J. W. Van Cleave, C. A. Ducharme and W. H. Pfahler, Board of Managers. The death of President Orr has caused the duties of that office to devolve on Vice President Peck. The organization is well manned and in good shape to handle any emergency which may arise calling for prompt action by national representatives of the stove trade.

THE WORLD'S FAIR.

Arrangements are being made to render the space allotted to stove exhibits in the World's Fair as attractive as possible. A large number of stove manufacturers intend to exhibit samples of their goods, and from statements made in a general way the impression is gained that no effort will be spared by leading companies to make a display which will not only be creditable to the stove trade, but will also be an interesting feature of the exposition.

William H. Roelker.

The stove trade of the West will learn with regret of the death of William H. Roelker, which occurred on the afternoon of Friday, December 23, at his residence in Evansville, Ind. He was the son of the late John H. Roelker, and was born in Evansville, January 16, 1857. He began his business career at the age of 18 years, and at the time of his death was a member and vice president of the Roelker Stove & Plow Company. Up to the time his health failed he traveled for the concern through the South and Southwest. In 1884 he was married to Miss Amelia Worth of Quincy, Ill., who, with a daughter seven years of age, survives him. For the past three years Mr. Roelker had been in failing health and a little over a year ago he made a trip to New Mexico, remaining there for six months, since when he had been confined for most of the time to the house. Mr. Roelker was a member of the Business Men's Association, and during the first year of its existence was a member of the Manufacturers' Committee. He was also connected with the Commercial Travelers' Association of Evansville and a member in good standing of La Valette Commandery, Knights Templar, under whose auspices his funeral services were held.

ODD PLATES.

THE WALKER & PRATT MFG. COMPANY of Boston, Mass., have added to their interesting assortment of cook stoves and ranges a very attractive construction known as the Columbia. It is a six-hole range embodying the modern features and is embellished in a style which cannot fail to command the attention of the trade. It is referred to by the manufacturers as possessing more live, practical, sensible selling points than any range in the wide world.

THE CLEVELAND FOUNDRY COMPANY, Cleveland, Ohio, make the interesting announcement to the trade that for the convenience of their New England customers they have opened a branch office and store in Boston at 82 North street, where they will carry a complete line of goods of their manufacture, including oil stoves, gas stoves, warm-air registers, sad irons, &c. The Boston branch house will be in charge of F. A. McMann and E. F. Brainard, who are well known in the New England trade.

IN FRONT of the new plant of the Littlefield Stove Company, Albany, N. Y., is a sodded area, which has been christened "West Shore Park" in honor of the range turned out under that name by the company.

THE DANGLER STOVE & MFG. COMPANY, of Cleveland, Ohio, are giving the gas stove branch of their business special care and have secured as foreman in this department E. C. Warren, who for the past six years was superintendent of the Van Wie Gas Stove Company. The company are at present actively engaged in the preparation of a gas stove catalogue, which it is expected will be ready for distribution to the trade about the 20th of the present month.

JOSEPH ALOIS SUPPIGER of Hirslanden, near Zurich, Switzerland, has recently been granted a patent for a form of stove construction possessing many interesting features. The device makes use of an ordinary lamp for generating the heat, the arrangement of parts being such that this is done, it is claimed, without disagreeable odors.

A STOVE LEG FASTENING forms the basis of a patent lately granted to Louis E. Covert and Charles W. McCutcheon of Peekskill, N. Y. The object of the device is to simplify the process of mounting and handling the legs of stoves. The fastenings may be of any form necessary to perform the work required and for extra heavy stoves or constructions requiring long leg shanks two or more fastenings may be used.

THE PHILLIPS & CLARK STOVE COMPANY of Geneva, N. Y., have shut down their plant, according to custom, and will remain closed about six weeks. The business of the establishment has been splendid during the past year.

THE READING STOVE WORKS of Reading, Pa., are about making some improvements in their establishment by the addition of a 125 horse-power boiler in their No. 1 plant and a 100 horse-power in their No. 2 plant. They are also adding to their sheet-iron department about $3500 worth of new machinery and have purchased a new lathe for the wood pattern shop. In their Millmont plant they are

making some additions, among them being a new No. 7 Baker blower. The trade prospects for the ensuing year are considered favorable and the company will place eight new stoves and ranges on the market during the next few months.

THE MAGEE FURNACE COMPANY, Boston, Mass., whose headquarters in New York have been at 117 Beekman street, have leased the premises at 242 Water street, where during the coming year they will be pleased to see their friends. By those familiar with New York it will be noticed that the new location is but half a block from the old one.

ONE OF THE HANDSOMEST and most artistic calendars which have come to our desk this year is that sent out with the compliments of the Weir Stove Company of Taunton, Mass. In general make-up it resembles the artistic novelties of this character which have been distributed by the company named in previous years. The calendar proper is a long strip of fine-quality paper, carried upon two black enameled wooden rollers, mounted upon heavy cardboard. The rollers work in metallic bearings, and are so placed that the scroll of paper carrying the calendar for the twelve months of the year may be rolled upon the lower rod while it is unwound from the upper rod. The scroll is divided into sections giving to each month a panel of 6½ inches, which, in addition to the days of the week and month, is embellished with a familiar quotation and a quaint design. The printing is done in colors, with artistic effect. Across the heavy cardboard upon which the rollers carrying the calendar are mounted is the word "Glenwood" printed in old gold letters upon a white mottled ground. Down the sides are designs of a floral nature, while across the bottom is the inscription in old gold letters, "Compliments of Weir Stove Company, Taunton, Mass., Designers and Makers of Glenwood Ranges and Heaters." Through the top of the card is a cord of a delicate shade of pink for hanging it upon the wall.

AN IMPROVEMENT in vapor stoves forms the basis of a patent recently granted to Arthur J. Parker and Robert G. Hunter of Williamston, Mich. The various parts are so combined as to provide an auxiliary section of the casing carrying a stove pipe and a damper so made that the section may be inserted or detached at will. When attached the products of combustion may be either directed to the chimney or allowed to pass into the room, as may be preferred. Above the burner is a deflector so placed as to throw the heat against the sides of the stove, after which it takes a circuitous passage to the top of the heater, where it is discharged at a high temperature into the room.

THE MAGEE FURNACE COMPANY of Boston, Mass., have furnished through their branch house at 86 Lake street, Chicago, A. A. Spear, manager, Boston heaters for some of the finest residences in Chicago. Among others may be mentioned the dwelling of A. M. Lynch, 4220 Grand Boulevard; the residence of Dr. J. H. Woolley, Forty-third street; that of J. W. Faxon, 3331 Indiana avenue; as well as those of M. W. Atwood, 4324 Ellis avenue; Dr. T. N. Jameson, 3937 Vincennes avenue, and Dr. A. W. Freeman.

EDMOND RAFTERY, associate manager of Rathbone, Sard & Co. at Chicago, spent "Merry Christmas" in London, England, with his family. He will return from abroad early in the new year.

FLOYD, WELLS & CO., Royersford, Pa., are the assignees of a patent for an oven plate having a corrugated surface, recently granted to Isaac Brooke of Pittston, Pa. To the walls of some of the corrugations are secured plates forming flue which are open at the top and bottom and leaving passages near the top whereby the hot air in the oven may enter the flues and escape therefrom in such a way as to re-enter the oven and cause a circulation of hot air therein. Another flue is so formed as to be open at the bottom and closed at the top. Some of the openings communicate with the exit flue in such a way that some of the air may escape from the oven, thus causing a draft in the latter and permitting fresh air to be drawn in.

THE ECLIPSE STOVE COMPANY of Mansfield, Ohio, state that although their traveling men have not been on the road since last July and the works have been run at their full capacity, they were unable to keep within from four to six weeks of their orders. They have decided to provide adequate facilities for the future and are displacing their present 80 horse-power boiler and 60 horse-power engine with a plant of double the capacity. They have just completed an addition 130 x 135 feet to their molding department and are putting additional machinery in their mounting and nickeling rooms. When the improvements are completed the company expect to be able to ship all goods promptly on receipt of orders.

THE SUPERIOR STOVE COMPANY, Superior, Wis., are distributing a neat advertising novelty in the shape of what appears to be an ordinary firecracker. Upon pulling the fuse a strip of paper is drawn out upon which we find the statement that "This cracker is not made to explode, but to boom our Great Northern Wrought Steel range, which we make in all sizes and styles for coal, coke or wood." There is also reference to the location of the company at the head of Lake Superior and to the fact that their goods are made from Lake Superior charcoal iron. The little device is gotten up by Livermore & Knight of Providence, R. I., who, as our readers will remember, have brought out a great many interesting novelties which have been distributed by the stove and other trades.

THE PRESBREY STOVE LINING COMPANY of 212 Somerset avenue, Taunton, Mass., send us a neat catalogue for the new year embellished with a panel picture and entitled "Favorites." The card carries the name and address of the company across the center, while below is the calendar proper, consisting of 12 sheets printed in black upon white paper. At the left-hand margin of each sheet are given the various phases of the moon for the month. Across the bottom is a line calling attention to any holiday that the month may contain, together with the statement that the World's Fair opens May 1 and closes October 30. A blue silken cord through the top of the card is so arranged that it may be suspended on the wall.

ON CHRISTMAS EVE one of the members of the firm of Rathbone, Sard & Co. received, through their old agent at Belvidere, Ill, John Plane, who was one of the pioneers in introducing Acorn stoves in the West some fifty years ago, a magnificent specimen of a turkey, together with a very pleasant letter, wishing the compliments of the season. As an incident in the business of Mr. Plane's successors, Tompson & Tousley, of Belvidere, Ill., he writes that he wishes to have Gen. John F. Rathbone informed of the fact that a little wood stove bearing his name, and sold by Mr. Plane in 1852, was lately replaced by a Duplex Acorn range, the old stove having been in constant use since it was sold.

G. L. NYE, manager of the Minnesota Stove Company, Shakopee, Minn., was presented by the employees with a Christmas present of a heavy gold seal ring. The presentation speech was made by John Squires. The popular foreman of the works, W. V. Johnson, was also given a handsome fountain pen.

WILLIAM F. SHULZ, formerly of the Albany Stove Company, has connected himself with the office and traveling force of the Littlefield Stove Company, Albany, N. Y.

THE CHICAGO & ERIE STOVE COMPANY, LIMITED, of Erie, Pa., have their Chicago office and salesroom piped for natural gas, and have on exhibition samples of the company's line of patent burners for the fuel named. These burners are in active operation, and are the objects of no little interest to all who visit the salesroom. The burners are made in a variety of styles and sizes, including long burners for basket grates for open stoves or for inserting in fire places; round gas grates for heating stoves; gas grates for ranges, and also what is known as the Miller burner for plumbers' use. These grates and burners, we understand, have been in use for some years past in the natural gas districts of Pennsylvania, Ohio and Indiana, and have given such satisfaction there that the company are in a position to recommend them from actual experience. One of the great advantages obtained in their construction is said to be the fact that should a temporary stoppage in the flow of gas occur from any cause, coal or wood can be used on the burner without disturbing the fittings, or sending for a man to displace the grate.

J. M. LITCHFIELD will continue with the Perry Stove Company during the ensuing year, representing the New York house, 74 Beekman street, on Long Island, and in Brooklyn and nearby cities.

VICE PRESIDENT GRANGE SARD and Superintendent Robert Shaw Oliver of Rathbone, Sard & Co., Albany, recently returned from a Western trip which included Aurora and Chicago, Ill.

J. H. CORT, manufacturer of gas heating and cooking apparatus, also dealer in stoves, ranges, furnaces, &c., 220 and 222 Water street, New York, has admitted his son, Warren L. Cort, as a partner, the style of the firm from January 1, 1893, being J. H. Cort & Son.

J. D. LINCOLN of J. D. & C. C. Lincoln, dealers in stoves, ranges, heaters, &c., at 236 Water street, New York, refers to the season's trade just closed as very satisfactory, and anticipates an increased demand for the ensuing year.

JOHN E. FRENNING, treasurer of the S. M. Howes Company, 40 and 46 Union street, Boston, was married at Cambridge, Mass., on Thursday, December 29, 1892. Mr. Frenning is a young and popular member of the trade, and is receiving many congratulations, to which *The Metal Worker* adds best wishes.

THE AURORA VAPOR STOVE COMPANY of Cleveland, Ohio, are now fully settled in their new factory, which has recently been completed for them in that city. The main structure is 50 x 200 feet in size, two stories in hight, with a wing 50 x 100 feet and two stories and basement in hight. The japanning and paint department, which is a separate building, is 30 x 50 feet, and equipped with the latest improved ovens. The improvements which have been made by the company have increased their manufacturing facilities nearly five-fold and will enable them to promptly serve their customers in the future. The Aurora line of stoves have established a wide reputation, and with the assortment of Aurora Hot Generating and Process stoves which will be on the market the coming season, the manufacturers feel certain that they will be able to give entire satisfaction to all who may patronize them. They also manufacture a

full line of gas stoves and ranges, soldering furnaces, plumbers' pots, oil and gasoline torches, burners, &c. The officers are: Charles A. Pope, president; George M. Clark, vice-president, and A. C. Pope, secretary.

THE DANGLER STOVE & MFG. COMPANY, Cleveland, Ohio, send us a copy of an exceedingly attractive catalogue and price-list which they have issued, relating to gasoline vapor stoves and ranges. It is a publication of 40 pages, neatly printed on good paper and bound in colored-paper covers with a side title embossed in gilt letters. This is the fourteenth annual catalogue which the company have issued, and in it they call special attention to the improved design of the frame for their individual and single-generator burner stoves. The great merit of these goods is claimed to be that they are made with the company's "H.K.D." Excelsior and single-generator burners, which have been in constant use for the past thirteen years. The Dangler Surprise has also been the subject of several important changes after one season's use, and the manufacturers believe that the stove will rapidly come to the front and continue to grow in popularity. The catalogue illustrates cabinet gasoline ranges, gives a sectional view of the burner employed in connection with the Surprise stove, together with general views of individual burner constructions, Junior stoves, ovens, waffle irons, plumbers' and tinners' furnaces, gasoline torches and directions for operating the Dangler Process stove. Another interesting feature of the catalogue is repair lists for various sizes and styles of burners. There is also found a number of pages devoted to gas stoves, including the Surprise, a sheet-iron cylinder construction, and the Dangler, a six-hole gas range of very attractive construction. The catalogue closes with an official price-list adopted by the Vapor Stove Manufacturers' Association of the United States and a telegraphic code for gasoline stoves, ovens, &c.

THE MICHIGAN STOVE COMPANY are furnishing their customers with unique posters for store use. They are made of ordinary manila wrapping paper, printed in imitation of lettering with a marking brush. The language used is pointed and vigorous. One says: "Are *you* going to buy a new stove? The Garland is the world's best." Another reads: "A new arrival of the celebrated Garland stoves and ranges." A third remarks: "Step in and examine our new line of Garland stoves and ranges." A fourth announces: "Just received—a new line of the celebrated Garland stoves and ranges." Every sheet bears the well-known Garland trade-mark. If these sheets are hung in a merchant's window for a while or tacked to boards outside the door, they will undoubtedly attract more attention than an ordinary printed poster in conventional type, as they have the appearance of having been done by hand.

House-Furnishing Goods.

The term "house-furnishing goods" covers a wide field; and the reports of our correspondents which are classed under that heading will give a very good clew to the condition of general trade throughout the country. Nothing should be so good an index of the well-being and prosperity of the community at large as the demand for household goods. Money spent to a large extent in the articles which come under that name, shows that money is abundant and well distributed. We are pleased, therefore, to see that, in almost every line of house-furnishing supplies, the reports which have come to hand testify to more or less flourishing business having been experienced during the year. A few extracts from reports will give a better general idea of the state of this trade than it would be possible to do in a summary, on account of the variety of goods treated.

ENAMELED AND TIN WARE, ETC.

A home firm importing and manufacturing enameled ware writes of a business which has doubled in the past year. Competition in this line is keener, and a great deal of poor quality goods are put on the market to compete with the better grades. In regard to prospects, the writers consider the outlook for business as good. They add: "Our goods are bulky, and dealers are forced to order small lots and often. They cannot be overstocked. Those who have looked for prices first and quality afterward have had so many complaints and lost so many customers that they have concluded it better policy to sell prime-quality goods."

From a new England concern making granite and agate ware as well as tin and Britannia ware, we learn of increased business at slightly smaller margin of profit, owing to more active competition, with a tendency to lower prices, and a cheapening of the class of goods marketed. The certainty of at least a fair business in the new year is expressed.

HARDWARE SPECIALTIES.

Trade generally good throughout the Eastern and Western States. A prominent concern in the East making specialties in hardware house-furnishing goods report 10 to 12 per cent. increase in volume of business, but smaller profit proportionately than in 1891. An excellent business is predicted for 1893.

From a Western house engaged in the same line of manufacture we receive the following report:

"We have during the past ten years made a yearly gain in gross sales of about 10 per cent., in spite of the fact that in that time prices have grown very much lower. We should have made a better showing this year but for the failure of the cabbage crop, which caused us to sell less cutters than during any previous year. Cost of manufacture is rather less, but prices being also lower makes the margin of profit about equal. We think the prospect good if the World's Fair does not affect business."

From a wholesale tinware house in Indiana, we are told of growing business, with no drop in the margin of profits. The outlook is thought to be better for business this year, than in any preceding it.

WASHING MACHINES.

A 25 per cent. increase is expected in the business in washing machines, for which a growing demand is noticed.

HOUSEHOLD UTENSILS.

Business in pails, wash basins, cuspidors and other household utensils is reported as better than before experienced. Sharper competition and lower prices are stated to rule in the Western States, where dealers are buying cautiously.

ICE CREAM FREEZERS.

Freezers have had a good year, we are told by more than one maker of these utensils in the East. The export trade in ice cream freezers is said to reach a very much higher figure this last season than usual. Severe competition and consequent close prices obviate, however, any large margin of profit.

Twenty five to 30 per cent. is given as the gains in volume of business last year.

REFLECTORS.

A manufacturer who makes a specialty of reflectors states that he has found business much better than any other year. He complains of irresponsible competition and low prices, reducing profits to a minimum.

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TRADE REPORT.

The Outlook in the Iron Market.

VERY little need be said concerning developments in the Iron and Steel markets during the past week. There have been very few transactions of magnitude to test the market in any line or in any leading distributing center.

The consensus of opinion, so far as the coming year is concerned, seems to be that for many months to come nothing but a low range of values can be expected. The Iron and allied trades are expected to share largely in the general quickening of commerce which is likely to develop in certain directions as one of the effects of the World's Fair. Conservative business men are nervous, however, concerning the possibility of an invasion of cholera. Another question which is beginning to come forward as a possible disturbing factor is the danger of a premium on gold.

So far as the Iron trade proper is concerned, the principal argument for a continuance of low prices is based on the prediction that Lake Ores will be very cheap this year. First of all, it is undoubtedly true that considerable quantities of Ore now on the docks at lower lake ports remain unsold. That is conceded by the mining interests themselves. The point is made, however, that relatively little Bessemer Ore is unsold on the docks. If this be true, then there is sure to be a pressure on the non-Bessemer varieties, which will react on Gray Forge Pig and crowd down Muck Bar, thus helping the puddling furnace in its struggle with the Bessemer converter.

The principal cause for the cheapening of Bessemer Lake Ore for the coming year must be sought in the invasion of the markets by the product of the Mesaba range. These new Ores must fight their way into favor. For the present they can be very cheaply mined, and it is intimated that $3.75 at Cleveland is expected to be the selling price. This may crowd a good many of the weaker miners in the older ranges to the wall, but even then the market is likely to be heavily supplied. The most conservative estimates of the 1893 Mesaba Ore product place it at 750,000 tons, this figure being based rather on the probability of inadequate transportation facilities than upon the producing capacity of the mines.

Should developments in the Lake Ore markets take this course, which can be interfered with only by labor disturbances, then the producers west of the Allegheny Mountains will possess a tremendous advantage. They are likely to become fiercer competitors than ever before in Eastern markets in all Soft Steel products. They will probably crowd the Southern Pig Iron makers back from markets which they have thus far invaded. The Southern producers may then be expected to put even greater pressure upon the markets east of the Allegheny Mountains.

Relief can apparently come only through a continuance of the enormous consumption of this country, encouraged by low values. It is in this direction that prospects are brightest. Comparatively little increase is expected from the Steel Rail trade, since financial matters are not in such shape as to encourage much construction of new mileage. But the outlook in engineering construction, in architectural work and in the general trade is regarded as excellent.

The Eastern Iron Trade in 1892.

As the controlling Eastern market, the following review of the trade in Philadelphia and Eastern and Central Pennsylvania closely reflects conditions prevailing during 1892:

Pig Iron.—There is not much room for comment in regard to prices during the year just closed, as they were uniformly low, the extreme point of depression being reached during the months of July, August and September. Prices opened in January, 1892, at about $1.50 to $2 better than could be realized during the month just closed, and from $2 to $3 better than was obtainable during the summer months. December, 1890, showed the weekly output to be the largest on record up to that time. Production kept on increasing during the three following months, reaching in March the enormous aggregate of 194,000 tons. This, as might be expected, was the last straw that broke the camel's back, and from that date on until October there was a very rapid curtailment, a difference in fact within six months of about 42,000 tons per week. From the course of the market during the past year it may be inferred that 190,000 tons per week is more than the market will take and that 160,000 tons is below its requirements, so that if consumption during the next six months averages about the same as during 1892 the present average output of 175,000 per week ought to keep prices pretty steady. The decline in prices was simultaneous with the increase of production beyond 180,000 tons, the recovery was also simultaneous with the decrease in production below 160,000 tons. That is to say, prices begin to weaken when production is over 180,000 tons, and begin to stiffen when it gets below 160,000 tons. It is therefore fair to presume that our normal consumption will average about 175,000 tons per week. Any material falling off from that tonnage will be likely to affect prices unfavorably, and on the same basis, any marked increase in consumption will also be likely to influence them in the opposite direction. The monthly reports of furnaces in blast ought therefore to be a fairly correct indication of the course of the market from time to time. From present appearances there is nothing to suggest any material departure from the conditions recently prevailing. The Steel Rail trade is liable to become a factor of some importance, but that interest has been dormant so long that the trade almost entirely ignore it. All the same, some of these days it will surprise people when they least expect it. Meanwhile many important changes are being worked out. Steel is usurping Iron to such an extent that the demand for Gray Forge is almost a thing of the past. A few local furnaces, with one or two in Virginia, virtually supply all the first-class Mill Irons that are called for in eastern Pennsylvania, while the foundry trade, which is rapidly extending, absorbs Iron from all parts of the country. Some local brands still retain their former high reputation, but they no longer have a monopoly. Western Pennsylvania (to some extent Ohio), Alabama and Virginia are all contributors to this market, and are supposed to be here permanently. Some of these brands from a distance find a market because of their superior quality, others because of their low prices, each particular brand having become fairly well known for its distinguishing feature, either in price or quality. In regard to prices during the coming year, it is hardly possible to form any very decided opinion, except that they are likely to rule very low. There is some prospect of a lower cost of production, apart from which we should be rather inclined to expect a slight improvement, but under present conditions it will require a good deal of heavy buying to impart either strength or vigor to the market. In any case, matters are in such a shape that consumers have no fears of being taken unawares, and this, in fact, is one reason why there is so little variation in prices. There is not enough concerted buying to put prices up, but, on the other hand, consumers are so dependent on the frequent renewal of their purchases that they have no chance to go down. The extreme limits of quotations have, as we said before, been about 50¢ below the figures of to-day, and at the highest from $1 to $2 above them, as shown by the following, which were current quotations in Philadelphia at the beginning of each month in the year:

1892.	Standard Pennsylvania. No. 1x.	Standard Pennsylvania. No. 2x.	Standard Virginia. No. 2x.
January	$17 50	$16.00	$15.00
February	17.50	16.50	16.00
March	17.25	15 75	15.00
April	15.50	15.00	14.50
May	16 50	15.00	14 50
June	15.75	14.75	14.00
July	15.00	14 00	14.00
August	15.00	14.00	13.75
September	15.00	14.00	13.75
October	15.00	14.25	14.00
November	15.25	14.50	14.00
December	15.25	14.50	14.00

Steel Slabs and Billets.—Some rather wild fluctuations have been met with in this department. Prices opened steady in January at about $27, which was maintained with slight variations until early in February, when a decided feeling of weakness began to manifest itself. This continued almost without a single reaction until July, at which time the complicated appearance of the labor question began to attract attention. Meanwhile prices had reached $24.50 for deliveries to points equivalent to Philadelphia, and it is believed that $24, or very close to it, was done in some instances. During August spot lots began to be at a premium and so continued until about the middle of November, after which date business gradually assumed its normal condition. During the fall months prices ranged from $25.50 @ $27, price being graded according to the necessity of the consumer and the condition of the seller's order book. There was no uniformity in prices, each transaction being a law unto itself. To-day's prices are to some extent of the same character. Sellers ask $24.25 @ $24.50, but buyers are unresponsive, and, while it is hardly possible that there can be any appreciable decline from these figures, it is believed that business will not start up to any extent until makers are willing to quote about $24. A few days will test the matter, but in the meanwhile it is understood that bids at that figure can be had for moderate sized lots for delivery during January and February; beyond that buyers are disposed to hold off. A few odd lots have been picked up at a trifle less than $24, but for the time being that is probably a minimum quotation.

Sheets.—A large business has been done in Sheets, and if the mills had full justice shown them a much larger business would have been done. The manufacture of Tin Plates ought to have absorbed 100,000 tons of Thin Sheets, but imports have been so large that Sheet manufacturers have not had anything near the proportion of business they ought to have had. Nevertheless, mills have been almost continuously full of work, and if there is no tariff tinkering they are likely to do still better during the year upon which we have just entered. Prices have not varied to any extent, but are to-day very close to the lowest on record.

The Western Iron Trade.

The influences of the course of events in the West are clearly set forth in the following review of the markets in Chicago:

The year just ended has been more than usually eventful. It opened with excellent prospects in almost every branch of the Iron trade. General prosperity prevailed throughout the West and Northwest. Agriculture, the basis of all business, had recovered from its depression of years and farmers were again most liberal buyers of all classes of manufactured products. Transportation lines were crowded with freight and stockholders looked forward to dividends with old time confidence. Industrial activity was quickened in every direction. Building projects were numerous in every city and town. Capital promised to embark in new enterprises with much less timidity than for the previous two years. The consumption of Iron and Steel was therefore expected to increase considerably, and as a matter of course, a more profitable business was anticipated by Iron and Steel manufacturers. Preparations for the World's Fair in Chicago were also to be pushed vigorously in 1892, and this was looked upon as a decided assistance to general trade. With millions to be expended on the fair grounds, millions more in local preparations outside the grounds, and millions more in providing greater transportation facilities, the effect of the coming fair, it was thought, would be very favorable for all classes of trade in the Northwest.

But adverse influences possessed sufficient strength to overcome these favorable conditions. Chief among these, it is believed, is not only the almost complete cessation of the investments of foreign capital in American enterprises, but also the withdrawal of a considerable portion of that already invested. The change from a long-continued stream of foreign capital pouring this way to a steady drain is a discouraging reversal of commercial conditions. Fortunately it came at a favorable time, or the consequences to this country must have been serious, as indeed may yet be the case if it continues for any considerable period.

The bright prospect with which 1892 was ushered in did not continue beyond the month of January. Values were determinedly seeking a lower level. The course of affairs was from bad to worse as spring opened. Crude iron and steel fell to lower and lower levels, and diminished production failed to check the decline, as the decrease in consumption outran the falling off in production.

Midsummer found the lowest prices prevailing in the Chicago market that had ever been known there, except for steel rails and common bar iron, but the decline was checked by the stoppage of the Western rolling mills and steel works in July and August, pending a settlement of the wages question.

The improvement in the Iron and Steel trades, which was stimulated by the long stoppage of the mills, continued until the middle of November notwithstanding the shadow of the Presidential election. Manufacturers smiled to think that they had ever regarded a Presidential election as a disturbing influence and the remark was often heard: "If this is a sample of Presidential election year business we would like to have an election every year." After the election they felt otherwise. The demand fell off and prices receded until the condition of trade resembled that of the spring. December was a month of general quiet in trade circles.

Pig Iron. January was a month of such activity in Coke Iron that strong hopes were entertained of an improvement in prices. This led to efforts by consumers to place contracts for long deliveries, in which they found local producers willing to join. Sellers of Southern brands were not permitted by their companies to sell so far ahead, and they consequently failed to get as much business as they would otherwise have probably secured. February was inclined to quietness, and March became exceedingly so. Special efforts were made this month by some of the local producers to force trade, and transactions occurred in No. 2 Foundry at the unprecedentedly low rate of $12.50, which was, however, so exceptional that sellers could not be induced to repeat the performance.

April witnessed some improvement in the demand for Coke Iron, and trade was quite active in May, tapering off again in June. During this quarter of the year Southern companies pushed for business more aggressively, and very low prices were made on some transactions, No. 2 Soft receding to $12.50, which was low water mark for the year.

July was comparatively quiet, August was dull until toward the close of the month, when active buying was renewed, and September was a month of very heavy trade. Southern makers surrendered to consumers during this quarter and numerous large transactions occurred at prices which were close to the lowest of the year. Prospects grew brighter for manufacturers toward the close of the month. Consumption was perceived to be very rapidly increasing, stocks at furnaces were known to be diminishing. The foundries around Chicago and through the Northwest were never busier than now.

October was a very attractive month, perhaps surpassing every other month in the year, and November started out equally well, but trade dropped off quite abruptly after the second week, and did not recover even in December.

The following table shows the course of prices at Chicago for the leading varieties of Pig Iron, based on cash payments and averaged for the month on weekly quotations:

Months.	Local coke No. 1.	Ohio strong soft No. 1.	Southern coke, No. 1.
January	$15.25	$17.75	$15.75
February	15 00	17.75	15.75
March	14.50	17.50	15.50
April	14.75	17.00	15.25
May	14.50	16.75	15 50
June	14.50	16.50	15.00
July	14.50	16.25	14.75
August	14.50	16.25	14.50
September	14.50	16.25	14.50
October	14.25	16.25	14.75
November	13.75	16.25	14.75
December	13.75	16.25	14.75
Av'ge for year	$14.50	$16.75	$15.00
Av'ge for 1891	15.50	18.00	16.00
Av'ge for 1890	17.50	20.00	17.25
Av'ge for 1889	16.75	18.75	16.75

Finished Iron and Steel.—If it were possible to obtain statistics of the total quantity of Finished Iron and Steel marketed in Chicago and its immediate vicinity in 1892, it is believed that the figures would be greatly in excess of any previous year. Season contracts by the agricultural implement works which were placed early in the summer ran far ahead of previous years. Other manufacturing interests intimately connected with agriculture were also heavier consumers of Iron and Steel than at any former period. Thousand of tons were used in elevated railway construction. Requirements for the World's Fair buildings were large. The consumption by car works and manufacturers of railway supplies was heavier than usual. The building trades were very active, more Iron and Steel structures having been erected in 1892 than in any former year. Yet prices for the 12 months averaged lower than ever before, and in some cases very much lower. Steel made further inroads upon the domain of Iron. Agricultural Implement manufacturers purchased Soft Steel in notable instances at lower prices than they had previously been able to secure on Iron. Bar Iron prices were lowest in May, having steadily declined from January. They stiffened

up in June, influenced by the prospects of a general stoppage of the mills in July. During the three following months there was great scarcity, and prices advanced still further, being well maintained until December, when concessions were made by mills running short of orders. Bar Iron jobbers in the Northwest enjoyed a phenomenally large business while the mills were closed down and for some time afterward. Large consumers, who usually buy direct from the mills, were forced to draw on jobbers' stocks and paid dearly for their failure to anticipate the stoppage of the mills and lay in supplies.

The Chicago market is now coming more closely under local influences than a year since. At that time the bar mills in the immediate vicinity were shut down, to all appearances permanently. Now they are in active operation, or will be in a few days, and besides new mills have been started in Indiana within a reasonable distance, so that they can easily reach the Chicago market. Sheet mills have also been built within the Chicago district during the past year, and competition is stronger in the Light Sheet trade.

Average prices for 1892 were lower than for many years, perhaps lower than ever before, although they ran up to a fairly high point in August and September, when the influence of the lockout was most felt. The following table shows the course of prices on mill lots, Chicago delivery, averaged from weekly quotations:

Months.	Common bar iron. Cents.	No. 27 common sheets. Cents.
January	1.65	2.90
February	1.67½	2.90
March	1.62½	2.85
April	1.57½	2.85
May	1.52½	2.75
June	1.55	2.80
July	1.62½	2.90
August	1.65	2.95
September	1.65	2.90
October	1.62½	2.95
November	1.62½	3.00
December	1.62½	2.95
Average for year	1.62½	2.90
Average for 1891	1.70	2.95
Average for 1890	1.82	3.17
Average for 1889	1.68	3.21

The Metal Trade in 1892.

Copper.—The year 1892 was one of considerable fluctuations in the Copper trade, a considerable part of the year being influenced by uncertainties as to the character of the understanding among the leading American producers and some of the principal mining companies represented in Europe of other principal producing countries throughout the world. For some years past a few of the giants in the Copper trade have been pursuing the policy of attempting to outdo one another and to crush the smaller companies. This has led to prices which at times have been very close to the cost of production of the average mine. The consumption also has fluctuated within apparently wide limits, and has thus added a further element to the uncertainties of the market.

The year was entered with Copper showing a rising tendency, advancing early in January from 10¾¢ to 11¢ ₱ lb for Lake Superior Copper as the results of large purchases by consumers for delivery over the first quarter. In some cases the contracts covered the first five months of the year. As is usual, the market was flat and lifeless after the majority of the leading Brass and Sheet Copper manufacturers and Wire drawers had bought, and in view of further supplies forthcoming the price was not maintained at the highest figure reached in the advance. The absence of an important export movement contributed to the easing tendency, which continued until the middle of February, when prices had fallen to 10.65¢. Then further contracts with consumers on the basis of about 10.50¢ @ 10.75¢ cleared the market of its surplus. At the same time large sales for export of Matte, involving about 10,000 tons, over six months' delivery, and transactions covering 4000 tons of Ingot for export, aided the situation.

It was a little later, early in March, that rumors began to obtain credence concerning negotiations pending between the leading American and foreign producers. These and the absence of any pressing supplies enabled producers to mark up prices from 10.75¢ to 11.50¢, and further export sales of Matte led to a rising of values up to 12¢. This remained the nominal quotation during the balance of March and the greater part of April and of May. During all this time consumers, having fully covered their requirements, maintained an absolutely indifferent attitude and there were periods in April when small quantities were offered by second hands at a shade under the sellers' quotation of 12¢.

Negotiations among the producers on both sides of the Atlantic were continued throughout these months, the delay encouraging buyers in the conviction that a final arrangement might not be reached. This feeling appears to have been shared by some of the smaller outside companies, who in June began offering supplies at lower figures. Simultaneously the opportunity was seized by bankers to dispose of upward of 6,000,000 or 8,000,000 lb of Copper still held as the balance of material carried over from the time when the French syndicate was operating.

June brought some specific information concerning the arrangement entered into through the international agreement. It was understood that nine of the principal American companies, including the Calumet & Hecla, Tamarack, Osceola & Quincy, on Lake Superior, Anaconda and Boston & Montana, in Montana, the Phelps-Dodge interests and the Old Dominion, in Arizona, had agreed not to produce more than 100,893 gross tons of fine Copper during the year ending July 1, 1892, as compared with an output of 90,625 tons during the preceding year. It was understood that the outside American producers represented a total output of about 36,160 gross tons. At the same time the American producers made the concession to foreign mine owners that their exports should not average more than 3333 gross tons per month. On the other hand, European mining companies, representing undertakings in Spain, Germany, the Cape, Australia, Mexico and Venezuela, bound themselves to reduce their output from 5 % to 10 %. It was reported that these associated companies represented about one half of the total production of the world outside of the United States.

Consumers having been pretty well supplied by bankers' stocks and through other sources kept aloof from the market, which early in July declined to 11.25¢. In the middle of that month the cheap Copper had been pretty well absorbed and prices were marked up to 11.75¢, at which figure they were kept during the greater part of July. Slow sales, however, induced a decline to 11.50¢, a figure which ruled with some irregularity during early September, but could not be upheld. The determination of manufacturers to withhold from the market was the feature until early in October, when somewhat more liberal orders were placed at 11½¢. Then manufacturers entered the market for larger quantities, causing an advance up to 11.50¢. This movement was helped by the announcement that the Anaconda Company would close down their works early in November. Although the impression prevailed that this shutdown was not entirely voluntary and though it was evident that it was utilized for speculative purposes in the English market, consumers become uneasy and the price was rushed up to 11.75¢.

In the first half of November manufacturers bought quite heavily for December and January deliveries, and at the same time a considerable export movement in Ingots and in Matte was attained. This advanced the price to 12¢ and was followed by a very large sale of Lake Copper for electric purposes for delivery during the first half of 1893 at the reported price of 12.50¢. As usual, the struggle between buyers and sellers after culminating in large transactions led to a prolonged period of inactivity, which characterized the whole month of December and promises to be the feature during the early weeks of the current year.

Tin.—During the whole year under review this metal has been juggled with by a set of speculators operating both in this and in the London market. At times prices have been rushed up to squeeze outsiders who have attempted short sales and at other times the market has been artificially depressed in order to punish operators working in the other direction. A feature of the trade, particularly in the earlier months of the year, was the keen competition among importers, which manifested itself chiefly in making special prices for out-of-town customers. The whole course of events has been exceedingly puzzling to consumers and to jobbers, and matters have been complicated by the expectation during the summer that prices would advance in anticipation of the imposition of a duty on Tin under the McKinley law on July 1, 1893.

Tin declined from 19.85¢ for large quantities for spot early in January to 19.50¢ in the middle of February. March developed a more active speculative movement, culminating in prices rising to 20¢ at the close of the month. It was in April, however, that the argument coupled with the Tariff law began to have its first effect in the form of a rise to 20.75¢. The early weeks of May witnessed a very heavy speculative movement, leaving at the end of the month the bull clique in full control, with the price up as high as 21.50¢. The cornering of a short interest in London is supposed to have been the principal cause of a continued rise during early June for Straits Tin to 22.20¢ for large lots. Then came a drop, coupled with a complete standstill of purchases on the part of the trade and of jobbers.

The whole of the rest of the year was characterized by the fact that the speculative element alluded to was in absolute control of the market, at times running up the price and at other times letting it down. These fluctuations up to early November were between 20.15¢ and 21.15¢.

The result of the election threw doubt upon the enforcement of the Tin clause of the tariff bill, and brought about a decline to 19.50¢ in December. Some relief has been sought since then by shipments of stock to England, and by the diversion of metal afloat for America to the London market. Throughout the greater part of the year the supplies were ample, so far as ordinary consumptive requirements demand. It was estimated that at one time the speculative clique was carrying fully 3500 tons of Tin in this country, and was supposed to control the greater part of the metal in Europe.

Lead.—In spite of influences which should have aided the metal, Lead has throughout the year developed an almost persistent declining tendency. The year opened with a continuance of a contest of endurance between producers and consumers, which culminated in the middle of January with considerable sales at 4.10¢, one of the depressing influences being the possibility of foreign Lead being landed in seaboard markets. Buyers did not again reappear until the middle of February, when they

took round blocks at 4.05¢ @ 4.10¢. Then a somewhat stronger undertone carried the market along until March, when consumers were again able to place larger orders at 4.10¢. In April, under good sales, the market improved until 4 27½¢ was reached, at which figure additional sales were made in May.

It was at this time that the labor troubles began in the Cœur d'Alène region, Idaho, a district which furnishes by far the largest quantity of Lead Ores in the country. In spite of this curtailment of supplies of raw material, the market continued weak during June, July and August, falling as low as 4¢. In anticipation of a good fall business producers assumed a firmer attitude and were able to carry the market back in September to 4.15¢. From this price the decline was almost uninterrupted until 3.70¢ was reached in December. Since then there has been a slight recovery, the year closing with the market steady at 3.85¢.

Spelter. — Under the weight of an enormous production on the part of American Spelter makers the markets throughout the country have weakened during the greater part of the year. Prices started at 4.65¢ and were only fairly maintained during the first four months by repeated export sales, the prices made by the European syndicate of producers making it possible to market Spelter abroad. August brought a somewhat better tone, which was aided in September by the fact that floods in the Missouri and Kansas mines curtailed heavily the supply of Ore. Spot metal was carried up from 4.50¢, the lowest price reached, to 4.90¢ in June. Then, however, the chance of the further relief of the market by export orders was cut off through the collapse of the European combination, and Spelter started on a downward course which carried it to 4.40¢ in October. Efforts to support the market were made in October and November, but were without effect, and the price settled down to 4⅛¢, closing down at that figure.

Tin Plate.—We review at length elsewhere the condition of this industry in the United States, and in referring to the markets on foreign Tin Plate need only state that fluctuations throughout the year were within a very narrow range, IC 14 x 20 Bessemer Coke Tins of full weight selling at $5.30 during the first six months. July brought an easing to $5.25, followed by $5.20 as the regular quotation for large lines during August and September. October witnessed a recovery, which brought values up to $5.30. A further rise to $5.45 was realized in November, while December closed with quotations advanced to $5.50.

Financial.

It is generally conceded that in most lines of business the year just closed has been one of exceptional prosperity, despite the fact that it was a "Presidential year," and such a result might have been anticipated as naturally following a year of unprecedented agricultural abundance. The volume of trade was of unusual proportions, but as a rule prices were low and the margin of profits unsatisfactory. Cotton manufacturing seems to have been a notable exception. The present condition of trade throughout is pronounced sound, but the outlook for 1893 must be regarded as uncertain, chiefly on account of financial problems, of which the silver question and a possible Treasury deficit are uppermost. Europe, too, is under a cloud, both financially and politically, so that a conservative policy on the part of business men with reference to the future is the suggestion of wisdom. Owing to the low prices of cotton and grain and the reduced value of exports, together with the return of American securities in exchange for gold—the latter at a period as unseasonable as it is inopportune—in respect of Treasury operations, the outlook for foreign trade is less satisfactory than could be wished. On the other hand, the traffic stimulated by the Columbian Fair cannot but impart a wholesome influence, and the unprecedented accumulation of grain at Western points for forward shipment in the spring gives promise of unusual activity on the opening of navigation and remunerative freight. Even for the month just closed railroad earnings were larger than for the corresponding month last year. Payments through clearing houses outside of New York in December were the largest ever made in any month, exceeding those of 1891 by 15 %, and the year's transactions exceed those of any previous year by nearly 8 %. At New York the increase in December was 10 %, but for the year over 8 %.

Coal.

Another interesting development in the Anthracite Coal trade is chronicled this week which is capable of various constructions, viz : the separation of the Lehigh & Wilkesbarre Coal interests from the Reading management. President Maxwell of the New Jersey Central Railroad, being likewise president of the Lehigh & Wilkesbarre, is supposed to be desirous of restoring the *statu quo* so far as possible to the conditions existing prior to the Reading combine, in order to conform to a recent ruling of the courts. Naturally, it is reasoned, Mr. Maxwell takes with him the Coal company, from prudential considerations. Accordingly, the latter has issued its circular recognizing the fact, and Percy B. Heilner is sales agent. Combine prices are nowise affected, and the market remains as a week ago. Pea alongside is $2.85, Buckwheat $2.25. Some dealers in the trade assume that the separation of the Lehigh & Wilkesbarre from the Reading Company following the new finance arrangement indicates weakening which precedes final dissolution somewhere in the future. The relative importance of the financial and legal complications respectively is variously understood

Bituminous Coal is in good demand, up to the supply, and the market is stiff. Cumberland is quoted $3.25 @ $3.50, alongside; Clearfield, $3 @ $3.25

The Hardware Market.

Notwithstanding the fact that trade is characterized by the inactivity which is expected at the opening of the year and before the accounts of the past year have been balanced, there is evidence of an excellent feeling in regard to the prospects for business during the season. There have been thus far few changes in price and few announcements of new lists, but some of the manufacturers are sending out new catalogues and there is evidently a good deal of enterprise being shown in putting new goods on the market, improving plants, &c.

Advices from Chicago: Shelf Hardware jobbers report trade quiet, as their salesmen have not yet started out. Prospects are bright for the coming year, as the Northwest is in excellent shape. Farmers have enjoyed two very prosperous years, with good results to all interests directly connected with them. Heavy Hardware jobbers report their trade starting off well this year, manufacturing consumers taking liberal supplies of all sorts of stock handled in this branch of trade.

Advices from St. Louis: Trade has not quite recovered from the holiday dullness, and as it will be a week or ten days before traveling men will be on the road again, business is not likely to be very heavy. The local cold snap has enabled jobbers to clean up their stock of Skates, some of which they have been carrying for several years. Barb Wire and Wire Nails are dull and prices are somewhat weaker. Jobbers are all busy preparing for a big trade during the present year and say the outlook is decidedly encouraging. The Southern trade is not as good as might be expected, but shows a decided improvement over the corresponding period of one year since. Texas trade has been large on account of cut in freight rates.

Notes on Prices.

Cut Nails.—The Cut Nail market continues sluggish and without special feature. The demand is small but stocks are not increasing, owing to the largely diminished production as the result of the agreement among the Eastern manufacturers and the usual stoppage for repairs. Prices in New York city are $1.75 to $1.85 for small lots from store. Carload lots on dock are held at $1.60 to $1.75, according to average.

Chicago.—Cut Steel Nail are quiet, factories being shut down for repairs. Very cold weather is interfering with outdoor work, so that consumption is light at present, and manufacturers recognize the futility of endeavoring to force sales at such a time. Small lots are unchanged at $1.65 to $1.70 from stock.

Wire Nails.—The Wire Nail market continues weak and irregular, and it is understood that Nails have been sold at lower figures during the past two weeks than ever before.

Chicago.—Wire Nails are quiet on account of the light consumption. Rumors that heavy buyers are in the market to cover future requirements were in circulation last week. Small lots are selling at $1.70 to $1.75 from stock.

Barb Wire.—The market appears to be characterized by a somewhat better tone, and manufacturers are pursuing a conservative policy with reference to

orders for future delivery. The regular quotation for small lots from store in New York is $3.10 for Four-Point Galvanized, an abatement of 10 cents being made in carloads.

Chicago.—Barb Wire is steadily growing is demand, and prospects are brighter than ever for a large spring trade. Large lots are, of course, selling at lower prices than carloads, but manufacturers claim to have been able to secure an advance on such sales during the past week. Small lots from stock are still in selling at $2.30 and $2.75.

Shot.—Under date January 2 the manufacturers of Shot, without making any change in their regularly announced prices, quote them in a different form. The quotations at present are given as below, it being stated that in lots of 2000 pounds and upward taken at one time a discount of 5 cents per bag of 25 pounds will be allowed ; terms, net cash 30 days, or 2 per cent. for cash in 10 days :

Drop Shot, sizes smaller than B, per 25-pound bag	$1.45
Drop Shot, B and larger sizes, per 25-pound bag	1.70
Buck and Chilled Shot, per 25-pound bag.	1.70
Dust Shot, per 25-pound bag	2.00
Drop Shot, sizes smaller than B, per 5-pound bag	0.35
Drop Shot, B and larger sizes, per 5-pound bag	0.40
Buck and Chilled Shot, per 5-pound bag..	0.40
Dust Shot, per 5-pound bag	0.45

Freight is equalized with New York, Philadelphia, Baltimore, Pittsburgh, Cincinnati, Chicago, St. Louis, Kansas City, Omaha and St. Paul. The price at New Orleans has been advanced 3 cents per bag of 25 pounds. A change is also made in regard to Gunnies or Pockets, which will be credited at the prices charged if returned in good order, without deducting freight as heretofore.

Stanley Rule and Level Company.—This company make no changes in the discounts on their entire line of Tools. They call attention to a new form of Plane Iron recently adopted by them, and for which they claim improved features.

Practical Saw Jointer.—A. E. Rogers, Melrose Highlands, Mass., manufacturer of the Practical Saw Jointer, quotes these goods at $4 per dozen.

Wrought Butts.—The manufacturers of Wrought Butts have adopted a new list correcting the inequalities which have existed in the one which has been in use for so long a time. We give below the list of the Stanley Works, New Britain, Conn., and 78 Chambers street, New York, which is subject to a discount of 40 per cent. :

Size. Inches.	Narrow and Lt. Narrow, Nos. 800 & 838.	L. Pin. Light Narrow, No. 840.	Light Parliament, No. 832
¾	$0.16	.....	.....
1	.18	.....	.....
1¼	.20	.....	.....
1½	.25	$0.31	.....
1¾	.28	.36	.....
2	.31	.40	.....
2¼	.36	.45	.....
2½	.38	.50	$0.88
2¾	.45	.55	.....
3	.48	.64	.95
3¼	.60	.....	.....
3½	.72	.95	1.05
3¾	.95	.....	.....
4	1.05	1.30	1.30
4½	1.30	.....	.....
5	1.65	.....	.....
5½	2.15	.....	.....
6	2.60	.....	.....

Size. Inches.	Reversible, No. 804.	Broad, No. 808.	Reversible, with tips, Nos. 822.	Light Reversible, No. 824.	Light L. Light, No. 830.
2 x 2	$0.50	$0.40	$1.30	$0.50	$0.50
2 x 2½	.52	.48	1.50	.52	.52
2 x 3	.62	.....	.....	.62	.....
2½ x 2	.57	.....	1.50	.....	.....
2½ x 2½	.65	.55	1.60	.65	.....
2½ x 3	.75	.65	.....	.75	.....
3 x 2½	.85	.70	1.75	.....	.....
3 x 3	.95	.85	1.85	.....	.....
3 x 3½	1.05	.95	2.00	.....	.....
3½ x 3	1.25	1.10	2.05	.....	.....
3½ x 3½	1.35	1.25	2.15	.....	.....
3½ x 4	1.55	1.45	2.35	.....	.....
4 x 3½	1.55	.....	2.50	.....	.....
4 x 4	1.65	1.55	2.65	.....	.....
4 x 4½	1.75	.....	2.85	.....	.....
4 x 5	1.85	.....	3.05	.....	.....
4½ x 4	1.90	.....	3.00	.....	.....
4½ x 4½	2.15	2.00	3.20	.....	.....
4½ x 5	2.35	.....	3.50	.....	.....
5 x 5	2.75	2.35	4.00	.....	.....
5½ x 5½	3.35	3.20	5.20	.....	.....
6 x 6	3.80	3.55	5.85	.....	.....

Size. Inches.	Table Hinges and Square Flaps, No. 810, 816.	Back Flaps, No. 814.	Light Inside Blind, No. 842.	Light Inside Beveled Edge, No. 843.	L. Pin Light Inside, No. 844.	Pew Door, No. 818.	Chest, No. 820.
¾	.....	$0.24	.....	.....	.....	.....	.....
⅞	$0.24	.26	.....	.....	.....	.....	.....
1	.26	.28	$0.21	$0.41	.....	.....	.....
1¼	.28	.31	.94	.44	$0.34	.....	.....
1½	.31	.34	.26	.47	.36	.....	.....
1⅝	.36	.38	.28	.52	.38	.....	.....
1½	.38	.43	.31	.60	.40	$0.43	$0.60
1⅝	.43	.47	.....	.....	.....	.....	.....
1¾	.47	.52	.36	.64	.....	.....	.....
2	.52	.57	.....	.....	.....	.60	.85

Eave Troughs and Conductor Pipe.—The revised lists on Eave Troughs and Conductor Pipe, which were referred to in a recent issue and which are printed in a condensed form on another page, were adopted from a desire on the part of the manufacturers to equalize the list on the 2 and 3 inch sizes, on which advances were made, the balance of the list remaining the same. The change will probably have the effect of stimulating the use of larger sizes, as herotofore the 3-inch has been so very low that it was used many times where 4 inch ought to have been the capacity of the Pipe. The advance made is, however, a very moderate one.

Tin Plate.—Prices have stiffened slightly on Bessemer Coke Foish Plates, as a result of fairly liberal purchases of large quantities for spring season delivery. Sales for immediate delivery of almost any kind of Plates are small, with no change in prices. Importers are closing accounts with their customers for the year, taking account of stock and making arrangements for the coming year; in fact, they anticipate little business at present. Collections are reported as fairly good, though importers complain of the small profits during the past year. From various sources the general feeling throughout the country is reported as encouraging for the coming year, the merchants seeming unanimous in the opinion that the prospects for future business are bright.

Glass.—The cold weather with snow and storms during the past week has caused somewhat of a suspension in building operations throughout the country, and will probably cause a lull in shipments of Glass from the factories. Most of the factories, however, report small stocks on hand and plenty of orders. Local trade is about at a standstill, though the price is firm, and no disposition is shown to force sales at a sacrifice of profits. The price of imported Glass remains unchanged. It is reported from Pittsburgh that a general agent has been appointed by the Plate Glass manufacturers of the United States to sell the product of the 11 Plate Glass factories and to distribute the orders. All orders will pass through the agent's hands and will be distributed by him between the factories on the basis of production. Headquarters will be in Pittsburgh, and it is understood the arrangement will go into effect about the middle of the present month. Quotations on Glass are as follows: American Window Glass, 1000-box lots or more, 80 and 15 per cent. discount; carloads, 80 and 10 per cent. discount; less than carloads, 80 and 5 per cent. discount. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 10 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔	@	$0.03¼
Rubber Shoes, in ton lots ℔	@	.03
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔	@	.04¼
Wringer Wire Rolls, ℔ .01	@	.02
Syringes, ℔	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper, ℔	10¢
Light and Tinned Copper, ℔	9¢
Heavy Brass, ℔	7¢
Light Brass, ℔	6¢
Lead, ℔	3½¢
Tea Lead, ℔	3½¢
Zinc, ℔	2¾¢
No. 1 Pewter, ℔	14¢
No. 2 Pewter, ℔	7¢
Wrought Scrap Iron, ℔ gross ton,	$17.00
Heavy Cast Scrap, ℔ gross ton,	10.00
Stove Plate Scrap, ℔ gross ton,	7.00
Burnt Iron, ℔ gross ton,	5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags, ℔		4 ¢
No. 2 White Rags, ℔		3 ¢
Mixed Rags, ℔	1½ @	1⅝¢
Blues and 3ds, ℔	1⅝ @	2 ¢
Hard Sized White Shavings, ℔	3 @	3½¢
No. 1 White Book Shavings, ℔	2½ @	2⅝¢
No. 2 White Book Shavings, ℔	1½ @	1⅝¢
Light Book Shavings, ℔	⅞ @	1 ¢
No. 1 Mixed Shavings, ℔		1¼¢
No. 2 Mixed Shavings, ℔	¾ @	⅞¢
No. 1 Printed Books, ℔	1⅜ @	1½¢
Ordinary Mixed Books, ℔		1 ¢
Newspapers, ℔		½¢
No. 1 Manila Paper, ℔	1⅛ @	1⅜¢
No. 2 Manila Paper, ℔	⅞ @	1 ¢
Bogus Paper, ℔	⅝ @	¾¢
Common Paper, ℔	⅝ @	½¢
Straw Chips, ℔	½ @	⅝¢
Binders' Clippings, ℔	½ @	⅝¢
Jute Butts, ℔		1¾¢
No. 1 Jute Bagging, ℔	1¼ @	1⅝¢
Mixed Bagging, ℔		1 ¢
No. 2 Bagging, ℔		¾¢
Hemp Twine, ℔		2¼¢
Manila Rope, ℔		2¾¢
Jute Rope, ℔		1¾¢
Mixed Rope, ℔	¾ @	⅞¢

Trade Notes.

J. J Sweeney & Co , 236 Water street, New York, manufacturers of Stove Boards, are congratulating themselves on the successful trades of the past season, and announce that they are prepared for increased demands during the coming year.

Among the New Year's reminders which have reached our desk is a large wall calendar from the Wm. Cabble Wire Mfg. Company, 43 Fulton street, New York. Each month occupies a whole page, the upper portion of which contains the name and address, with a list of the various productions of the house. It is neatly printed, in various shades of red, blue, green, buff and violet, the whole forming a handsome and useful office or store calendar. On the back is a view of the Company's factory in Brooklyn, N. Y.

Charles C. Chase, Jr., has withdrawn from partnership in the Tin Plate and Sheet-Metal business of Riter Bros. & Co., 213 Race street, Philadelphia. The firm now consists of Charles J. Riter, M. M. Riter, Jr., and R. Pearce, Jr.

The double page announcement of the Highland Foundry Company, printed elsewhere in this issue, shows a general view of their stove works, which are described as the only works of the kind located in Boston, the office, salesroom and foundry being at 139-165 Pynchon street. The concern also have a salesroom at 114 Lake street, Chicago.

A. B. Kingsland & Co. of Burlington, Vt., make an interesting announcement about Kingsland's Improved Portable Oven of their manufacture. They give a list of reasons why the Kingsland Oven should be made use of, 11 of its principal advantages being noted. An illustration shows the general appearance of the Oven.

The Exeter Machine Company, 32 Oliver street, Boston, Mass., in an advertisement elsewhere, direct attention to the Exeter Radiators, in various styles. A special note is made of the artistic design and quality of finish of these Radiators, a cut presenting the appearance of the Exeter Ornamental.

A card in our advertising columns this week of the J. D. Smith Foundry Supply Company, Cincinnati, Ohio, directs attention to Radiant Foundry Facings, Blackings, &c., of their manufacture.

Fayette R. Plumb, Frankford, Philadelphia, for the better accommodation of his customers in Chicago and the West, has made arrangements with Trout & Sackel, 228 Lake street, Chicago, to carry a complete stock of all goods of his manufacture. Edward F. Ross will continue to act as Mr. Plumb's direct representative, and will carefully look after the territory assigned to him as heretofore.

Stransky & Co , New York, announce that they will on February 1 remove to 27 Murray street and 31 Warren street, the building running through the block.

S. B. Thompson, Broken Bow, Neb., announces under date December 15 that he has bought all the interest of A. L. Davis in the former firm of Davis & Thompson, dealers in Hardware, Stoves, Tinware, &c.

Wright & Hutchison have bought out Mitchell, Moser & Co., Slate, Tin and Sheet Iron Roofing, Hardware, Stoves, &c., Warren, Ohio, and will carry on the business at the old stand. C. Wright of the new firm was formerly of the firm of Kane Bros. & Wright, Caldwell, Ohio. Mr. Wright was also at one time in the grocery business at Caldwell. L. G. Hutchison was formerly located in Morristown, Ohio.

Gilbert & Bennett Mfg. Company, New York and Chicago, call the attention of the trade to the change which they have made in their Poultry Netting, from annealed wire to bright wire. It is remarked in a circular pertaining to this change that bright steel wire very much increases the strength, stiffness and evenness of the fabric, and affords a surface free from scale, to receive and retain the extra heavy pure zinc finish. All sizes will continue to be made with three long regular unwinding twists, standard mesh and full weight, length and width. Also Nos. 19 and 18 will have three strand twisted selvages. Their circular No. 92 includes illustrations of Netting and revised price-list.

Trout & Sacket, 228 Lake street, Chicago, Ill., have opened a house in that city for the introduction of the special lines which they affect. They will make a specialty of goods manufactured by the Wire Goods Company of Worcester, Mass., including their Steel Door Mats, Wire Coat and Hat Hooks, &c., and will carry a full and complete stock, and be ready to take care of the wants of the trade after January 5.

Cooper & McKee, 119 Gwinnett street, Brooklyn, N. Y., issue a neatly engraved folder in which the compliments of the season are extended to their customers. It illustrates one or two winter scenes, and calls attention also to their New Columbia Refrigerators.

Hibbard, Spencer, Bartlett & Co., Chicago, send a hanger, entitled "A Trip to the World's Columbian Exposition." Sixteen of the buildings of the exposition are shown in colors, and are numbered, indicating the order of the buildings in a tour of the grounds from the main entrance, at Fifty-ninth street. Near the top of the hanger is a larger view, showing the block of buildings used for the business of the above company. At the lower end are attached calendar sheets for 1893. The idea is a pleasing one, and will give their customers an excellent idea of the magnitude of the firm's business, and also of the coming exposition.

A prominent announcement in this issue is made by Hibberd & Spinner, 9 Cliff street, New York, who show a number of Sheet Metal Tools and Machines. Other goods referred to are Plumbers', Roofers' and Slaters' Tools, Cornice and Skylight Makers' Tools and Machinery, &c.

Joseph Huse & Son, of 95 97 Blackstone street, Boston, make an announcement in another part of this issue relative to Stove Repairs. The firm have issued a catalogue of interest in this general connection, a copy of which, we understand, will be mailed to any address upon application.

H. M. Hillson, of 247 to 251 North street, Boston, Mass., is offering the trade an extensive line of Tinware at prices which cannot fail to attract attention. An illustrated catalogue of the goods has been issued by Mr. Hillson, and he will send, upon application, a copy to those interested. The catalogue covers Stamped and Japanned Ware, Agate Iron Ware, Enameled and Wooden Ware, Wire Goods and a general line of House Furnishing Goods.

In their advertisement appearing elsewhere in this issue, the Apollo Iron & Steel Company, Pittsburgh, Pa , direct the attention of the trade to their Apollo Best Roofing Plates, Galvanized Sheets, Open Hearth Special Soft Steel Sheets and Refined Iron Sheets. The plant of this firm is located at Apollo, Pa., and is being operated to its full capacity.

The announcement on another page of the Kelsey Furnace Company, 339 West Fayette street, Syracuse, N. Y , directs attention to the Kelsey Corrugated Warm-Air Furnace. Illustrations also show the chief features of the Heater. In addition to the home office the Kelsey Furnace Company have offices in Buffalo and Denver, Col.

George T. Chambers & Co., of Livingston, Mont., have opened a branch store in Lewistown, Mont., with W. A. Selvidge as manager.

In their advertisement, appearing elsewhere in this issue, the U. S. Iron & Tin Plate Mfg. Company, of Demmler, Pa., call the attention of the trade to the different roofing plates they are putting on the market under the names of "U. S Bright" Tin Plates, "U. S. Redipped" Terne Plates and "U. S. Monongahela" Terne Plates.

Review of the Metal Trade

We are indebted to Bruce & Cook, 186 Water street, New York, for one of their pretty calendars for the year 1893. The general design of these card calendars has not varied, and the trade now recognize the appearance as belonging to the old firm of Bruce & Cook, and yet it seems to us that the decoration is a little brighter this year, and that colors are added with a more pleasing effect. The center of the card is arranged with the months in panels on either side of an illustration of the warehouse of the concern. Accompanying the calendar is their usual New Year's Greeting, containing a review of the trade and an estimate of the future. From this interesting review we quote as follows:

The year 1892 was without any special features in the market for Metals, if we except the question of tariff on Tin Plates. What action may be taken, or when it may be taken in this matter, must largely be conjecture. Unless a special session of Congress is called especially to consider it, no change in duty, and consequent fall in prices, may be looked for until the spring of 1894. The Sterling costs during 1892 were the lowest on record during the history of the trade, and the present low range of prices will probably continue for some time to come, unless unexpected conditions arise in the Iron or Steel market, with the exception that on July 1, 1893, according to present laws, a duty of 4¢ ℔ lb will be put on Pig Tin, which will have a tendency to increase the cost as it works against the American manufacturer, and the coating of English Sheets in this country. We do not think any lower prices may be looked for until action is taken by the incoming Administration. The production of Plates in this country has been principally the Terne or Roofing Sheets, some with American Steel, but mostly with English Sheets coated here. . . .

With large crops to market in this and other countries, an opportunity for a reciprocal trade with other nations, we see no reason why the coming season should not be one of great activity, which usually means prosperity, and in which we hope all may have a share; but to get the full benefit of this, there should be wise legislation by Congress touching the question of national currency, which should be, on the one hand, ample for our country's needs, and on the other, of such a character that our monetary position shall be upon a basis so sound that it will not admit of unfavorable criticism on the part of any person or nation.

The World's Fair, to be held at Chicago, should also be an element of prosperity to our people in all parts of the country.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, January 14, 1893.

DAVID WILLIAMS, - PUBLISHER

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BOSTON.....146 Franklin Street
PITTSBURGH.....Room 500, Hamilton Building
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CINCINNATI..... S. E. cor. Fourth and Main Streets
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....210 Superior Street

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Prize Competitions.

We wish to call attention to a number of competitions announced on other pages of *The Metal Worker* this week. The competition in skylight pattern cutting is repeated for the benefit of those who may not have noticed it in our last issue. We also direct attention to the several prize competitions, six in all, on various subjects of interest to all persons engaged in business. One relates to advertising, another calls for entertaining stories, a third relates to treatment of clerks, a fourth is on the very practical matter of keeping track of jobs, which is a question that often comes up for discussion. The next one is for a series of business maxims, while the final one is of especial interest to retailers, as it relates to the keeping of a record of prices. The particulars of these competitions, with prizes and limit of time, is presented in the announcement. A further series of weekly competitions is begun, which we believe will interest very many of our readers.

Quality of Steel Roofing.

A note of warning is sounded in letters we have received from two prominent steel-roofing companies, which merits the consideration of manufacturers of this material. Our correspondents appear to be apprehensive of a lowering of the standard which has hitherto been maintained in steel roofing. The increasing competition in this business, and the excessive desire of some members of the trade to do a large business at any cost, tend, it is thought, toward such a cutting of prices as to result, ultimately, in a general deterioration of material used in the manufacture of steel roofing and of the methods employed in its application. The use of inferior paint for factory coating and want of care in the protection of the under side of the roofing by properly applied sheeting and felting will, if indulged in, open the door to serious depreciation in the value of steel for roofing purposes. One correspondent mentions the possible adoption of a poor quality of steel as a feature likely to result from the endeavor to lessen the cost of production. But we cannot think such a contingency is very likely to arise, as steel, unlike iron, is not liable to much variation in quality, and there is no such wide range of grades to choose from. But, leaving this aside, the deterioration is quite liable to set in from other causes. The only remedy seems to be an earnest effort on the part of manufacturers to maintain the standard of steel roofing by using the best material available and insuring its proper application, afterward making such a price as will secure to themselves a fair margin of profit and sticking to it. It is a fatal mistake to make a price first and then to be obliged to get materials to suit it. To quote one of our correspondents on this subject: "One shipment of poor roofing from a factory not only unfavorably affects the trade of that factory, but is an injury to the trade at large. It has an effect that is felt far and wide."

Explosions of Gaseous Mixtures.

Every little while the daily press puts up on its bulletins some such announcement as the following: "Two workmen killed by an explosion while varnishing the inside of a fermenting tun with shellac!" "Steam-fitter killed and two others badly injured by an explosion while repairing a refrigerating apparatus!" "Woman burned to death by explosion of a lamp!" "Hotel endangered by an explosion of gas through carelessness of a servant!" On January 7 it was this: "A match struck in a coal cellar caused an explosion which demolished a building in Pittsburgh!" Three persons were killed and two badly injured by this accident, if an event resulting from well-known causes, and certain to occur when ignorance or carelessness sets these causes in operation, is properly to be called an "accident." There is little probability that such casualties will cease to be all too frequent. It seems in vain that people are exhorted to remember that, with few exceptions, inflammable gases and vapors are, fortunately, possessed of strong odors; and that wherever there is a smell of such gases or vapors danger is likely to exist if an ignited match or flame of any kind be brought into an inclosed space pervaded by the odor. Some people read only to forget. Some do not read at all. Others, with knowledge, will take the chances. These three classes—the forgetful, the ignorant, the willfully reckless—will continue to supply about the regular quota of this sort of news to the daily collection of horrors posted upon newspaper bulletin boards. What, then, is the duty of that class of publications that like, *The Metal Worker*, aim to instruct rather than merely amuse; to impart wholesome information rather than to collate news regardless of its character or effects upon readers? To cease warning seems an abandonment of duty; to endlessly repeat seems vain; yet perhaps some may take heed, and thus be prevented from bringing frightful disaster upon themselves and others. The preventive measure is simple, certain and always easily applied. When an inclosed space is discovered to be pervaded by the odor of gas, &c., that by leakage or otherwise has accumulated in it, a few minutes' thorough ventilation is entirely sufficient to remove all danger. A cylinder or pipe that has been used for containing or conveying any easily inflammable liquid or gas should always be thoroughly blown out by a current of air passed through it before it is approached with flame or heated irons, no matter what the inflammable material may have been, whether vapors of ethers, alcohol, petroleum-distillates (kerosene and the like), turpentine or benzine, or permanent gases, natural or artificial, such as are used for heating and illumination.

Artesian Wells.

The largest filter known to man is the crust of the earth. Not merely the surface soil is included in the term "crust"—rock strata, many hundred feet in thickness, sand and gravel beds, and even clays all act as effective percolators for transferring water, purified by the straining and chemical action of the materials through which it has passed, into multitudinous caverns, fissures and pockets lying at great depths below the level of the sea. Artesian wells penetrating these water veins and subterranean lakes supply water the purest in the sense of freedom from germs of disease of any obtained from natural sources. The great progress in well boring that has characterized the last decade is of immediate interest to all engaged in the supply of well-boring tools, iron pipe and fittings, pumps, or any appliances used in the procuring and distribution of water. These wells not only directly affect the metal trades, but also, by largely extending agricultural operations and making deserts to blossom, indirectly benefit trade at large.

Statistics of Artesian Wells.

A late census bulletin enables the public to form an idea of the extent to which formerly arid regions of our country have been restored to fertility by the use of artesian wells, and the figures therein given also afford a reasonable approximation to the first cost of such wells and data for estimating the cost of water thus obtained. It appears that for irrigation purposes alone there were enumerated in the last census 8097 of these wells, of which 3210 are in the State of California, leaving 4887 distributed in various other States. The average cost for the 8097 wells was $245.58, and their rate of delivery averages $54\frac{48}{100}$ gallons per minute, or 78,379 gallons

per day of 24 hours. Allowing for interest and deterioration that 16 per cent. is a fair average (it is probably too large), the cost of procuring the water is about 11 cents per day per well; or, estimating the cost per one million gallons, it averages about $1.40. This, of course, does not include cost of distribution. It is thus shown that the artesian system is a cheap method of obtaining water. The California wells cost $425 on an average. But their depth is greater and their average yield much in excess of the general average, being 164 gallons per minute, or 236,160 gallons per day. The cost of this water per well, estimated on the basis of 16 per cent. (interest on investment and deterioration) would be about 19 cents per day, and the cost per million gallons delivered would be about 80½ cents. This estimate of cost warrants the belief that artesian well-boring will be greatly extended in the near future. The data as to cost of distributing the water thus obtained are unfortunately lacking. In some cases pumping must be resorted to, and for nearly all wells efficient distribution requires additional outlay for pipes, trenches, terraces, &c., and appliances for controlling and directing the flow. In some cases these increase the cost considerably; but the general result has been highly favorable.

Value of Trade-Marks.

In discussing stove trade matters recently a very prominent manager made the striking assertion that if he were given the choice between the right to use the trade-mark of his company and their entire property in plant, including ground, foundry, machinery, materials on hand, &c., without the trade mark, he would instantly take the former, even without a dollar to back it up. It was strong testimony to the value of a good name, long before the public, known in almost every home in the land, and known also as a guarantee of high quality. The name of the company was regarded as of no consequence. Without the use of the well-tried and thoroughly advertised trade name the company would find itself without a market. The same superintendent might run the same foundry with the same set of molders on the same patterns, but his customers would want the old name on their goods or else be educated by a long and tedious process to the fact that the stoves offered them were just as good as those they had been in the habit of buying. The old trade-mark given to a new foundry would spring at once into the possession of a trade empire, in which it had been the acknowledged sovereign, and from which it could not be driven, except, perhaps, by immense expenditures and only after a long period of persistent warfare.

Trade-Marks and Firm Names.

An interesting episode, illustrative of the difference between a widely advertised name and the mere name of a company has since then fallen under our notice. A stove manufacturer visited a neighboring city, and while there concluded to call upon a fellow manufacturer, whose company, if mentioned, would be recognized as one of the best known in the country. Having arrived, as he supposed, in the immediate vicinity of his friend's foundry, but seeing no sign of it, he entered, according to his story, a corner drug store, and asked the vendor of pills to kindly direct him to the works of the Greater Mfg. Company. The apothecary scratched his head, but could not locate the concern. Thought he had heard of it, but wasn't exactly sure. Asked how long he had been on that corner, replied over 20 years. And in all that time never heard of the Greater Mfg. Company, who make the world-renowned Black Elm stove? he was asked, the inquirer gazing with astonishment at such an exhibition of ignorance. A flood of light irradiated the apothecary's countenance, and he hastened to assure the stove man that he was within two blocks of the foundry, and if he had only said Black Elm stoves at first he would have instantly been properly directed.

Select a Distinctive Name.

There is vastly more in a trade-mark than merely business egotism. Every manufacturer who thinks it worth his while to lay the foundations of an enduring business should adopt a distinctive name for his products and not change it. Year in and year out, day by day and every day, he should keep the name before the trade until it became better known than his own. Occasionally, in the case of something having special merit but which has never been named distinctively, the trade will, through some curious chain of circumstances, coin a name by which the article will be known. This is in accordance, evidently, with a natural trade law out of which the trade-mark has grown. The name of a company, or more especially of a firm, is too long for mankind generally to bother with. A short name takes the fancy. If it is particularly smooth, snappy or euphonious, and if, moreover, it represents a really high-grade article, it makes an impression on the minds of those interested which is almost incradicable.

Railroad Men.

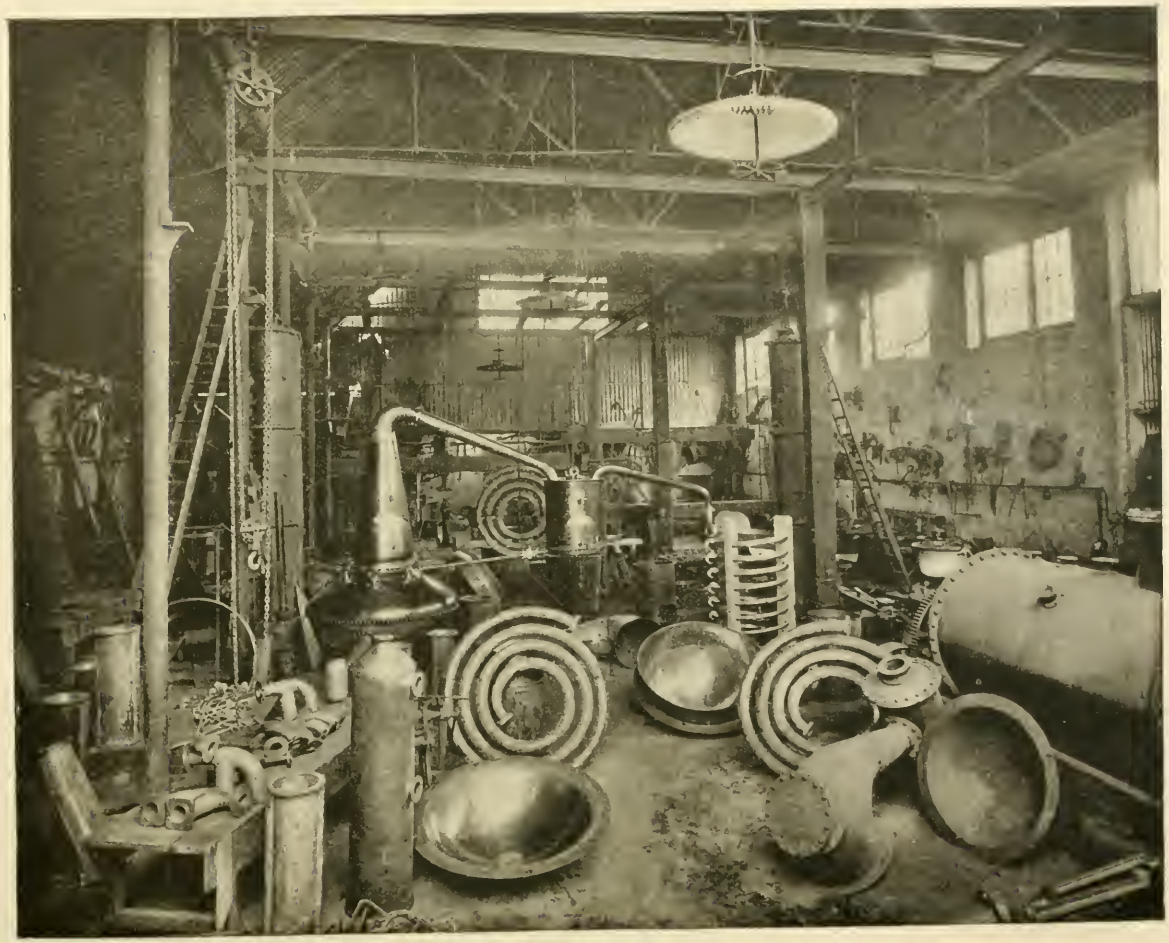
From the fourth Annual Report of the Interstate Commerce Association we gather that the number of men employed on railways in this country during the year ending June 30, 1892, was 784,285, being an increase of nearly 35,000 over the previous year. The report also contains a statement, which is of more than passing interest as indicating the constantly growing importance of the railroad industry in its relations to our social and industrial life. The fact is therein recorded that the proportion of persons employed in connection with railroads, in all capacities, during the year covered by the report, was 1 to 82 of the total population of the United States. In 1889, it was but 1 to 87; in 1890, 1 to 85. This proportional gain has been going on steadily for several years and seems likely to continue. One conclusion is reached from a consideration of the figures above quoted, and that is, that the population of this country is increasing at a less rapid rate than that portion of it which is engaged in transportation by rail. Another fact demonstrated in the report, which is of interest to the general public, is that the number of railroad employees has in the year increased in greater ratio than the actual extension of railroads in miles during the same period. When it is considered that the lives and safety of millions in this country are daily consigned, with absolute confidence, to the care of the railroad man, the increase in the proportion of this class is very gratifying. It shows, all things considered, that railroad corporations are taking more care to insure the comfort and safety of their clients by increasing the number of those who minister to them.

Shop Stories.

PUTTING UP AN EAVE TROUGH.

Jim considered himself an expert at putting up trough, and felt in his bones, as it were, that he could do the job a little better than any one else. He was always particular to have the trough so nicely adjusted that each and every drop of water would run out. Jim went out in the country once to put up some trough on a barn. The farmer received quite a lecture on the subject of troughs in general, and regarding Jim's skill in particular. This pleased the farmer very much, as he wished the best trough that could be procured. Arriving at the barn, the usual difficulty was experienced in securing ladders of suitable length to reach the eaves, but at last this part of the work was done, and the trough put up in good shape, at least it appeared so. The conductor was connected in a proper manner, and when water was poured in the upper end of the trough, Jim was greatly surprised to observe that it did not run out as water should. Jim was quite unable to explain why such should be the case, as he always supposed that water would run down hill. In fact water was quite as celebrated for its talent for running down hill as it was for being wet. The only way of solving the mystery appeared to be by looking at the trough, and when Jim again mounted the ladder and viewed the water in the trough, he noticed that he had neglected to cut a hole in the trough after soldering on the outlet. After this defect had been overcome the water ran out of the trough in an orderly manner. It is unnecessary to mention that Jim did not deliver any more lectures to the farmer regarding how eave troughs should be put up. TIN CHIPS.

Mr. Scott of the Union Iron Works in San Francisco has full confidence in the ability of the Pacific Coast to compete successfully with any other part of the country in iron shipbuilding, whether for the navy or mercantile purposes. One special advantage is the mildness of the climate, which permits work at all seasons. Mr. Scott says: "We also manufacture everything at our yards that goes into the ships except the plates, which are not made at any of the yards. Our facilities, too, are superior to most of the yards in the East. The disadvantages we have are that the plates and armor plates have to be shipped from Pennsylvania, but we can build ships as rapidly as they can here."



ART OF COPPERSMITHING.—Fig. 428.—Interior View of Coppersmith Shop, Showing Pipe Coils and Brewery Fittings.

THE TIN SHOP.

Pattern for Spiral.

From J. S., *New Albany, Ind.*—I would like to see published in *The Metal Worker* a method for laying out a spiral incline to fit in a cylinder. Something similar to the spiral conveyors used in conveying grain.

Answer.—In Fig. 1 is shown a general view of an article similar to that described by our correspondent. The shape is such that it cannot be made out of sheet metal without stretching. To prove this, a blank similar to that shown in Fig. 2 can be cut out and the experiment made of forming it to a spiral shape. In practice, metal. Inasmuch as the shape cannot be cut out of flat metal, owing to its resemblance to a screw, a pattern must be obtained which will require the least amount of stretching to produce the desired result. Suppose, in Fig. 3, that E F represents the diameter of the shaft around which a spiral of the kind described by our correspondent is required to go, and that the pitch of the spiral is as represented by A B in the elevation, or, in other words, that A B represents the distance lengthwise between two revolutions. If we construct the right

As all radii bear the same proportion to their circumference, this length may be obtained by geometrical proportion thus: Locate the point C on the base of the triangle, making A' C equal to O E of the section. From the point C erect a perpendicular line cutting the hypotenuse in D; then A A' will be to C A' as B A' is to D A'. Since A' B is the required length of the inner circumference, then D A' will be the length of radius R, Fig. 4, by which to describe it. Then, making the distance M N equal to the projection of the required spiral from the same center, we strike the outer circle. Cutting the piece in two along M

Fig. 1.—General View of Spiral Conveyor.

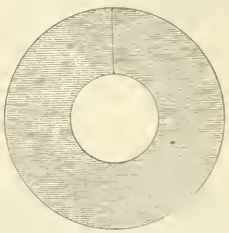


Fig. 2.—Suggested Blank for Spiral Conveyor.

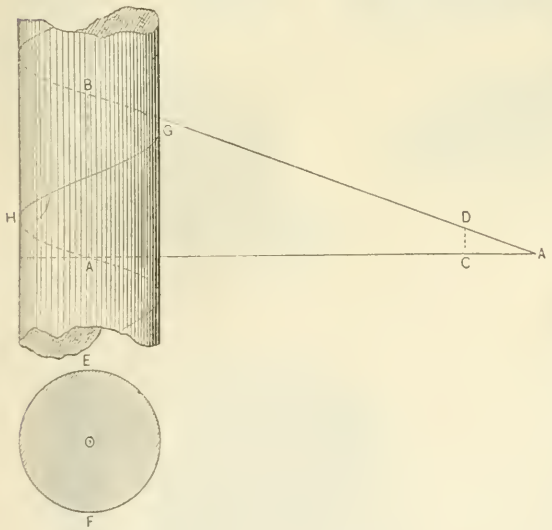


Fig. 3.—Means of Determining the Length of a Revolution of the Spiral.

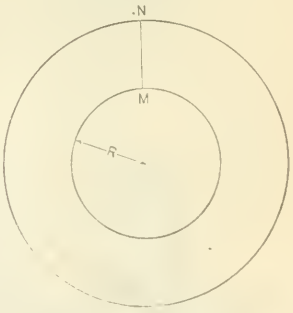


Fig. 4.—Approximate Pattern for a Single Revolution of the Spiral.

PATTERN FOR A SPIRAL.

a spiral is made by cutting out blanks similar to those shown in Fig. 2, then heating red hot if the metal is very heavy, and by the use of dies, pressing the metal into the desired shape. An article published in *The Metal Worker* some years since on the same subject is as follows:

If our correspondent will give the matter a moment's thought, he will be convinced that the shape which he requires is one that cannot be produced in sheet metal without some stretching. In other words, the shape is the section of a solid, rather than an envelope, a distinction which makes a difference in the matter of developing the shape and of producing it in sheet

angled triangle A' A B, so that the base A' A shall be equal to the circumference E F, and the hight A B equal to the distance between the revolutions, then the hypotenuse A' B will represent the length of the inner side of strip to form the spiral flange. If such a triangle be made of paper or thin metal and placed with its perpendicular at the back of the shaft, exactly as shown in the diagram, and then wrapped around till the point A' reaches the point A at the back of the cylinder, the hypotenuse will form the curve line B G H A on the cylinder, which will be the line to set the flange to after it is made. The next thing to be done is to ascertain the length of radius by which to describe the inner line of the flange.

N, we have a pattern that will make a single revolution of the spiral. It will, however, be necessary to stretch this pattern slightly with the hammer, or by means of a suitable die, in order to compensate for what is taken up by drawing the spiral out to give it the shape indicated in Fig. 1. By cutting out the pieces after the plan here indicated, and by joining them, either by lapping and riveting or by placing pieces under the two abutting ends for forming a butt joint, a spiral of any length may be obtained. By using the butt joint last referred to, just as many pieces of the kind shown in Fig. 4 will be required as there are revolutions to the spiral. If the lap is taken, as first suggested, each piece will make just as much less than a revolution as the amount consumed by the lap.

COPPERSMITHING.

ART OF COPPERSMITHING.

XXXVIII.*

Pipes for Heavy Work.

The earlier pages were principally devoted to a description of the working of light sheet copper in the manufacture of cooking utensils or small articles generally, and known better as the braziers' art. This was followed by the work for the locomotive and marine engine, which, it will have been seen, in the main comprises the making of copper pipes, large and small, bending and twisting them into any shape to suit the position desired or exigent circumstances, and is known as light coppersmithing. From this point an endeavor will be made to interest the reader with some examples of heavy work, such as he may occasionally encounter in his way (as has happened with the writer) while moving from shop to shop, either from choice or necessity. To keep as nearly in a progressive line as possible, the subject of pipes will be resumed and considered in their various forms in large and heavy work for application in breweries, sugar and still houses.

In breweries the principal uses for pipes are for refrigerators and attemperators, and these consist of coils of pipe of various forms which are made to fit the coolers or fermenting vats for the purpose of raising or lowering the temperature of the liquor by the aid of a current of water or steam passing through the pipes.

In Fig. 428 is presented a view of the interior of a shop engaged in this kind of work, which gives the reader a good idea of the conveniencies that are necessary to perform it successfully. The photograph from which the cut was made was kindly furnished by G. Hendry & Co. of London, England, especially for this work, with a view of giving the reader a more faithful illustration than can be done by a pen description. The picture is so complete that it would seem to need no further explanation.

In Fig. 429 is represented a cooler having a group of pipes made to fit it, and so arranged that the pipes may be raised or lowered in a convenient way when necessary to do so for cleaning. This grouping of the pipes is perhaps among the oldest contrivances used for cooling purposes in the manufacture of beer. It consists of a number of pipes of equal length, grouped together with horseshoe bends to form a continuous run of piping sufficient to fill up the space on the bottom of a cooler, as shown. The horseshoe bend is shown in Fig. 430, and is made of brass or gun metal. The pipes are separated from each other by boards called channel boards. The two end pipes are left open and are provided with hose unions for connection with the water supply, which is made to run along inside the pipes in the opposite direction to the wort in the cooler. Fig. 431 shows a set of pipes for a small cooler without the

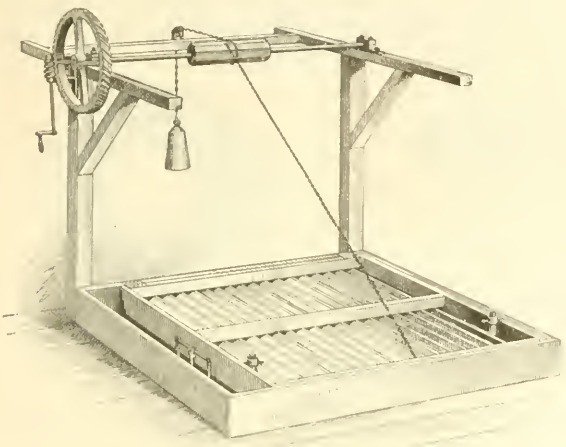


Fig. 429.—Cooler with Movable Pipes.

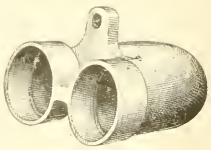


Fig. 430.—Horseshoe Bend.

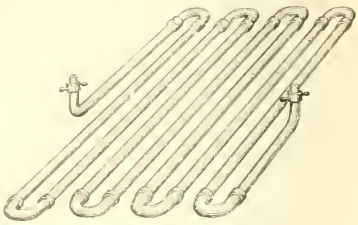


Fig. 431.—Set of Pipes for Small Cooler.

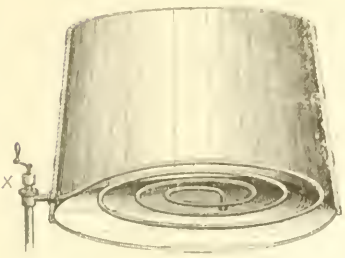


Fig. 432.—A Boiling Round or Vat.

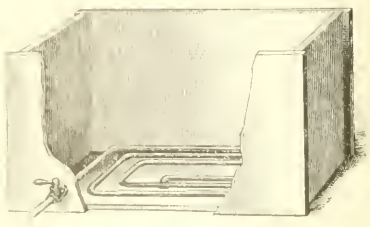


Fig. 433.—A Liquor Back.

*Copyrighted, 1889, by John Fuller, Sr.

lifting appliance shown in Fig. 429. For large coolers two and three sets of pipes may be and often are connected together, each working independently of the other, but all bolted on the same frame by means of the lugs on the bend. By this arrangement smaller pipes can be used and the cooling surface increased, while the consumption of water is proportionately diminished. The pipes are usually soft soldered into the bends. The foregoing aparatus is designed and used for cooling purposes, but the conditions are sometimes changed, and similar pipes are used for warming, which are called attemperators, and others are used for boiling coils. In Fig. 432 is represented a boiling round—that is, a round vat or tub, supplied with a coil of copper pipe lying on the bottom, which is set with a gradual fall toward the center so that the condensed steam or water is drained off through the bottom, the condensed steam keeping the live steam at the full pressure, thus making the liquor boil quicker, and preventing a waste of steam, which must occur if it was allowed to blow off into the air. The steam is turned into the coil by a valve fastened to the side of the round as shown at X, Fig. 432. Fig. 433 is the same in principle, but made to suit an oblong vessel. This vessel is called a back, on account of its shape, so that it may be easily distinguished from a round vat. Another form of liquor back is shown in Fig. 434. The set of pipes is furnished with either ball joints or gland and stuffing box, so that it can be raised or lowered at will for cleaning or to get it out of the way when necessary to do so. It is therefore much better and more convenient than the kind with fixed coil. Vats and backs are also fitted with spiral coils as shown in Fig. 435 and Fig. 436. When they are fitted with coils in this way they are used principally for fermentation, thus distributing the temperature evenly through the mass of liquor.

Let us make one of these coils, and let the pipe of which it is made be 3 inches in diameter and the coil consist of four rings, Fig. 437, the outside ring being 6 feet in diameter from center to center, and the inside ring 2 feet. The first thing is to find the length of the coil, which we do by marking out the coil in Fig. 437, as follows: Draw the line Z Y, making it 6 feet, and bisect it in V, and with V as center and V X as radius, equal to 1 foot, describe the semicircle X U W; then divide X Z and W Y into three equal spaces, X *a*, *a b*, *b* Z; W *c*, *c d*, *d* Y, and from V on V Z lay off V *e*, equal to one of the spaces X *a*, and divide V *e* at T, then from the point T as center and T W as radius, describe the semicircle W S *a*, changing the centers V and T for each semicircle in succession until the coil is complete. Now, we have seven semicircles, the center one, X U W, 2 feet in diameter, the next, W S *a*, $2\frac{2}{3}$, the third, *a* R *c*, $3\frac{1}{3}$, the fourth, *c* Q *b*, 4 feet; the fifth, *b* P *d*, $4\frac{2}{3}$, the sixth, *d* O Z, $5\frac{1}{3}$, and the seventh, Z N Y, 6 feet. Now adding these all together and dividing by 2 we have

$$\frac{2 + 2\frac{2}{3} + 3\frac{1}{3} + 4 + 4\frac{2}{3} + 5\frac{1}{3} + 6}{2} = 14,$$

or a circle of 14 feet equal to coil; and multiplying this by 3.1416 we get $14 \times 3.1416 = 43.9824$ the length of the coil. Hence we want 44 feet of pipe (exclusive of that required to make the joints) to make the coil. The pipes may be made, fitted and bent and joined together with socket joints.

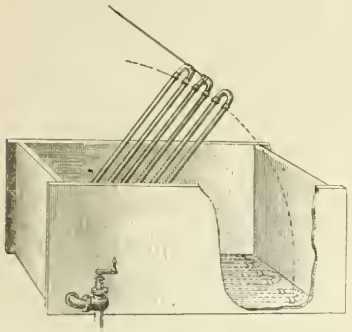


Fig. 434.—Liquor Back with Movable Pipes.

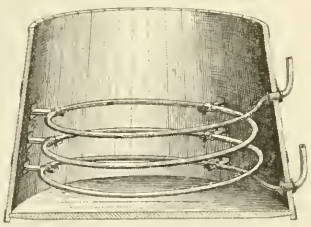


Fig. 435.—Attemperator Fitted to Fermenting Round.

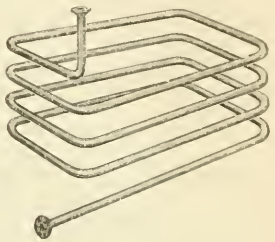


Fig. 436.—Attemperator Suitable for Fermenting Back.

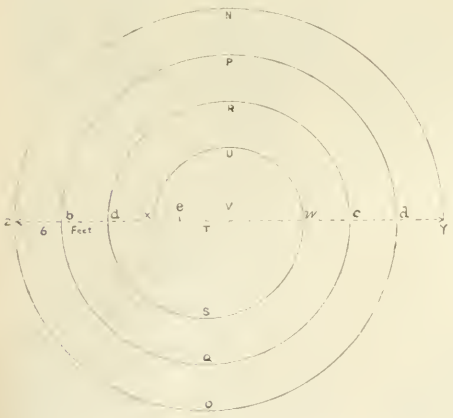


Fig. 437.—Diagram for Coil.

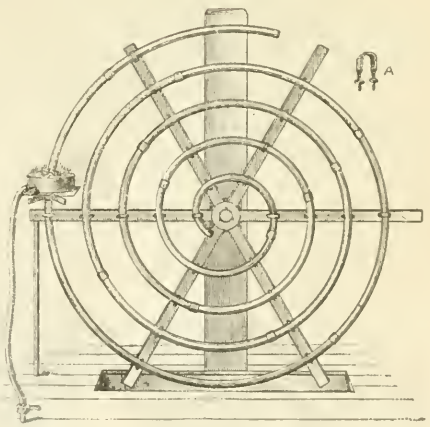


Fig. 438.—Wheel and Axle for Brazing Pipe.

ART OF COPPERSMITHING.

BRAZING OR JOINING FLAT COILS.

Copper pipe used in the making of coils of various kinds has usually been made in lengths varying from 10 to 14 feet, therefore all coils of any considerable size must be made in sections and joined or brazed together. To do this brazing in the most convenient and expeditious way it is necessary to provide a wheel and axle, as shown in Fig. 438, upon which the coil may be fastened with a strap, A, and held in position for manipulation as each section of pipe is added to the coil and the process of brazing together is being executed. The wheel and axle are fastened to a suitable post and over a pit, the axle being placed about 3 feet from the floor, so that

the socket when level will be on a line with the center of the axle, and can easily be attended to when the coil exceeds 6 feet in diameter. The accompanying illustration, Fig. 438, sufficiently explains itself.

The method given above for describing a flat coil is perhaps the simplest that can be used. For those who desire to make a coil nearer the truth, it is necessary to resort to what is called an eye—that is, a group of points situated in regular polygon form for centers, which may begin with a triangle, as in Fig. 439, or with any other number of points, as in Fig. 440. I will explain these two methods, and leave the learner to pursue the further study of the subject as he may desire. In Fig. 439, the eye of the coil which governs the distance between the rings is an equilateral triangle. Now let it be required to make a coil 6 inches apart from center to center of the rings, then we divide the 6 inches into three and erect a triangle, A B C, making the sides equal to 2 inches; then with B as center and B *a* as radius, describe the arc *a b;* and with C as center and C *b* as radius, describe the arc *b c*, and with A as center and A *c* as radius, describe the arc *c d*, and repeat the process until the size of the coil is reached. In Fig. 440 the eye of the coil is a hexagon. Now let the distance apart be the same as in the last example. Then 6 inches divided into six parts gives us 1 inch for one side of a polygon of six sides. Draw a hexagon, A B C D E F, Fig. 440, and make the sides equal to 1 inch; then from A as center and A *b* as radius, describe the arc *b c*, and with B as center and B *c* as radius, describe the arc *c d*, and repeat the process around the polygon, taking each corner in succession, until the coil has been completed the required size.

Fig. 439.—Laying Out Coil with Triangle for Center.

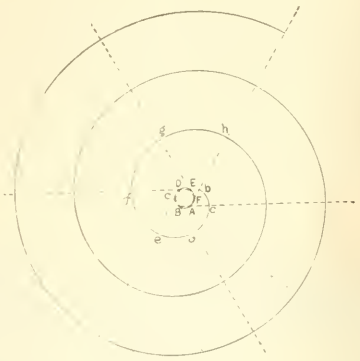


Fig. 440.—Laying Out Coil with Hexagon for Center.

Fig. 441.—Portable Coil.

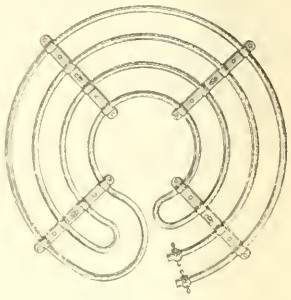


Fig. 442.—Coil with Openings Together.

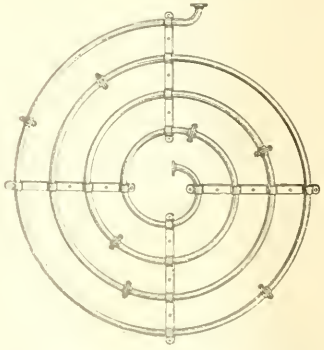


Fig. 443.—Coil with Flanged Joints.

ART OF COPPERSMITHING.

The length of these coils may be obtained in a similar way to that already given—that is, by adding together the diameters of all the circles which compose the coil and multiplying by 3.1416 and dividing the product by the number of points in the eye of the coil.

Fig. 441 shows a portable coil and the

manner of using. The three supporting stays are iron, bolted together, and provided with eye bolts for suspending rods, by which the coil may be hung in a vat or tun at any hight desired. The ends of the coil are supplied with unions for connecting leather or rubber hose. These portable coils are quite handy, as they may be removed readily with pulley blocks out of a tun when not required. Portable coils may be made any other shape desired.

It sometimes happens that it is better and more convenient to have the two ends of an attemporator—that is, the outlet and inlet—lying side by side or close together in preference to having one end cross the coil as in Fig. 441. In this case we resort to another plan which is shown in Fig. 442. When it happens that the workman does not possess the skill necessary to perform the operation of brazing the sectional joints of the coil, flanges may be employed for joining the sections together, as shown in Fig. 443, the flanges being made just wide enough to get bolts in, and of sufficient strength to make the joints secure. It may sometimes be better to put them together in this way, so that any section may be taken out for repairing when necessary.

To find the length of a spiral coil, as in Fig. 435, whose diameter is 6 feet from center to center of pipe and having three rings, with a rise of 1 foot to each ring, it will be seen that as each ring rises 1 foot, that the length of pipe required for the three rings of the coil would be the hypotenuse of a right-angled triangle whose base is equal to the circumference of three flat rings as the base, and the foot rise of each of the three rings of the coil as a perpendicular. Then the length of the coil is

$$\sqrt[2]{(6 \times 3.1416 \times 3)^2 + (1 \times 3)^2} =$$

56.58, or 56 feet 7 inches nearly; therefore to make a spiral coil, as in Fig. 435, we require 56 feet 7 inches of pipe, which is made of convenient lengths and put together with socket joints as before directed.

The Cast Iron Pipe Consolidation.

We reported two weeks since that a movement was on foot to bring about a consolidation of the cast-iron pipe foundries in the country, the first step being to bring together the Western concerns and the second to consolidate the Eastern shops. We are advised that the latter movement has not progressed far and that a consolidation is improbable. A number of denials have been published concerning the Western fusion. The fact is that two weeks since the representatives of nine Western and Southern works met in this city, and the first steps toward a consolidation were taken, the works represented being the Lake Shore, St. Louis, Addyston, Dorman, Long & Co., Bessemer, Columbus, Chattanooga, Anniston, Bradford and South Pittsburgh. Prior to the meeting the different plants had been appraised and a statement had been secured showing the financial results obtained in recent years. On the basis of these reports the allotment of stock in the new concern was made. It is reported that additional amounts will be offered to the public. Nine directors were elected and there was some discussion relating to the presidency. Another meeting is to be held on the 18th instant. We understand that on the day following the meeting conferences were held with a number of the Eastern pipe founders at which prices on some large contracts then pending in this State were discussed.

The Canadian Pacific Railroad is blocked with snow worse than for five years.

Patents, Patentees and the Public.

Compulsory Licensing and Lapse by Failure to Work.

BY BERNHARD T. VETTERLEIN.

Should not the present system of granting patents for inventions be amended?

The law as it is is not so satisfactory as to merit disinterested support, and it is surely worth consideration whether the defects can be removed by amendments.

Earnest and persistent attempts have been made at intervals to abolish the law and substitute a grant of money by the Government in place of patent privileges, and it is reasonable to anticipate a renewal of the agitation with more or less strength, in view of the well-acknowledged imperfections which are removable and have not been removed. Patent laws are good only when they offer the most equitable arrangement for protecting inventions from plunder, and are at the same time fair to the public.

Any person who has discovered a new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof, under certain restrictions, may obtain a patent. The grant is to the author of the invention and for the exclusive right of practicing it for a term of years. The consideration for which the grant is made is the benefit resulting to society by the practice of the invention. Now, during a year a large number of patents are issued, of which some are for alleged improvements and some for trifling alterations of patents in force. The market becomes crowded with patents, few of which may be of any value, but all of which may be productive of embarrassment.

A large number of these unmeritorious patents are never practiced or intended to be practiced, but held in reserve till by some subsequent improvement they become practicable and have a commercial value. The holder of the original patent then has the game in his own hands. This is a genuine grievance, and though the last invention gives commercial value to the series of which it is the crown, the owner is helpless unless he can make some fair arrangement with the proprietors of the anterior patents. It is quite true that an invention when first tried is never complete in all its details, but if the inventor does nothing to perfect it and someone else does, the latter during the life of the first patent is subject to the disposition of its owner. It must be remembered that the greater the success of a discovery the larger will be the gain to the public when the patent expires. Experience often suggests slight but valuable alterations. The public then acquires not an invention which may answer the purpose for which it was intended, but an invention which has been made capable of perfecting the anticipations of its discoverers. To give any one an exclusive right to work his invention is equivalent to trusting that he will devote his time and skill in getting it introduced.

It may also be urged, with good reason, that the owner of a fundamental patent of real merit, as the law now stands, can become the monarch over one field of industry, and refuse to grant a license to make his apparatus, or work his process. Patents are not intended to be monopolies. The statute of monopolies, which removed those "odious, hurtful and nauseous weeds in the fair field of industry," made an express exception for inventors, "so as also they be not contrary to law, nor mischievous to the State by raising the price of commodities at home, or hurtful to trade, or generally inconvenient." It is said that a monopolist controls the market, but that the owner of a patent privilege cannot force the public to buy the article he manufactures. But the experience of the public is somewhat different from this, and it would be very often difficult, if not impossible, to make a distinction between a monopolist and the owners of many patent privileges.

The law should be amended so as to provide:

1. That the patent shall cease and terminate if the patentee or owner does not make effective use of the invention within a fixed period.

2. For the introduction of compulsory licenses; the amount of royalty to be determined by arbitration when differences of opinion cannot otherwise be reconciled.

The practice of granting patents for inventions prevails over the whole civilized world. In most of the countries provision is made in the law for determining and ending the life of a patent, unless worked within a definite time or by the non-payment of fixed annuities. In some countries there is a clause relating to compulsory license. In the Argentine Republic, for instance, the law is plain and to the point. After quoting the law of this Republic, we shall give the sections of the statutes of other countries bearing on the two amendments suggested in this article.

The Argentine Republic.—Argentine Republic in 1864 enacted the following:

THIRD SECTION, ARTICLE 29.—When such certificates of addition (*i.e.*, for improvements in patented articles) have been obtained by other than the original patentees, they do not confer on their owners the exclusive right of working their invention, except under the condition of paying a premium to the original inventor, the amount thereof having to be fixed by the commissioner, by taking into account the importance of the improvement, and of the part used of the original inventor.

ARTICLE 30.—The original inventor has the option between availing himself of the provision contained in the preceding paragraph and of working the improvement jointly with the improver. If he chooses the latter, a patent of addition shall be delivered to him on the same terms as that to the improver.

ARTICLE 32.—If two or more parties shall apply at the same time for a certificate of addition for the same improvement, and if they shall not come to some arrangement between themselves, no patent shall be issued to either. The same provision applies also to letters patent.

TITLE 5, ARTICLE 47.—All patents duly issued become void whenever the invention has not been worked within two years of the issue of the patent; whenever the working has been interrupted for a similar period, except by circumstances beyond control, &c.

ARTICLE 49.—No special judicial decree of nullity or lapse is required for causing the patent discovery or invention to become public property; the mere fact of nullity or lapsing suffices for authorizing every one to work freely the patent articles.

Austria.—If within one year from the date of the patent, the pateutee has not begun to work his discovery, invention, or improvement in the empire, or whenever he has interrupted his work for two complete years.

Barbados.—Work must begin within a period of three years.

Belgium.—The patent must be worked in Belgium within one year from the commencement of working abroad. The time may be prolonged for one year. At the expiration of the first year, or the extension, the patent shall be annulled for omission.

Brazil.—The patent shall lapse, if the patentee does not make effective use of the invention within three years; if the patentee suspend the effective use for more than one year.

By use is understood the effective exercise of the patented industry and the supply of the products in proportion to their employment or consumption. On proof that the supply is evidently insufficient for the needs of employment or consumption, the employment can be restricted to a zone, &c.

Bolivia.—The patent must be worked within a year and a day.

Canada.—The patent is null and void at the end of two years unless the patentee or his assignee shall have commenced, and shall after such commencement continuously carry on, in Canada, the manufacture of the invention or discovery patented in such manner that any person desiring to use it may obtain it or cause it to be made for him at a reasonable price at some manufactory or establishment for making or constructing it in Canada.

Very many of the counties have this section: The inventor of an improvement cannot make use of the improved article while the patent for the principal invention lasts without an authorization from its inventor. Nor can the latter employ the improvement without agreement with the former.

Chili.—For each patent, a proportionate term shall be fixed for the establishment of the machinery, plant or manufacture, on the conclusion of which the patent shall commence to run. If at the expiration of this term the invention has not come into work it shall lapse, as it shall also if the working be discontinued for more than one year.

Colombia.—When not practiced during a whole year the patent is void.

Denmark.—By royal decree the invention must be carried out within a year.

Ecuador.—The patent must be worked within a year and a day.

Finland.—It is necessary to publish a description three times within two months from the day of the issuing of the patent, and within two years to send evidence that the patent is in full working operation. The term may be limited to one year and also extended to, at the utmost, four years, but afterward evidence must be given of continuous working.

France.—None but the patentee or person interested through him . . . can during one year legally obtain a patent for an alteration, improvement or addition, &c. Nevertheless, any person who shall wish to obtain a patent for an alteration . . . may during the said year make an application, which shall be transmitted to and remain deposited under seal. . . . At the expiration of that year the seal shall be broken and the patent delivered. Preference is given to the original patentee for all alterations, improvements and additions for which he shall have demanded during that year a certificate of addition.

The patent must be worked within a term of two years, and if the working is discontinued for two consecutive years, the patent ceases and determines.

Germany.—If the patentee fails to work his invention in Germany to an adequate extent, or at least to do everything that is necessary to insure its being worked, a patent can be declared void after the lapse of three years.

Whenever the grant of licenses to others to use the invention appears to be demanded in the public interest, and the patentee nevertheless refuses to grant such licenses upon adequate compensation and good security, the patent lapses.

Great Britain.—If on the petition of any person interested, it is proved to the Board of Trade that by reason of the default of a patentee to grant licenses on reasonable terms, or the patent is not being worked in the United Kingdom, or the reasonable requirements of the public with respect to the invention cannot be supplied, or any person is prevented from working or using to the best advantage an invention of which he is possessed, the board may order the patentee to grant licenses on such terms as to the amount of royalty . . . as the board, having regard to the value of the invention and the circumstances of the case, may deem just. There is also a provision for the forfeiture of patent on non payment of annulty.

Guatemala.—The time is limited to two years for the establishment of the machines; . . . forfeited if, after commencement, the working is abandoned for more than a year.

India.—The patent lapses on failing to grant licenses on reasonable terms—same as in Great Britain—substituting the Governor-General in place of the Board of Trade. The Governor-General may order the inventor to grant, or may himself, on behalf of the inventor, grant licenses on such terms as he may deem just.

Japan.—Persons that are desirous of obtaining patents for articles that are improvements upon other patented inventions must secure the consent of the original patentee. If the original patentee should refuse his consent, and the Minister of Agriculture and Commerce deems the refusal obstructive to the improvement of the inventor, he may grant the improver special permission to use the original invention, together with the improved part. In such cases . . . the Minister shall cause the improver to give approximate sums of money to the original inventor by way of compensation. The patent is void unless practically publicly applied within two years, or suspended for two years thereafter.

Liberia.—The patent must be worked within three years, and refusal to license works forfeiture.

Norway.—The proprietor of a patent shall during a period of two years . . . have the sole right of obtaining a patent for improvements. Applications by others must be kept under seal for that period. The patent must be worked within three years, and is forfeited if the working is discontinued for one year.

Orange Free State.—Non-use for two years works a forfeiture.

Peru.—The patent must be worked within two years, or period stipulated in the privilege.

Switzerland.—The patent lapses if not carried into effect in the third year.

Queensland and South African Republic.—The law is the same as in India.

Uruguay.—If it be a stranger who obtains a certificate of addition, he shall only enjoy the right to work his invention upon the condition of paying to the first inventor a premium, the amount of which shall be fixed by two experts appointed by the parties interested, with a third in case of disagreement. The executive fixes the time for the working of the privilege at the time of the granting of the patent.

Venezuela.—The patent is canceled when annual payments are not made, or when the working is not commenced within two years or discontinued during two years.

Sweden.—Must be worked within three years to an adequate extent. If working is abandoned for one year the patent is forfeited.

Portugal.—The patent for an improvement cannot be made during the first year of the patent granted for the principal invention, save to the person who obtained that patent. Any one who does not carry out his invention within two years . . . or has ceased to use it for two years consecutively . . . shall forfeit his said patent.

Russia.—Patents shall not be granted for trifling or unimportant discovery, invention or improvements, indicative only of inventive genius, without offering any new advantage or utility. The privilege must be put into completed practice or execution during a specified term, and lapses unless before the expiration of six months thereafter there is presented to the proper department proof that it has actually been put into practical execution.

South Australia.—Patents cease on non payment of annuities at the expiration of three years. They are also liable to be revoked after the expiration of three years if it appears that either the patentee or his licensee, or his assignee, has not before that time used the patented invention to a reasonable extent for the public benefit.

New Zealand.—Annuities are payable in five years. The invention must be brought into actual, practical use within the space of two years from the date of the patent.

Spain.—The patent must be worked within two years in Spanish territory, and proved. Omission to operate the invention for one year and a day thereafter forfeits the patent.

The sections of the laws of the several countries quoted should be sufficient to show how other civilized nations look upon patents. There is not a country, small or large, which has not a patent law and some provision bearing on the amendments suggested. Of course, even with the corrections intimated, the law would not be as it should be. Two amendments are sufficient for present consideration.

It is quite true in general and it would be quite logical to say that licenses should not be granted at all, but if patentees have the power to grant licenses they ought to be compelled to grant them to whomsoever shall offer a fair percentage in return. It can be argued that, were it in every one's power to work a patent on the payment of a certain sum, there would be less incentive to the infringement of patent rights, so called, and consequently less necessity for harassing litigation and expense. Of course, a patentee can reply that the right of property in his invention having been accorded to him by the office, he should be left in an untrammeled position regarding any disposition he may wish to make of it. He ought to be left free to dispose of it, and equally free to refuse to share his rights with any one except at his own time and on his own terms. But a compulsory license, equitable both to the inventor and to the public, with a compulsory working limit, would meet the requirements. The preliminary examination is of very little use. The same system prevails in many countries. It was, and is yet, supposed to be a preventive to litigation. It is and would be impossible for any Patent Office, or its examiners, to be acquainted with the details of every process or manufacture. If the Government could guarantee the patent, then a preliminary examination would be of value.

In the cases of the strikers who have been on trial in the courts at Pittsburgh for some days past on the charge of riot at the time of the strike at the Duquesne Steel Works of the Carnegie Steel Company, Limited, last August, the jury returned a verdict on Tuesday, the 10th inst. Thirteen men were on trial, and of these ten were found guilty of riot, two of unlawful assemblage and one was acquitted. The verdicts in these cases are expected to have no inconsiderable influence on the balance of the Homestead cases, which will come up for trial in the Pittsburgh courts some time during this month.

The Canadian Minister of Finance, Mr. Foster, is untiring in his efforts to improve trade relations with England and France, from which countries he recently returned. Previously he visited the West Indies, with a similar purpose, hoping to recoup any shortening of trade through the operations of the United States tariff. Besides visiting Paris he reports that he "initiated several bases of action in connection with our commercial agents in Great Britain, which will have the effect of bringing in closer touch Canadian sellers and British buyers, thus augmenting the necessary trade with Great Britain. I found a very lively interest on the part of dealers there in the products of Canada and the possible chances of trade being done therein."

WORLD'S FAIR NOTES.

Display by the Army.

To the War Department was allotted about one-fifth of the floor space of the Government Building. This came to be located in the southeast corner of the structure and the space was divided up between the several general divisions of the service. The staff detailed to make the exhibit by the Secretary of War was Major Clifton Comly, in command, representing the War Department; Capt. John F. Rodgers, Quartermaster; Capt. William L. Marshall, Corps of Engineers; Surgeon La Garde, Medical Department; Capt. A. H. Russell, Ordnance; Capt. R. E. Thompson, Signal Corps; Lieut. H. L. Harris, Artillery.

For over a year these officers have been devoting their time to preparing the displays. Everything is now in shape and before long shipments will begin from Washington and other sources from which material is to be drawn.

In a general way the ordnance department will be perhaps the most interesting. The longing in the heart of the average civilian to see a big gun will be fully gratified. One throwing a shot twelve inches in diameter will be in the Government Building. It will weigh 50 tons. Smaller cannon for field service will be plentiful.

The actual manufacture of rifles will be carried on in the exhibit. Bullets and cartridges will be made in the sight of the multitude. Torpedoes for use in military operations will also be manufactured, but when people want to see torpedoes that are torpedoes they must visit the battleship "Illinois," where the Navy Department has its exhibit. Care has been taken not to have the two departments overlap anywhere. Of course, the ammunition will look like the real thing, but the powder would not explode, not even burn. No army officer, however brave, would care to have real gunpowder and dynamite flying around among workmen in a crowded building. The spectators, however, will not know the difference.

To show the construction of heavy ordnance by actual work was not feasible, but it will be exhibited in varied phases, so that a good idea of the process can be gleaned. Only the processes generally known can be shown, as the War Department is not accustomed to unfolding its secret methods on the housetops. A testing machine to prove iron and steel to the extent of 100 tons to the square inch, doing its work as perfectly as if in an arsenal, will also have its place in the ordnance department. Nothing will be lacking from a silver-mounted revolver to the 50-ton gun. Gatling guns will not be the least important.

The signal corps will show how communication in the field is kept up by telegraph and telephone. The utility of the balloon in military operations will be demonstrated beyond a doubt, if one should now remain. These balloon tests will be extremely curious to non-military people.

In the signal corps' exhibit will be some 85 magnificent pictures of arctic scenery taken by the Greely arctic expedition. They are among the most highly prized archives of the corps. All the appliances for using signals will be included in the exhibit, and great pains have been taken to make it thoroughly popular. It was a difficult task, but it is said there is no doubt about it being well done.

The post hospital will contain 24 beds, and will be an exact reproduction of the regulation hospital at a military post. It will also contain a medical scientific exhibit, which will be of great interest to physicians at least. Then there will be the tent hospital for actual service on the field of battle. The ambulances for carrying the wounded from scenes of carnage to the field hospital will be there. The appliances in use by army surgeons to save life before the hospital can be reached will be fully represented. So complete will be the exhibit of the medical department that the surgeons could take the field for active service directly from the Government Building.

In service it is the quartermaster's duty to provide food and clothing, and the quartermaster is quite a man in extensive operations, where a base of supplies must be maintained. In that department of the army's exhibit will be seen how large bodies of troops are fed, how they are clothed, and the way transportation is given.

The engineer corps was greatly handicapped in preparing its exhibit by the nature of things. While the other branches of the service could bring things to show, the nature of the engineers' work precluded this. A canal might be the hight of engineering skill, but it could not be brought to Jackson Park. A bridge making its designer famous must remain where it was built. Since river and harbor improvement was begun by the General Government over $225,000,000 has been expended under the direction of the engineer corps. There are now 747 different pieces of work under way. It is scattered from Portland, Maine, to San Diego, Cal.

Capt. Marshall, the United States engineer at Chicago, has been a year bringing the exhibit of his corps together. He has written numberless letters to brother officers asking for pictures of Government work in their districts. Cordial has been the co-operation extended him. The negatives taken under the direction of the corps were sent to Capt. Marshall.

The space assigned the engineer corps was under the gallery in the extreme southeast corner of the Government Building and 28 windows open into it about 7 feet above the floor. What might have been an unattractive space has fallen into Captain Marshall's plans most admirably.

Three transparencies, one above the other, will hang in each window. The transparencies will be draped at the side, and will resemble panels in a curtain. The transparencies will represent many of the most noteworthy feats in army engineering. The one showing the largest stone arch on the globe, in the Washington aqueduct system, and another, of the movable dams on the Ohio, are certainly striking. There are 84 in all of the transparencies.

Over 100 large framed photographs will hang between and under the windows. Several hundred smaller photographs will be shown in the albums, a full description of the Government work represented appearing on the opposite fly leaves. A huge transparency, 16 feet long, will give a panoramic view of Chicago Harbor and Government works here. The view was taken from the lighthouse and covers the field of vision from northeast to west. Far to the southward the exposition buildings are seen. Tugs are towing in schooners and a steamer is just leaving port. A great fleet of shipping is under the breakwater. Most people will get their first idea of what Chicago Harbor entrance is like from this beautiful transparency, which is now almost ready for the artists.

The geological survey will have some handsome transparencies in the Government Building. They will be of natural scenery mostly. The illustrations of the engineer corps will be confined to works of the corps.

Some models of harbor work will also appear in the exhibit. Fixed torpedoes, so far as the engineering service uses them, will be represented, but no especial show of torpedoes will be attempted. While most of the engineering works of the army are for purposes of peace, a full exhibit of military bridges and lines will find a place in the corps' space under the gallery.

Construction Goes on as Usual.

The cold weather has not delayed construction on the new buildings to any great extent. The cost of breaking ground for the foundations, however, has been materially increased, and the number of men required in that work has been largely augmented, the frozen ground being almost as solid as rock. Fully 200 men were engaged last week in putting down the foundations of the building commonly known as Liberal Arts, but which is termed the Anthropological Building. It is located between the Forestry and Agricultural buildings.

In Machinery Hall, where time counts for so much these days, the cold stopped all concrete and brick work around the boilers and engines. The platforms for the engines are rushed at a great pace. The ceiling of the building is nearly ready for plaster. Between 300 and 400 men are employed in the building. The painting of the interior of Manufactures Hall goes on regardless of weather. The calcimine machines send calcimine through the hose just as well when the thermometer is at zero as in midsummer. The west part of the hall is now entirely painted, and the wonderful effects of that space upon the eye become even stronger, since the interior is all of a light hue, except the iron supports. Week in and week out nearly 100 painters have labored. Their work is now nearly complete, from the wooden columns to the dome 245 feet above. Within ten days the hall will be ready for the installation of exhibits.

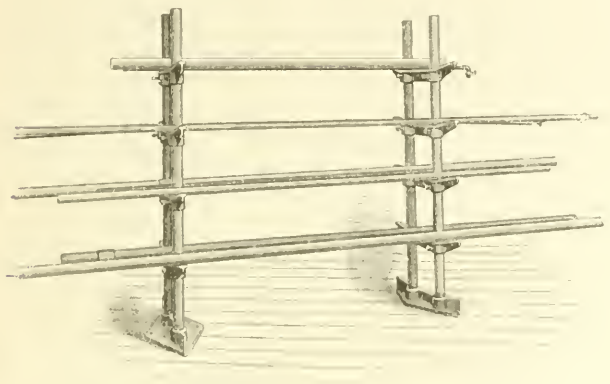
A force of carpenters were employed last week taking up the coverings which had protected the hardwood stairways of the Agricultural Building during the period of construction. The floors have been chalked off for exhibits and every post and every space has its number. The hall would be entirely ready for the oncoming flood of material were there not little snow banks on the floor here and there. They tell of spots in the roof which must be patched before it will be safe to place much merchandise in the building. Painters have completed their work at the Fisheries Building and the interior looks trim and tasty. Nothing more is to be done and material can be received at any time. Mines and Mining and Electricity buildings are also ready. Rapid progress has been made on the electric elevated road the last fortnight. The standards for nearly the entire line are up and track laying has begun in the rear of Machinery Hall. About the only thing that the cold has brought to a full stop is dredging in the lagoon south of the Agricultural Building. The dredges are frozen in ice 1 foot thick. The old whaler "Progress" is as solidly imbedded in ice as if it were again in the arctic regions. The scaffolding has been taken down from the main entrance of the Administration Building, and the first clear view of the architectural beauty of that structure obtained. It was all that had been promised for it. Enough of the scaffolding has been removed from the main entrance of the Transportation Building to discover its artistic beauty. The decoration alone cost $15,000. The last building to be erected by the fair will be the Public Comfort Building. Work will begin the coming week.

Space to be Allotted at Once.

Every available foot of space in the big buildings will be practically awarded to intending exhibitors within the next ten days. The ultimatum has gone out from the Director-General's office that the chiefs

would be expected to allot their space at once and end their troubles. This means a great slaughtering of applications, a dread of which has caused whatever delay that may be complained of. In the Manufactures Building there are possibly ten applicants to one that can be accommodated with a location. Chief Robinson of the Machinery Department has received 1200 applications and can accommodate not more than 500. Other chiefs have been obliged to scale down. Chief Allison has had the most difficult problem, since he has had the greatest surplus of applications.

Some of the directors have felt that they were unduly criticised for delay because of the fact that the special building originally intended for educational exhibits was not contracted for until recently and the further fact that they have been unable to agree with the National Commission upon the adoption of a set of rules for the government of the exposition and its exhibitors. These rules for the last two months have been clamored for by intending exhibitors and especially by the World's Fair commissions of foreign countries.



PIPE AND BAR STOCK RACK.

Foreigners have been anxious to know just how much they would have to pay for power, light, heat, &c. The rules will in all probability be adopted this week.

Mr. Allison of the Manufactures Department and Dr. Peabody of the Liberal Arts Department have necessarily been delayed because of inability to provide promptly for the extra building which was conceded by the directors a few days ago. That structure will now be used for the Department of Ethnology and for housing the exhibits of the Bureau of Music, the Bureau of Charities and the Bureau of Hygienic Exhibits. It has added nearly 200,000 square feet of space to that in the Manufactures Building. Until it was known whether this extra building would be provided Mr. Peabody and Mr. Allison could do nothing definite. Since then Chief Peabody has closed up all the space for educational exhibits, and will begin next week on the bureaus.

The Great Electric Cranes.

The first to be installed of the three electric traveling cranes for Machinery Hall was made by the Yale & Towne Company of Stamford, Conn., while the other two are to come from the establishments of the Morgan Engineering Company of Alliance, Ohio, and William Sellers & Co. of Philadelphia. Each crane will be operated on a track 1400 feet long, has a carrying capacity of 20 tons and weighs about 50 tons without load. The Yale & Towne crane has two trolleys, each of 10 tons' capacity. It is operated by five motors of the United States Company's Manchester slow-speed type. One, a 25 horse-power machine, suffices for the bridge travel, while two 10 horse-power motors, one on each trolley, operate the hoists. The cross travel is taken care of by a 3 horse-power motor on each trolley. Current is taken from two No. 2 B. & S. wires by Thomson-Houston under-running trolleys. The crane can travel at the rate of about 500 feet a minute. During the fair proper it will be fitted up for the accommodation of passengers, of whom about 300 can be carried at one time. An excellent opportunity will thus be given for viewing the busy scene beneath.

New York Mineral Exhibit.

One of the prettiest structures which will be erected by New York State will be that for the mineral exhibit. Architect Isaac G. Perry has just completed the drawings for it. They call for a rectangular pavilion in pure Roman-Ionic architecture, 31 x 61 x 22 feet high. The four corners are to be surmounted by balustrades; the caps of the fluted columns are to be richly carved; there will be an ornamental frieze, and the spandrels will be decorated with mining implements worked into the ornamentation.

The structure will be of white and gold. There will be a balustrade all about the floor, except across the front. The front, or entrance, is of a concave half circle. Directly opposite the entrance an obelisk will rise to a hight of 30 feet. This will be 3 feet square at the base and taper gradually to the top.

It will be composed of rocks illustrating the geological formation of the earth as has been developed by research.

Transporting Russian Exhibits.

A Copenhagen cable dispatch says that the Russian Government has just executed a contract with the Thingvalla Steamship Company, and also another with the United Steamship Company, for transporting to America and return all exhibits from the Russian Empire to the World's Fair at Chicago. It is officially stated that the collection of exhibits from Russia will be the most extensive ever sent from that country to any international exhibition. Unusual interest is expressed in the shipment, which will probably be effected from Port Liban.

The Brazilian Exhibit.

The preliminary exhibition of exhibits at Rio Janeiro, intended to be sent by Brazil to the World's Fair, has been successfully opened, and United States Minister Conger, stationed at Rio Janeiro, predicts a fine representation at Chicago.

Pipe and Bar Stock Rack.

The Builders' Iron Foundry of Providence, R. I., have placed on the market the stock rack for conveniently arranging pipes and bar iron, here illustrated. Screwed into a cast-iron base are two pipes adapted to receive cast-iron cross pieces, which are held at any desired hight by set screws. This provides at each cross piece three shelves, if we may use the term, two outside and one between the bars, for receiving the stock. By means of this simple rack, pipes and bar iron can be arranged so as to be conveniently handled, and the spaces between the cross pieces can be so adjusted as to meet the requirements of the different kinds of stock carried. The cross pieces are made in several sizes in order to adapt the rack to large or small stock.

A New Rust Preventive.

By accident one of the members of the firm of Edmund Mueller & Mann of Charlottenburg, Germany, discovered a mixture of essential oils and greases which proved to be an excellent rust preventive. The demand led to its manufacture on a larger scale under the name of "Mannoeitin," which was adopted by a number of the German Government departments, the post office, state railroads, gun plants and regiments. It has also attained widespread recognition among private manufacturers of machinery, engines and iron and steel. The composition is a thin fluid, which is readily applied by means of a brush. In a short time the essential oils forming a part of its composition evaporate and the greases remain behind, forming a coating which protects the polished iron, steel, brass, copper, gun metal or nickel plated goods against atmospheric influences, and even against the action of sea water. The absence of acid in the composition is alluded to as an important point, nor does it enable acids to form through contact with air or water. We are informed by Vilmar & Goetze of 81 New street, New York, who are agents for this country with the exception of certain States, that the composition, while relatively costly, is economical, because a very small quantity will protect a good deal of surface. It is claimed that the composition does not turn rancid and that it can be readily removed by rubbing with cotton waste wetted with turpentine. It leaves a surface bright and smooth. It has been tested by the purchasing agent of the Illinois Steel Company, Chicago, who exposed a piece of polished steel to the atmosphere for two months, and subsequently kept the same article under shelter for the same length of time. It was then found that the article was as bright and free from rust as it was on the day the material was put on it.

A bill creating a Department of Transportation and providing for the construction of a Nicaragua ship canal has been introduced in the House by Mr. Otis. The department is to have general supervision of the carrying trade of the entire country and to exercise all the powers of the Interstate Commerce Commission, which is abolished. On his appointment the secretary of transportation is to name a commission to proceed to Central America to inspect the work done by the Maritime Canal Company and report what treaties, &c., are necessary to give the United States full control of the Nicaragua Canal.

THE LETTER BOX.

The Plumber's Apprentice.

From S. I. D., *Canada*.—I see in the December 3 issue of your paper (or our paper, I might say) that "G. B." of Newburgh and his shopmates, have been having some debates on questions of interest to the trade. He wishes to know if bosses are imposing on apprentices in keeping them three or four years in learning a trade. In my opinion, I should say not. He has probably seen boys, as I have, who, after two years of service, are as proficient in their trade as others who have put in almost double that time in the same shop, showing clearly the difference in the individuals; their ability to learn and to make the best use of their time. &c.

One of these boys, who has his business at heart, after putting in his day at the shop, will spend his evenings in advancement. If he be a tinner he will save his pocket money to buy a *Metal Worker* pattern book, and there he may learn in his winter evenings what he would be years in picking up in ordinary shop life. I know of such a case where there were a number of "joura" in the shop who, when a job of difficulty or rare occurrence came along were glad to get that same boy to help them. The other boy thinks he has done enough at quitting time, so he spends his time at the opera house, the saloon, on the street, or elsewhere, and never thinks of his business till next morning. Now, as a graduate of a trade school, I would like to disabuse your correspondent's mind of the idea that none but tin workers attend them. It is not so, and plesse tell him, Mr. Editor, that they don't all claim to be able to do tin and sheet-iron work, plumbing, steam and hot-water fitting. Men who make such claims are, I believe, ignorant of what that list includes, and so are the bosses who ask a man to do such work. Let us look for a moment at this "want ad." from the same issue of *The Metal Worker*: "At once: a good all round workman who thoroughly understands plumbing, steam heating and furnace work, and can do some tinning. A man who can do a job and will not have to go back two or three times and fix it over," &c.

This is only a sample of a good many of the same nature, is it not? If such a man is found who "thoroughly understands" these trades, it will be well to publish his name for the benefit of the trade and for the satisfaction of knowing that there are such men to be had. We will suppose a man to have served four years at plumbing, to be a good workman, understanding both the manual and scientific practice of his trade; then he goes and serves another four years as a steam and hot water fitter and becomes proficient at that also. Now, he answers an advertisement like the one before us and gets the job. He has to work at each trade alternately. I say he may thoroughly understand them both, and yet at what a disadvantage he would be if called upon to work alongside of a plumber who thoroughly understands his business and who works at it continuously.

Then again, this kind of boss, who expects so much, often asks his men to do work that is wrong. He takes a man to a job and tells him to connect up a bath and basin, &c., so and so. The plumber says: "It would not be right to put traps on the fixtures without venting them," and explains their necessity to prevent syphonage, &c. The boss replies: "Oh, bother; never mind that, we don't do that way here." And the plumber either has to refuse to do the work wrong and lose his job, or to do it wrong and have someone come along and say he didn't understand his business. In conclusion, I would say that I have nothing but words of praise for the New York Trade School and for the kind and courteous attention from all its officers.

Taking Account of Stock.

From M. U. D., *Garnet, Ga.*—The new year and the new *Metal Worker* just show up in great shape. One reminds that *tempus fugit*, and the other impresses that better ideas "fewgit" than it distributes, though the mistress advises me that if I stuck closer to metal work than to *The Metal Worker* there would "fewgit" a chance to dun me. This rather woke me up, and I'm thinking about making a fortune out of tin. You know a fortune is only an accumulation of "tin." Well, I've got a pile, but it is scrap. What else have I got that is good for something in getting that other pile of "tin?"

A lot of as good ideas as ever any man got from a wide experience and as expert a handicraft in all the workmanship of my assorted trades as a specialist in some one of them. The fact is established with the people all through my section. At a cheap rent, right in center of the town, a roomy, light store and shop with a big lot and a barn on the back of it, all of them as dingy, dirty and disorderly as a man without system, ambitions, pride and industry would have them; as incongruous a lot of stock as buying of everybody only could get together; shop as full of badly arranged tools as adding one at a time and put up in a hurry could make, and where time is lost from their being unhandy; the worst mess of odds and ends of tin plate, sheet iron, lead-pipe fittings and general stock that I ever saw; as big a pile of old stoves, old iron and trash as ever any one man kept so long without calling in the junk dealer; ladders and wagons unsheltered, because the barn is full of stuff that should not be there, or arranged to take up half the space; books badly kept and way behind; bills never sent out; everybody at the first of the year always collects prompt from good psyers, and trusts slow payers because they won't pay till they get ready; money in bank, none; in pocket less; bills for everything on the file, some with remarks on them sharper than the file; wife as good as the world holds, two smart boys and a girl that take after their mother.

Well, that would be a sorry old stock if it wasn't for the family and *The Metal Worker* ideas that I never used. I always observed the workshop laws laid down as gospel; but the best ideas are suggestions and hints; them I never heeded. I think I've tumbled to the ideas, and state my case so that some other follow whose shebang is run in the same way may tumble to them.

Well, I aint making any resolutions for the new year, but if *The Metal Worker* can suit the boys better by a change of style just look in on me when this year gets older.

Discounting Notes.

From W. H. E., *Brooklyn, N. Y.*—Will you kindly inform me through *The Metal Worker* if there is any way that I can raise money on the following note:

$460. September 28, 1892.

On or before one year after date, we promise to pay to the order of.....jointly and severally $460 at.....for value received with interest at 6 per cent. until paid.

(Signed) .....
(Signed) .....

I hold stock as security, the par value (the stock is now selling at par) of which is $4600.

Answer.—We suppose there can be no doubt that any bank would be glad to discount this note when it is backed by such good collateral. There ought to be no trouble in negotiating the paper with any one. If the parties to the note are in sufficiently good credit, the note might be taken without the delivery of the collateral, but if not, the person or bank to whom the note is sold would insist on the security being transferred. The question in the mind of our correspondent probably is whether he has the legal right to part with the stock. This depends on the agreement under which the stock was delivered to the holder of the note. Very frequently it is stipulated that the security shall not be repledged. It certainly would be dangerous in most cases to permit collateral of much more than the value of the note to be passed into the hands of an irresponsible person who might appropriate it to his own use. The owner of the stock might justly complain if this was done without his knowledge or consent. He would in such a case, we think, have a claim on the party to whom he intrusted the security for any damage he might sustain. It is our opinion that where there is an agreement that the collateral shall not be transferred, or where there is no agreement at all, where the parties are silent, the holder of the note assumes full responsibility for the collateral in case he transfers it. He must psy in case it is wrongfully appropriated. Of course, where permission is given to turn over the security with the note no such liability would attach. Unless, however, such transfer was expressly forbidden, the holder would be safe in repledging the security with some thoroughly responsible bank. It might be well to obtain, however, the consent of the maker of the note. It may be said that banks do not usually wish to discount paper which has so long to run, and in this case the situation is further complicated by the fact that the makers have the right to psy it off at any time. These are practical matters, however, which can only be settled by attempting the negotiation.

ROOFING AND CORNICE.

The Country Cornice Shop.

II.

By Cornice Worker.

DRAWING INSTRUMENTS.

It is of great importance for all who wish to do cornice work to become familiar with the use of the drawing board, T-square, triangles, and a set of drawing instruments.

The drawing board for shop use should not be smaller than about 3 feet 6 inches by 5 or 6 feet, and can be made by any carpenter. The T-square should be about 4 feet long, with a set of triangles of different angles. A brass set of drawing instruments costing from $3 to $4 will suffice. It is also convenient to have a smaller T square on hand, say about 30 inches long, to be used for small work.

In Fig. 7 is shown a drawing board with T-square and triangle, and paper attached. When using the T-square always set it on the left side, as shown in Fig. 7, and from the bottom.

Let us suppose that we have received an inch scale drawing from the architect, from which we have to work out the detail.

To work out this inch scale drawing to full size we will require a scale with which to obtain measurements. In Fig. 8 is shown a scale, 1 inch to the foot, or in other words, with the inches divided into 12 parts. Each one of these divisions, therefore, represents a full inch on the drawing, provided it is drawn to a scale of 1 inch to the foot. The same method as shown in Fig. 8 is employed when using smaller scales. If the architect's drawings were ¼ inch scale, we would divide ¼ inch into 12 parts, and each part would represent 1 inch on the full size. Although boxwood scales with the quarter, half, three quarter and inch scales upon them can be obtained as low as 25 cents apiece, it is better if we understand how to construct our own scales, in case none other was at hand.

EAVE TROUGHS.

Let Fig. 9 represent a section of hanging gutter or eave trough, with lock attached, for eaves of pitched tin roofs. These eave troughs can be made of tin, galvanized sheet iron or copper; copper, except for the cost, having the preference on account of lasting the longest and requiring no painting. The eave troughs can be made in lengths equal to the length of the cornice brake. Care should be taken that all seams are closely riveted and soaked with solder. Should copper be used for the gutter then solder the seams on the inside only, so as to leave a clean appearance on the outside when finished. Fig. 10 is a perspective view of the same gutter, showing the top braces in position. Fig. 12 shows the plan and side view of a wrought-iron gutter brace, made of $\frac{3}{16}$ x 1 inch band iron. A and B are the countersunk holes for screws. If the tinner

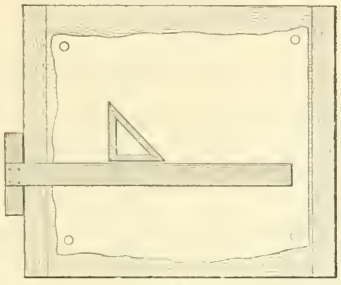


Fig. 7.—T-Square, Triangle and Drawing Board, with Paper Attached.

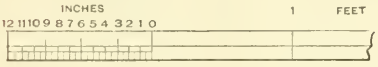


Fig. 8.—Scale of 1 Inch to the Foot.

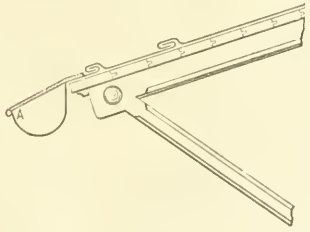


Fig. 9.—Section of Hanging Gutter with Lock Attached for Eaves of Pitched Tin Roofs.

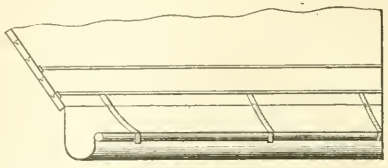


Fig. 10.—Perspective View of Gutter Shown in Fig. 9.

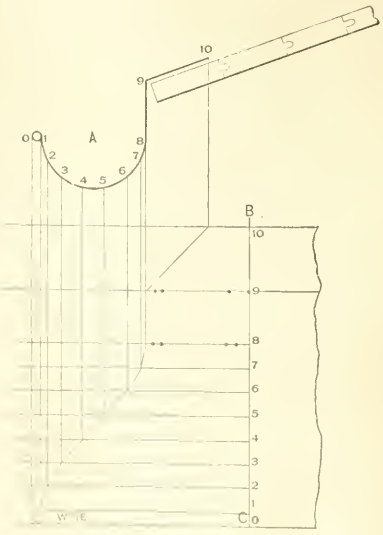


Fig. 11.—Square Miter for Hanging Gutter.

has not the service of a portable forge it is advisable to obtain one, for they are of considerable assistance for doing light iron work, the small size costing but $15. Let us suppose that the tinner has a forge, and intends to do his own wrought-iron work required for cornices, &c. In making the wrought-iron brace shown in Fig. 12, the one end is heated in the forge almost to a white heat, and with quick successive blows with the hammer is drawn out to a point, and curved according to the size of the rod used in the edge of the gutter. As some tinners have no forge, this work can be done by the blacksmith, or the drop the brace on the roof and drive the point C, Fig. 12, well around the wire A, Fig. 9, and put the two wood screws in each brace, thus completing the work of setting the gutter. The tin following is now locked in the gutter, as shown in Fig. 9.

Fig. 13 shows another form of hanging gutter or molded eave trough with leader attached. Fig. 15 gives an enlarged view of the eave trough shown in Fig. 13, also the method of obtaining the pattern for square return miter.

Let A, Fig. 15, represent the end of any molded gutter, for which we desire to

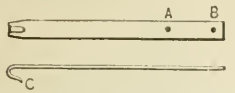


Fig. 12.—Plan and Side View of Wrought Iron Gutter Brace.

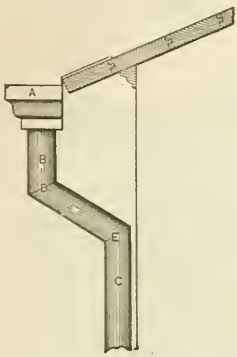


Fig. 13.—Molded Eave Trough with Leader Attached.

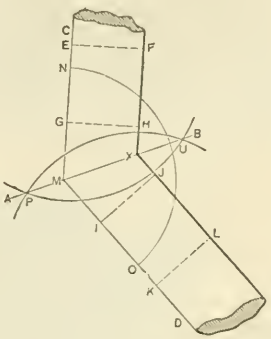


Fig. 14.—Proving the Accuracy of the Miter Line A B.

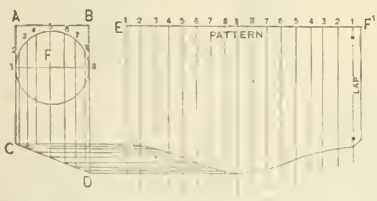


Fig. 16.—Miter Pattern for Elbow the Angle of which is Shown in Fig. 14.

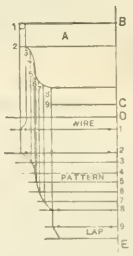


Fig 15.—Square Return Miter for Eave Trough Shown in Fig. 13.

THE COUNTRY CORNICE SHOP.

gutter hangers may be obtained from dealers in tinners' supplies. The holes in the braces can be punched by hand and countersunk with breast drills, which can be purchased from any hardware dealer In putting up the gutter shown in Fig. 9 (the bending of which will be described later on), after having the pitch bent on it and the lock attached, take a few roofing nails or 1-inch wire nails, bend up the lock every 2 feet, and drive in a wire nail. Now replace the lock in the first position, and we are ready for the braces. The braces should be placed about 3 to 4 feet apart, according to the size of the gutter. Take a small chisel and cut a notch underneath the wire, as shown at A, Fig. 9, and slip in the point of brace shown at C, Fig. 12. Next obtain a square return miter head. Divide the mold A, Fig. 15, in any number of equal parts (the more parts, the more accurate the pattern), as shown by the numbers 1, 2, 3, 4, &c. In line with the back of the head of the gutter, as shown by B C, Fig. 15, draw a line, as shown by D E, upon which lay off the stretchout or actual length of profile of the mold A, Fig. 15, as shown from D to E. To illustrate what is meant by the stretchout, let us take a strip of tin or zinc, say about ¼ inch wide, and bend it to the same shape as the profile of the mold A.

Now flatten out the strip and we have what is called the stretchout, corresponding to the stretchout line D E, Fig. 15. At right angles to the line D E draw lines from the small numbers, as shown, which intersect with lines drawn from the mold A of corresponding numbers, or in other words, have the line 1 of mold A intersect the line 1 of stretchout D E, the line 2 of mold A intersect with the line 2 drawn from the stretchout D E, and so on. A line traced through these intersections, will be the required pattern for a square return miter head, as shown in Fig. 13.

The method just shown is the short rule for obtaining patterns for square return miters only, or those having an angle of 90°. If the angle was more or less than 90°, the plan and miter line would have to be employed for obtaining the pattern, the method of which will be fully explained in the next chapter.

LEADER ELBOWS.

In making galvanized-iron leaders, no lighter gauge than No. 26 should be used. If a good strong leader is required, it is advisable to place the rivets about 2 inches apart, using 2 pound tinned rivets and placing washers or burrs on same; this makes a strong leader, and by using the washers, the rivet heads require no soldering. The leader can also be double seamed, but I prefer a riveted leader. Copper leaders are made in the same way. When making leaders of tin, it is advisable to use lead plate and groove them. Brass mounted grooves can be obtained as low as from $8 to $12. In Fig. 13 is also shown a round leader, which requires two bends to bring it plumb against the wall. As the portions of the leader marked B and C run parallel to each other, the two angles or miter joints D and E will be the same as shown in Fig. 13. Fig. 14 is an enlarged view of one of the angles of the leader shown in Fig. 13. After placing the angle or bevel which we desire the leader to have, as shown by C D, Fig. 14, and taking the width of the leader with the dividers, we lay off this diameter or width, as shown by E F and G H, at right angles to E M, and I J and K L at right angles to M D. Then draw lines through F H and L J until they intersect at X, as shown. We now draw a line through M and X, as shown by A B, and we have what is called the miter line. To prove the accuracy of the miter line A B, proceed as follows: Placing the point of the compass at M, Fig. 14, strike an arc, with which intersect the line C M and M D, as shown at the intersections N and O. Next place one leg of the compass on the point O, and with radius greater than O M strike an arc as shown by P U, and similarly from the point N as center strike an arc, as shown by P U, intersecting the arc struck from the center O. A line drawn through these two intersections P and U, and corresponding to the line drawn through the angles M and X, will prove the accuracy of the miter line. What we have just done is simply giving the description of the definition of the geometrical problem called "bisecting any given angle," In making any elbows or other form of molding it is only necessary to draw the correct bevel or angle and then bisect it to get the miter; or in other words, cut the angle so that when the portion of the pipe K L M X is turned over on the line M X it will correspond to E F M X, as shown in Fig. 14. We will now describe how to obtain the pattern of the elbow as required in Fig. 13. Let A, B, C and D in Fig. 16 represent E, F, M and X of Fig. 14 reversed. The miter line C D, Fig. 16, being correct, draw the profile or section of the leader, as shown at F, Fig. 16, and divide into an equal number of parts, as shown by the small numbers 1, 2, 3, 4, &c. Parallel with the lines of the pipe A C and B D, drop lines until they intersect the miter line C D, as shown. Now at right angles to the lines of the pipe A C or B D draw the stretchout of

the profile F, as shown by the small numbers on the line E F^1. The stretchout is the length of the circumference of the pipe, stretched out straight. At right angles to the stretchout line E F^1 draw lines from the small numbers 1, 2, 3, 4, &c., which intersect with lines of corresponding numbers, drawn from the miter line C D, at right angles to the lines of the pipe A C or B D. A line drawn through these intersections will be the desired pattern for one portion of the elbow shown in Fig. 13.

SQUARE RETURN EAVE-TROUGH MITER.

Suppose that the gutter, Figs. 9 and 10, were to return around the corner of a building the angle of which was square, or what is the same, an angle of 90°, and let Fig. 11 represent an enlarged view of Fig. 9. To obtain the pattern proceed as follows: Divide the profile A into any number of equal parts, as shown by the small figures 1, 2, 3, 4, &c., from which drop vertical lines, as shown. Parallel with the vertical lines draw the stretchout line B C of the profile A of Fig. 11, as shown by the small figures 1, 2, 3, 4, &c. At right angles to the stretchout line B C, Fig. 11, draw lines which intersect with lines dropped from the profile A of corresponding numbers. A line traced through these intersections will be the required pattern. The small dots shown on the lines of the patterns in Figs. 11, 15 and 16 indicate the bends. The double dots shown on the line 8, Fig 11, indicate where the circle stops, as shown on the profile A, space 8.

National Iron Roofing Association.

The seventh annual convention of the National Iron Roofing Association began at 10 a.m, January 11, at the McClure House, Wheeling, W. Va. The first day's session was devoted to a discussion of matters pertaining to freight charges and classifications. The World's Fair exhibits of iron roofing and kindred products was also considered at length, and considerable time was given to a consideration of the methods of production and the questions of weights, gauges and measurements. Various committees were appointed, among which was a special one appointed to visit Washington and bring before Congress the desirability of a uniform system of weights and gauges to be used as a basis in levying duty on goods of the sort handled by these manufacturers. On Wednesday evening a banquet was held at which 60 covers were laid, and was attended by all the members present as well as a large number of rolling mill representatives. On Thursday unfinished business was taken up and the officers elected for the coming year, the election resulting as follows:

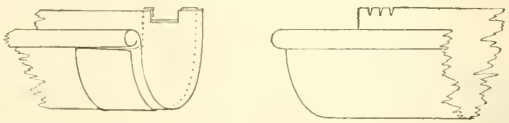
President, C. H Conner.
Vice president, James Hicks.
Secretary and treasurer, R. J. Hyndman.

The rest of the day was spent by the members in visiting manufacturing establishments in Wheeling and vicinity.

THE SLATINGTON-BANGOR SLATE SYNDICATE is the title of an organization perfected on Monday, January 2, and briefly referred to in our columns last week. From an explanatory circular which has been issued to the trade, we learn that it is the purpose, among other things, of the organization to purchase and market the output of the best quarries in the Bangor and black slate regions. The management of the organization is in the hands of James L. Foote, for the past six years connected with the Slatington Slate Company, while the treasurer is Joel Neff, for many years past favorably known as an extensive slate manufacturer. The syndicate represents over 20 quarries. Yards and slate centers will be established at four or five of the principal cities of the country, where roofing slate will be always carried in stock and promptly shipped to points required. We understand it is the expectation to market 100,000 squares during 1893 and 600,000 feet of blackboards, to be largely increased in following years. It is said that the syndicate is in no sense a trust, monoply or combination, but a business arrangement for the purpose of marketing slate on a business-like basis.

The Never-Slip Eave Trough.

Bowers, Galpin & Co., Binghamton, N. Y., are introducing a new eave trough called the Never Slip, which is illustrated in the accompanying engraving, the cut showing the trough separated at the joint. The construction, on which a patent is pending, is very simple and will be readily understood from an inspection of the engraving. As will be seen, one end slips in the socket and then the ears or clips next the eaves are bent front and back and hooked over the two sides of the slot, making the joint fast. A principal feature to which the manufacturers direct attention is that the Never-Slip is made by machinery and the fold is close up to the body of the trough, with just space enough so connecting sections slip up snug and make a flat and smooth joint. This construction by machinery does away with the open joint and the necessity of filling it with putty or cement. The Never Slip eave trough will be of interest to all who require a trough that can be put up without soldering.



The Never-Slip Eave Trough.

FLASHINGS.

THE NEW YORK IRON ROOFING & CORRUGATING COMPANY, First and Washington streets, Jersey City, N. J., send us a copy of a circular letter which they have distributed to the trade. It relates to the advantages possessed by the company for the proper conduct of their large and growing business, and to the new officers, who are practical metal manufacturers and are also at the head of the Penn Iron Roofing & Corrugating Company, Limited, of Philadelphia. The management of the New York company is under the direct control of E. P. Hoyt, formerly the secretary and superintendent of the Philadelphia concern, and originally for two years connected with the New York company under the old management.

JOHN F. SNYDER & Co. of Philadelphia, who have for the last six years carried on the sheet metal cornice business at 2314–2320 North Eighth street, in that city, inform us that increase of business has necessitated their making an extension of facilities in order to keep abreast of their work. They are accordingly now putting up a large new brick factory 115 feet long by 70 feet wide and two stories high, fitted with steam power and a quantity of new machinery. They hope to have it in operation by April 1. When complete, it is stated, the new building will be one of the finest cornice-making establishments in the country. Snyder & Co. have also leased a three-story building at 2511 North Broad street, Philadelphia, which will be used henceforth as their main office, as well as for the manufacture of metallic skylights.

H. B. TODD, Meriden, Conn., manufacturer of Yankee eave-trough hangers, has gone to Florida for the cold season. Mr. Todd will combine business and pleasure on the trip.

JOHN W. BELL & Co., Mercer, Pa., furnish a circular relating to the Bell eave-trough hanger and Bell's malleable roof-iron and wire fasteners, of which they are sole manufacturers.

R. T. NEWLAND announces that he has opened a tin shop at Mt. Jackson, Va., where he is prepared to furnish tin, steel and sheet-iron roofing.

THE AMERICAN ROOFING COMPANY, St. Louis, Mo., and Cincinnati, Ohio, report a steady trade for the lines manufactured by them. They advise us that the present year shows considerable increase over the business transacted during 1891, and the outlook for spring trade is particularly encouraging. During the past year they have improved their plant to the extent of several thousand dollars, and are now, and have been for some months past, able to handle the largest contracts offered.

IN *The Metal Worker* last week we printed a short table giving the amount of slate handled by the Vermont Slate Company during the past four years. The amounts, however, were erroneously given in dollars; the figures we printed should have been for the number of squares. That there may be no mistake in this we reprint the statistics:

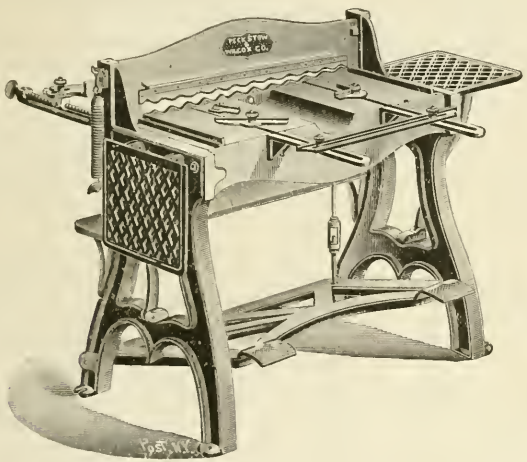
	Production. Squares.	Shipments. Squares.
1889	138,662.45	115,339.86
1890	152,958.45	178,304.04
1891	189,698.57	187,356.54
1892	201,527.19	192,997.24

GEORGE C. KEENE & Co., 140–150 E. Front street, Cincinnati, Ohio, owing to the continued increase in the demand for sheet metal roofing machinery, the production of which they make a specialty, have secured 10,000 additional square feet of floor space at the above numbers, divided into three rooms, the first of which will be used as a stock room for finished machinery such as cornice brakes and light tools, the second will be fitted up with additional machinery especially adapted to the production of small sheet metal working tools, while the third room will be used almost exclusively for the storage of patterns. A number of additional hands will be added. Several large contracts for iron roofing machinery outfits are now under way.

A VERY CREDITABLE PIECE of sheet-metal work has recently been completed in the warehouse of Tefft, Weller & Co. of this city by Lyles & Mills of 231 William street, New York. The basement of the building has been provided with a new ceiling, the center being formed of single-reeded sheets, with a border of double-reeded iron, having the cove cornice and molding in keeping with the remaining portion of the design. We understand that the area covered is 16,000 square feet. The first floor ceiling of the building is laid with embossed plates, with cornice and moldings so disposed that the entire area covered forms one design.

THE WORKS, with stock and machinery, of the Caldwell & Peterson Mfg. Company, at Wheeling, W. Va., were totally destroyed by fire on the morning of the 2d inst. The firm announce that they have made arrangements for duplicating their machinery and expect in a short time to be able to fill all orders promptly. Through the assistance of other manufacturers they are prepared to make prompt shipments of corrugated iron roofing and siding, V-crimped iron roofing and pressed standing seam iron roofing. The firm propose to rebuild at once on a larger scale than ever before, and work on the erection of their new plant will be pushed as rapidly as possible.

L. L. SAGENDORPH of Philadelphia, Pa., has been granted a patent for a metallic ceiling plate having a raised margin or molding on each side, the molding at the corners extending out beyond the margin of the plate. In placing the plates in position on a ceiling, the projecting portions overlap the two marginal beads on adjacent plates, and the corners thus formed are covered with rosettes. The latter are retained in place by a single nail driven through each of them and through the overlapped portions of the moldings at their intersecting points. A one-half interest in this patent has been assigned to Charles N. Harder of Philmont, N. Y.



Squaring Shears for Cutting Corrugated Metals.

Squaring Shears for Cutting Corrugated Metals.

The Peck, Stow & Wilcox Company, Southington, Conn., and 27 Chambers street, New York, have recently commenced the manufacture of squaring shears for cutting corrugated sheet metals of any description, particularly such as are used for roofing, siding, &c., the blades in each instance being made to fit the corrugation intended to be cut. In changing the corrugation it is obvious new blades must be supplied to correspond. So far this application is confined to the heavy No. 0130 squaring shear here illustrated.

Detroit merchants are securing pledges to the amount of $125,000 for a chamber of commerce building.

Only one full-rigged ship was built in Maine last year.

Delivery in Sales of Goods.

The delivery of goods sold is generally the first thing to be done on the completion of a contract of sale after the purchaser has performed any conditions precedent incumbent on him, and it is a very important matter in many respects. Of course, what is here meant by delivery will be understood to be such an act under a contract of sale as will satisfy the law and exonerate the seller in that regard. It may be actual, symbolical or constructive delivery. A symbolical delivery occurs in such a case as where the key to a room or building containing the goods is handed to the purchaser with intent thereby to deliver the goods themselves. Constructive delivery usually occurs where the nature of the property is such or it is in such a place that actual delivery is at the time impossible. Then it is sufficient if such delivery be made as the circumstances will permit. Illustrations are found in very bulky or heavy articles, logs in a boom, or goods at sea. As a rule the delivery is sufficient and title is vested in the purchaser if the contract of sale is completed and the property sold is set aside, or depostted, or marked as sold, at the request of the purchaser, who may take manual possession thereof at any time when he desires to do so. Especially is this true where he has paid the price. In other words, that is a sufficient delivery which puts the goods within the actual reach or power of the buyer, with immediate notice thereof to him.

Unless otherwise specified in the contract of sale, the place where the article is manufactured or offered for sale, as the case may be, is the place of delivery. Where the buyer lives at a distance from the seller he must send the goods as directed by the buyer, or if no directions are given, then as usage or reasonable care would suggest, taking all customary and proper precaution to prevent loss or injury in transit. In such case delivery to the carrier is delivery to the purchaser in contemplation of law if the goods are consigned to the purchaser, otherwise if consigned to the seller and he retains the bill of lading. But under a contract of sale whereby the seller is to deliver the goods at a particular place, the carrier selected by him is his agent to deliver, for whose acts he must be responsible. And when goods are contracted to be sold upon condition that they shall be delivered at a particular place, they are subject to attachment at the suit of the creditors of the seller until they are so delivered.

Where a time is agreed on for the delivery to take place, it must be at that time. Until the time for their delivery arrives, goods are subject to the attachment of creditors of the seller. Shipment before the time specified will not pass title. If no time is mentioned in the contract of sale, a reasonable time will be understood to be meant. And if there are conditions precedent to be performed by the purchaser, they must be performed before the seller will be obliged to make delivery.

Many of the principles underlying this subject are very clearly set forth in the leading case of Bloxam *vs.* Sanders, in which it is stated that where goods are sold and nothing is said as to the time of delivery or the time of payment and everything the seller has to do with them is complete, the property vests in the buyer, so as to subject him to the risk of any accident which may happen to the goods, and the seller is liable to deliver them whenever they are demanded, upon payment of the price, but the buyer has no right to have possession of the goods till he pays the price. The seller's right in respect to the price is not a mere lien which he will forfeit if he parts with the possession, but grows out of his original ownership and dominion, and payment or a tender of the price is a condition precedent on the buyer's part; and until he makes such payment or tender he has no right to the possession. If goods are sold upon credit, and nothing is agreed upon as to the time of delivering the goods, the purchaser is immediately entitled to possession, and the right of possession and the right of property vest at once in him. But his right of possession is not absolute; it is liable to be defeated if he becomes insolvent before he obtains possession. If the seller has dispatched the goods to the purchaser before he has paid for them, and insolvency occurs, he has a right, in virtue of his original ownership, to stop them in transit. Why? Because the property is vested in the buyer so as to subject him to the risk of any accident; but he has not an indefeasible right to the possession, and his insolvency without payment of the price defeats that right. And if this be the case after the seller has dispatched the goods, and while they are in transit, by so much the more is it where he has never parted with the goods, and where no transit has begun.

A failure to deliver goods at the time and place agreed on will justify the purchaser in refusing to accept them at all. And where delivery is in parcels or at different times, but the whole is not delivered, the purchaser may return the part delivered. The seller cannot compel the purchaser to accept a less quantity than his contract calls for, but if he fails to make delivery according to contract he can recover for what he has delivered, less the damage sustained by the purchaser, unless the latter restores to the seller what has been delivered. So if a greater quantity of goods than the contract specifies are tendered or delivered the purchaser may refuse to receive them or more than he purchased.

Purchase of goods without delivery thereof leaves the apparent title still in the former owner. Consequently, where a person bought an article, paid for it, and its delivery at another date and place was agreed on, and the former owner on the same day sold it to another person, it was held that there was no such delivery to the first purchaser as to pass title and protect him against an innocent second purchaser.

The financial crisis in Australia seems to be more acute. Failures are numerous.

"The Metal Worker" Competition in Skylight Pattern Cutting.

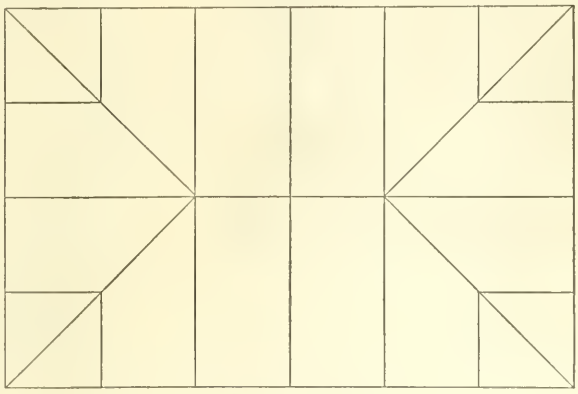
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

Hardware as Specified.

THIS TERM COVERS "a multitude of sins," as it is almost universally used by the architect in making up the plans for buildings. It is all right that such an expression be used and the specifications may make the work of estimating an easy task easier. The trouble lies in the fact that while the specifications are quite explicit as regards the wood work, the masonry, &c., in all probability a page will be devoted to Hardware and will read something after this manner:

HARDWARE SPECIFIED.

"Hardware to be of good quality"—that's definite—"and bronze on first and second floor; attic to be trimmed with rim locks and jet knobs; front and vestibule doors to be supplied with first-quality interchangeable key locks"—each maker has a first-quality lock. The balance of the page in reference to Hardware is devoted to sash pulleys, shutter butts, window fasts and other minor details, but never a word to enlighten one as to the grade, style or quality of goods to be used throughout the house. It therefore rests with the estimating party to decide what is right and proper for general application where no rules are laid down; and with this state of affairs, the floor plans and elevations before us, we will take the place of the estimating clerk and start in to trim.

THE BASEMENT.

According to the plans, there is an entrance door leading to the street. Obviously this door must have a good lock, and if the best lock is used on the main entrance, then this lock should be equally secure. To this door we will apply a mortise flat-key vestibule latch. In all probability there will be an iron gate used outside, but it does not show on plans. Specifications do not say. Now there is the back door leading to the yard. This door does not need so expensive a lock as the front one, but we will use a three-tumbler 5-inch mortise bit-key lock here, bronze knob outside and black iron inside, and a combined escutcheon plate outside, as we did on the front-door lock. Left to our own decision, we will use 5 x 5 butts, solid bronze, for these two doors, and the remaining basement doors we will trim with 4 x 4 iron butts. We take it for granted that the doors are light, and that baseboard molding is very thin. As for locks for the other doors, 4-inch mortise key plates and plain knobs should be the proper trimming. But here is the pantry door: what shall we put on this door? Must it be secure? Off we go again in the dark and trim the pantry with a flat-key dead bolt, a pair of knobs operating a spring latch. Our competing neighbor may use a cheap mortise lock. At this point we are again brought to a halt, and try and solve the question as to whether the cupboard doors are rabbeted or plain, as it makes quite a difference in the cost, but to be on the safe side we will use rabbeted locks. In the laundry the washtubs need butts and lifts, but we will leave that for the carpenter to trim, as well as seat in toilet. The toilet door we will trim with spring latch and small dead bolt operated on inside by thumb piece. The windows we will trim with a cheap fast and hook lifts, as cup lifts are not made for use in the case where servants with wet hands need to lift a window. The dumb waiter to butler's pantry we will also trim with hook lift, for the reason given before. Having finished the basement, we turn the plans and start the work on

FIRST FLOOR.

The main entrance door is the first to receive attention and we supply our best front-door locks, 5½ x 5½, or 6 x 6 butts, keys to pass front and vestibule locks, as this for a wonder was mentioned in specification, but at this point we stop. How about the escutcheon, hinge plates, dummy trimming, push button, &c., &c.?

We solve this problem, but in a very unsatisfactory way, by simply trimming the active doors in plain bronze or brass, and trust that we can adjust the other matter, provided we get the order. It is not safe to estimate $50 for front and vestibule trimming, while our competitor uses plain bronze and as little of that as possible. Of course we might have asked the architect about this—that is not the point—we might ask about 50 other details which should all be explained in the specifications. The doors from main door to parlor, to library, to dining room, are all double sliding doors—are they to be hung overhead or to have brass sheaves and way? The most approved style is to hang them, so we'll use hangers, and as we do not know whether locks are wanted or only pulls, we use the locks to be again on safe side.

From the plans it is impossible to tell whether butler's pantry door is double or single acting—how easy it would have been for the designer to have shown this by using his compass and indicated, so all might read, by means of a half or quarter circle? We will run the risk and use a double-acting butt, even if it does increase the amount $10. We finish the rest of the floor in the regulation way, as the minor trimmings do not signify much one way or the other, except for those windows to the porch. Are they rabbeted or plain? Again we overlook the cost and use the figure for rabbeted locks, and trust the other man will do the same. Cupboards, closets, &c., we trim in regulation style, and again turn the plans to the

SECOND FLOOR.

The specifications said bronze here, so we will proceed to trim the chamber doors with 4½ inch mortise locks, 4½ x 4½ loose-pin butts, combined escutcheon plates and plain bronze knobs. On the closets we will modify the trim by using escutcheons on outside only. For the bathroom we will use a lock similar to the other door locks, but add a dead bolt and thumb piece for inside operation. We cannot tell from plans whether the square window in bath is hinged, pivoted or lift; we will suppose it is pivoted, and furnish pivots and an adjuster, say 12 inch in length. From the plans we imagine that inside blinds are to be used; accordingly, we furnish butts, flaps and shutter bars throughout. If we are mistaken in this supposition, then we have increased our figures to such an amount that our chances for success in getting the order are very slim, as small butts and flaps are very expensive. Trimming the windows on this floor is very simple, only an ordinary fast and flush or cup lifts, two of the latter to each window. Having finished this floor, we now turn to plan of

ATTIC.

Rim locks, jet knobs, and properly black iron butts here; butts 4 x 4, and small key plates black iron, or more properly speaking, Bower-Barff. All the closets we will trim the same as the chamber doors, except we will use half pairs of knobs. The lumber-room door we will trim as we do the other doors, but will add a flat-key dead lock, as this door may require security. Lastly we trim the hatch to roof with a pair of 3 x 3 butts, a hook and staple and a scuttle chain. This completes the trimming all but a few small pieces; these being closet hooks, door stops, &c. We now check back our work to be sure that nothing has been omitted, and finding we are right we proceed to figure up the amount. A glance over the work convinces us that it would be impossible to cheapen the trimming in any way and have the house trimmed as it should be; therefore, when we find the amount to be, say, for example, $540, we feel confident that we are right. We send the plans to the architect, and by mail inform him of the amount as found.

THE RESULT

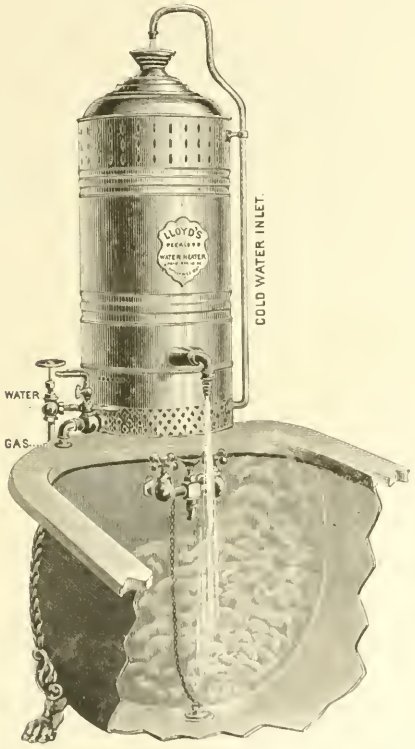
is that we get no reply and never hear of the matter again until, by chance, in passing, a call is made on the designer, and in answer to the question as to what disposition was made of the "Doe Residence," he replies, with a smile, "Why, we gave the order to Lox & Nobs; they were over $100 less than you." Here we are curious to find out what sort of trimming is being used that cost $100 less than the trim we would have used, and just for satisfaction sake we run to the town, nearby, and look over the residence. They are not using a butt in the house that is over 4 x 4, except on front door; they are using one tumbler locks all alike; there is not a door or window rabbeted, nor a piece of ornamental trimming being used. The successful party has used the cheapest, meanest kind of Hardware. The owner is pleased at the small cost. Will he be pleased with the wear and appearance after a year has passed? Would it not be better if the architect were more explicit in his specifications, thereby giving each one estimating a fair chance? Would it not tend to freeze out that class of tenement house Hardware manufacturers who are a constant drawback to reputable houses whose names are synonymous with high class goods. The firm that always get the order because their estimate is lower than their competitors' and the architect who always gives the work to the lowest bidder, irrespective of quality, together do a great injury to the owner, to the trade and to the general advance of art in this direction.

PLUMBING AND GAS FITTING.

Registration of Plumbers in New York.

Attention was drawn in *The Metal Worker* of the 24th ult. by Edward Murphy of this city to the failure of Mayor Grant to comply with the provisions of a law passed by the Legislature and signed by the Governor in May, 1892, in relation to the registration of plumbers and the supervision of plumbing in New York and other cities. The law, if we mistake not, is mandatory, and the leading master plumbers of this city who have for several years past conducted on their own account, with the concurrence of the Public Works Department, a system of examination of applicants for plumbing licenses, are desirous that the law should be fulfilled and the proper legal status be secured to those of the trade who stand ready to comply with its provisions.

In the communication referred to the writer expressed his belief "that the attention of the Mayor had been called to this business, but beyond referring it to the Counsel to the Corporation no action had been taken." A representative of *The Metal Worker* visited the office of Corporation Counsel Clark during the week, and diligent search by one of the assistants failed to find any evidence of the bill having been referred at any time to the law officer of the city government. The only possible color for such reference, it may be stated, would be the fact that changes made by another statute about that time creating the Building Department might in some measure affect the carrying out of the enactment. There is now no such officer in the Board of Health as a Chief Inspector of Plumbing and Drainage, that bureau having been withdrawn from the board and attached to the Building Department. The bill, however, provides for such a contingency, the substitution of other officials being permitted. The subject, therefore, demands prompt attention from Mayor Gilroy so as to provide the necessary means for legal registration before March 1, 1893.



The Peerless Water Heater.—Fig. 1.—View of Heater Attached to Bath.

THE WALCOTT-HURLBUT COMPANY, manufacturers and jobbers of plumbers' supplies, 175 and 177 Lake street, Chicago, furnish the plumbing fixtures for the Chamber of Commerce, Portland, Ore., the plumbing and marble work for which will require an outlay of $22,000. The toilet rooms are to be finished in marble with nickel-plated fittings, and the Dececo water closets and Puro basins will be used exclusively. J. F. Shea of Portland does the plumbing work.

The Peerless Water Heater.

The Toronto Steel Clad Bath & Metal Company, Limited, 123 Queen street east, Toronto, Canada, with United States factory at Detroit, Mich., have brought out the Peerless Water Heater (Lloyd's patent), general and sectional views of which are shown in the accompanying illustrations. Fig. 1 is a general view of the heater attached to the end of a bath-tub delivering a stream of hot water, and shows the outside appearance of the device. The apparatus illustrated is for gas, and uses either coal gas, water gas, natural gas or gasoline gas from gas machines. The capacity is 1 imperial gallon per minute raised to 180°. The apparatus is made in three styles at varying prices. The sectional view shown in Fig. 2 illustrates the operation very clearly. The water, being turned on at the supply cock, passes in the coil K at J. Then upward through the pipe on the outside of the heater and discharged into the chamber I through the strainer L. From here it is conveyed by means of spirals G on to the cone C. These spirals are 187 in number, and are connected at the top or open ends to the crown sheet H, while the lower ends connect to the skirts E and F. The water from the cylinder D is discharged through the pipe N and mixes with the air passing over the cone C before issuing at the cock M. The temperature of the water can be regulated as desired by opening or closing the cold-water supply at J. The gas burner is lighted by a pilot light which ignites the gas at the jets B, the flame passing up through the cone C and coming into direct contact with the bottom of the cylinder D. The surface of the cone C reflects the heat to the coil K under the jet, and, it is said, raises the temperature of the water fully 10 before it enters the heater. The ascending heat after passing the bottom of the cylinder D comes in contact with the spirals.

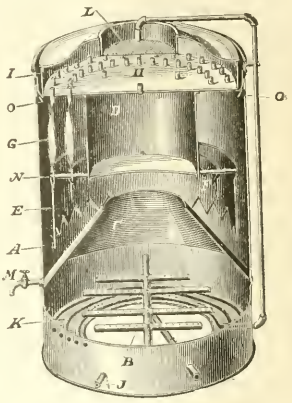


Fig. 2.—Sectional View of Heater.

The Canadian Plumbing Trade.

A correspondent in Montreal, Canada, writes in reference to the plumbing business, in which he is engaged: Volume of business about the same as last year, but competition is worse than ever. More little jobbing shops, which are now to be found in nearly every block. For this reason profits are less. The general public are asking estimates from a number for petty repairs. Nor are profits likely to improve. The worst feature in the trade here is the wholesale dealer selling direct to the consumer in small lots at wholesale prices. Then the consumer either hires a journeyman out of work or supplies the small jobber, who is without capital or credit, with material, and pays him so much per day to do the work. I can't prove it, but feel morally certain that numbers of the journeymen work at night for such people. It is a killing business for men who want to do business on respectable, above-board business lines. Many of the small jobbers are men who cannot earn a decent wage in a good shop, who go about doing repairs, their only stock or capital being their kit of jobbing tools.

Water-Closet Floor Connections

From C. S. P., *Waterbury, Conn.*—I am doing a job of plumbing in a new house here, where washout closets flushed by means of cistern and pull to be set after the most approved sanitary fashion are called for. The architect requires that I must use brass floor plates, and as I am not familiar with this method of connection I ask the assistance of *The Metal Worker* in preference to publishing my ignorance to any of my brother craftsmen. Will you explain the necessity of such a connection and how I should go about it? Also, what is the object of this new fad of the architect?

Answer.—We will begin with the last query. The purpose of a floor-plate connection for water closets (washout or other styles), which are made with bowl and trap in one piece, and necessarily set above the floor, is to guard against the admission of sewer gas through a defective joint where the lead soil pipe under the floor and the closet are connected. In some cases the method of setting these closets is to flange over the lead soil pipe on the floor and screw down the closet with a gasket of putty between the closet and the floor. But this is not a safe way, as shrinkage of the flooring, which is almost always certain to occur, will serve to dislodge the connection, and the trap being above the floor the seal which it would otherwise provide is rendered of little or no value. To make a sure rest for the closet no matter how the floor may shrink or warp a floor plate is necessary. This plate, which has a 4-inch opening, is set in the floor and the edge of the lead soil pipe is flanged over on the counter sunk edge of the opening. The closet is set on this plate with a gasket of either red lead putty or rubber between and screwed tightly together or to the floor, as the case may be. Some of these floor plates have the inner edge beveled instead of counter sunk and in such cases the connection between the floor plate and the lead soil pipe is made not by flanging over but by cutting the soil pipe flush with the surface of floor plate and filling the beveled space with solder, then setting the closet with the gasket as above. The floor plates having the bolts projecting upward are considered the better sort by some because of the fact that the bracing of the closet and the soil pipe is independent of the floor and they are not affected by the shrinkage of the wood.

Brooklyn Master Plumbers.

The following are the officers elected by the Brooklyn Master Plumbers' Association for the year 1893:

Thomas H. Radcliffe, president.
John H. Read, vice-president.
William J. Gault, recording and corresponding secretary.
John W. Kelly, financial secretary.
George B. Lewis, treasurer.
T. Dunn, marshal.
John J. Keenan, sergeant-at-arms.

Boiler Connections.

From W. F. T., *New York.*—In *The Metal Worker* of the 7th inst. "Young Mechanic" submits two sketches of how to connect kitchen boiler with water back in range, in one of which, Fig. 1, the cold-water supply pipe from boiler is about on a level with the water back, while in the other, Fig. 2, it is below the boiler, necessitating the forcing of the cold water upward. In deciding the merits of the two plans as to which is the correct one, you very properly give the preference to Fig. 1, but in doing so you condemn the other as being in contravention of natural law, by which cold water is supposed to descend while hot water ascends. I fail to see where there is anything consistent with natural law in the ascent of cold water in pipes when the necessary pressure is supplied. In Fig. 2, as well as Fig. 1, that pressure is provided, and there is no reason why a boiler set so that the cold water supply is a few inches below the water back should not work satisfactorily, provided always that such pipe, as well as the hot-water pipe, is not trapped. There are very many instances in which from the construction of the range the water back is higher than the cold-water pipe from boiler, and yet no bad results follow so long as traps in the pipes are avoided. As water finds its own level, there should be no fear of proper circulation under the circumstances. In the sketches as submitted the greatest defect, in my opinion, is that there is a sharp bend on the hot-water pipe B, the pumping of which is not apparent and which should not exist, otherwise there is no reason to consider that the arrangement of the cold-water pipe as shown is in contravention of natural laws and likely to lead to unsatisfactory results.

TRAPS AND VENTS.

As previously announced in the columns of *The Metal Worker*, the Executive Committee of the National Association of Master Plumbers met in New York this week for the transaction of business of the character usually considered in executive session. The Continental Hotel, corner of Broadway and Twentieth street, was the headquarters of the committee, but the meetings were held in the parlors of the Builders' Club at 113 East Twenty-fifth street. President Sheehan of St. Louis presided, and in the absence of Secretary Gerhard the duties of secretary were discharged by F. E. Hopper of Cincinnati. On Monday evening a reception was tendered the visiting committeemen by a committee of the New York Master Plumbers, of which John Byrnes was chairman, at Jaeger's Hall, East Fifty-ninth street, which was a very enjoyable affair. President Sheehan reports the outlook for the National Association all over the country as encouraging and the relations between the manufacturers and the association satisfactory.

The transfer of the Bureau of Inspection of Plumbing and Ventilation in New York City from the Health to the Building Department last June, notwithstanding the fears entertained that the standard of inspection might be lowered through the more or less political complexion of the Building Department, has proved entirely satisfactory to all interested in building matters. The continuance in office of the experienced inspectors who were transferred at the time of the change and the appointment of Col. Geo. D. Scott to the position of chief inspector have been fruitful of the desired results, and though political patronage plays some part in the selection of new candidates, personal fitness is held to be the primary consideration. The Master Plumbers' Association are looking forward to the appointment of the Examining Board by the Mayor, and the indications are that the high standard of plumbing which has been maintained in New York for some years past will be fully secured in the future.

The Dececo Company, Newport, R. I., are to furnish the plumbing fixtures for the $25,000 job of plumbing to be done at the Capitol Building, Washington, D. C.

The contract for plumbing the mess hall, guard house and four company barracks, which are to be built at Plattsburg, N. Y., by the Government, has been let to Babcock & O'Donnell, of Syracuse, N. Y., for $10,694.

The A. Y. McDonald Company, 168 Lake street, Chicago, are to issue a new catalogue of about 400 pages descriptive of the plumbers' supplies, sanitary specialties, pumps, pipe fittings, steam and gas goods handled by the firm.

Under date of January 11 the Colwell Lead Company, 63 Center street, New York, issue a notice to the trade that they have opened a branch in connection with Wm. McShane Company at 1524 Broadway, New York, for the sale of lead pipe, sheet lead, tin lined and tin pipe, pig and bar metal and solder, of which they will keep a full stock on hand. Their store at the corner of Sixth avenue and Thirty-ninth street has been closed.

The Hardware Club.

The following is a list of recent accessions to the membership of the Hardware Club of New York:

R. W. Clemson,
Tarpon Springs, Fla.
Hamilton Disston,
Henry Disston & Sons, Philadelphia.
William E. Gard,
Meriden Bronze Company, New York.
George Kissam,
198 and 199 Times Building,
New York.
S. Y. L'Hommedieu,
Columbia Rubber Works Company,
New York.
D. R. Morse,
Howard & Morse, New York.
E. B. Pike,
Pike Mfg. Company,
Pike Station, N. H.

The project to secure a deep water harbor at Corpus Christi Bay is to be carried into execution without further delay. Engineer E. H. Roper estimates the total cost, including docks and warehouses, at $2,000,000. The trans-Mississippi regions expects to derive therefrom substantial benefit.

Loss of Heat from Range Boilers.

Few persons realize how large a percentage of the heat derived from the fuel burned in the kitchen range is lost by the water circulating through the water back, pipes and boiler. Also, there are but few who do not realize the great annoyance and inconvenience of an insufficient supply of hot water for domestic and toilet purposes—particularly where the facilities provided for furnishing it are of a capacity which is supposed to be adequate. To say nothing of the value of the fuel wasted, it certainly shows a great lack of efficiency in the hot-water apparatus, if of the ordinary size in proportion to that of the establishment—that the quantity of water heated should be less than is necessary to meet the ordinary requirements of the family.

In American families the bath (and the use of it) is one of our indispensable institutions, and with the exception of a very short period during the summer season, the quantity of water necessary from the boiler to give a comfortable temperature is considerable. In case several members of the family desire to use the bath consecutively the supply usually falls short, and the unfortunate whose turn comes at the tail end of the list must either resort to the expedient of heating water by other means, or else hurry up the fire (at a considerable expenditure of fuel) to cause the boiler to heat up more rapidly. In either case the situation calls for the exercise of much patience, or, in default thereof, a safety valve which emits the odor of brimstone in volumes proportionate to the temperament of the individual interested. Now, the question is, does the insufficiency of hot-water supply result from want of a possible capacity in the heating apparatus, or does it come from conditions external to the latter, and if so, can the trouble be more or less easily remedied?

CAPACITY OF BOILERS.

In order to intelligently answer the question as to sufficiency of the capacity, it becomes necessary first to ascertain what that capacity should be under existing conditions affecting the absorption of heat by the water; and, second, to calculate the quantity of water at a given temperature necessary to supply the maximum requirements, as represented by the consumption for bathing purposes. Of course these quantities can only be calculated approximately, as the conditions governing them are necessarily assumed, but the results may be considered as being very close to the average as actually realized in practice. The several factors entering into the calculation of quantity of heat absorbed by the water are: 1, temperature of the fire in contact with the external surface of water back (or its equivalent); 2, the conductivity of the material of which the latter is composed, of course taking into account the deposits from oxidation and impurities in the water, on the internal surface; 3, the specific heat of the water, or the number of heat units necessary to raise a given quantity (by weight) to a given temperature, and 4, we must assume a hypothetical condition, that there is no loss of heat by the circulatory and storage portions of the apparatus.

As to the first, we may say that about 1500° F. will represent the temperature of an ordinary range fire when the latter is not being forced for the purpose of heating the ovens, for instance; but as there is always an accumulation of more or less ash from the coal in contact with the heating surface of water back, and as the ash is a non-conductor of heat, we may call the actual effective temperature, say, 1200°, which is the first quantity in our calculation. Second, the conductivity of materials of different kinds has been accurately ascertained by numerous careful experiments, the results of which are accepted as standard in all calculations of this nature. From this source we find the conductivity of cast iron, of which the water backs are made, to be 233 heat units transmitted per hour from the fire to water in circulation for each square foot of heating surface and a thickness of metal of 1 inch. These quantities are for a difference of 1° between the temperature of the fire and that of the water. Assuming the heating surface to be $6 \times 12 = 72$ square inches, or $\frac{1}{2}$ square foot, the thickness of metal at $\frac{1}{4}$ inch, and the mean temperature of the water 100°, we have then 233 heat units $\times$ $\frac{1}{2}$ square foot $\div$ $\frac{1}{4}$ inch $\times$ (1200° − 100°) = 1100° = 512,600 heat units per hour absorbed by the water. As, however, this represents the quantity for iron—*i. e.*, clean iron—and as there is always more or less oxide or scale on the water surface, we must calculate the allowance necessary for the lower degree of conductivity of such deposit, which must be substituted for the foregoing total.

DEPOSITS IN WATER BACKS.

The conductivity given for fine-grained calcareous stones, which are very similar to the ordinary lime deposit from water, is 22.4 heat units per hour. Assuming a thickness of deposit of $\frac{1}{16}$ inch, we find 22 4 heat units $\times$ $\frac{1}{2}$ square foot $\div$ $\frac{1}{16}$ inch thick $\times$ 1100° = 123,200 heat units transmitted per hour, from the cast iron to the water through the $\frac{1}{16}$ inch of scale. Thus we see that a loss of conductivity, and consequently of capacity, of (512,600 − 123,200) = 367,400 heat units, or $\frac{389\,400}{512,600}$ = 76 per cent., results from the presence of this coating. As will be seen from the following, however, this loss of capacity does not amount to a reduction of the efficiency below the point necessary to provide an ample supply of hot water were all of the heat utilized or, rather, retained by it. The quantity would be found as follows: Assuming, as an extreme condition, that the initial temperature of water entering the boiler from service pipe is found to be 36°. Then 100° − 36° = 64°. As a unit of heat is the quantity necessary to increase the temperature of 1 pound of water 1°, or from 39° to 40° F., we may calculate the quantity which the water back would heat under above conditions. One gallon of water at temperature of maximum density weighs 8 34 pounds; then 64° $\times$ 8 34 = 533.76 heat units necessary to raise 1 gallon of water from 36° to 100°, and $\frac{123,200}{533.76}$ = 230 gallons nearly, which could be heated every hour as above. This is manifestly far in excess of the possible legitimate maximum consumption.

The latter may be roughly calculated as follows: Say the quantity asked for, a very liberal depth of water for each bath, is 30 gallons, and the desired temperature is 75°. With the cold water at 36°, the quantity drawn from the boiler at 100° will be (75° − 36°) = 39° $\times$ 8 34 pounds per gallon $\times$ 30 gallons = 9757.8 heat units to raise the 30 gallons from 36° to 75°. Then as we have found 1 gallon of water at 100° to contain 533.76 heat units more than that at 36°, 9757 8 $\div$ 533.76 = 18 3 gallons at 100° required to mix with (30 − 18 3) = 11.7 gallons at 36° to give 30 gallons at 75°. Now, as it may be fair to consider four persons bathing in one hour as the maximum number, the total quantity of bath water from the boiler will be 18 3 $\times$ 4 = 73.2 gallons. Allowing 26.8 gallons to be the consumption for all other purposes during the hour, we have a total of 100 gallons as the maximum possible requirements, or, in reality, at least double the actual consumption. As we have found the capacity of the water back to be, apparently, 230 gallons per hour it would, therefore, seem ample, being 2 3 times as great as the maximum consumption. But, as a matter of fact, the above quantity of 100 gallons per hour is fully double what can usually be obtained from a boiler having the given heating capacity; and certainly one which can supply as much as 50 gallons per hour at 100° may be considered as being above the average efficiency.

WHERE DOES THE HEAT GO?

What, then, becomes of all the heat taken up by the water? It must go somewhere, as it is not in the water when drawn, and the actual efficiency, as compared with the calculated capacity of the water back, is less than 22 per cent. We have, therefore, a discrepancy of 78 per cent. to account for, and a portion of it, at least, is not very difficult to locate. We have in the boiler and its connecting pipes a relatively large amount of unprotected metallic surface, which, owing to its high degree of conductivity and radiating power, must necessarily cause the loss of a very large percentage of the heat absorbed by the water from the fire. Under the same assumed conditions as above we may calculate this loss and then see whether or not some efficient remedy is not absolutely demanded as a matter of correct practice in so important a branch of domestic engineering. Of course, during the cold weather, when the use of artificial heat is necessary to maintain a proper temperature of the atmosphere, the loss from the boiler—though at that time the most serious as regards the hot-water supply—is not a loss of economy so far as the fuel consumption is concerned, but in the summer months, when the use of a range fire becomes a disagreeable necessity on account of the heat, the additional diffusion by the boiler becomes not only a dead loss of fuel, but an unmitigated nuisance as well.

Taking, for example, a boiler of 12 inches diameter by 66 inches hight, and 8 feet of lead pipe for water-back connections, together with 20 feet for sink and bathroom service. The external area of boiler will be ($12^2 \times 0.7854$) $\times$ 2 = say 226 square inches, or 1.57 square feet, in heads and (12 $\times$ 3 1416) $\times$ 66 = 2488.2 square inches = 17 28 square feet in shell; 17.28 + 1 57 = 18.85 square feet, total.

The thickness of metal we may assume to be uniform in heads and shell at $\frac{1}{16}$ inch, and the surface (galvanized) to be not bright. In this calculation we must consider the loss of heat from three distinct sources, viz.: conductivity, radiation and contact of air. Let the temperature of atmosphere in the kitchen be 65°, which is probably rather above the average, when water is 36°. The loss (by contact of air) from the boiler—as determined by experiment—will be 0.52 heat unit per square foot per hour for each degree of difference between the inside and outside temperatures. Then 0.52 $\times$ 18.85 $\times$ (100° − 65° = 35°) = 344 heat units. By radiation the loss will be 0.5662 $\times$ 18 85 $\times$ 35° = 373.23 units. These two items, though comparatively small, have their share in the aggregate.

LOSS FROM CONDUCTION.

The loss from conduction is the most serious, as will be seen from the following: There is a very considerable portion of the surface of the water back in contact with the front and sides of the range, where the latter do not receive any of the heat from the fire and are exposed at their external surfaces to the atmosphere. In fact, most of the heat received by them is that — by conduction — from the wate back (or rather, as in most modern ranges

water from 8), and as their temperature may be safely taken as at least 30° below that of the water in circulation, and the surface as, say, ¼ square foot, we find the loss for ¼ inch thickness to be 233 × ¼ + ¼ × 30° = 3495 heat units, or about five times as much as that for radiation and contact of air combined. This gives a total for the three sources of loss of 4212 heat units per hour.

In the pipes as previously specified we have about 9 square feet. The loss is by radiation and contact of air only; and with the same difference of temperatures between water and air, we have for the former 0 5663 × 9 × 35° = 178.4 heat units. By contact of air 0.52 × 9 × 35° = 163.8. These latter quantities are mostly limited in their effect to the time during which the water is flowing through the pipes. Added to the previous sum they give the aggregate of 4554 units as the total calculated loss of heat absorbed by the water from the fire.

As $\frac{4554}{123,200} = 0.037$, or 3.7 per cent., we must look further for causes of the loss of efficiency. Of course, when the water temperature is greater than that assumed in the foregoing calculations, the loss will be proportionately greater. At 150°, for instance, it would be $4554 \times \frac{150}{100} = 6831$ heat units, or 5 54 per cent. But it is clearly evident that even this larger percentage will not explain the want of efficiency as compared with the capacity found by calculation from our assumed conditions; and it is here we must look for the discrepancy. Of course, the fact is well known that the loss from the unprotected surface of the boiler represents a comparatively large percentage of the total heat absorbed by the water, and as we have found it by the above figures to be so small, the inference is that the quantity absorbed must be considerably less, and that the assumed conditions do not, in reality, exist.

(To be continued.)

The Foundrymen's Association.

The twentieth meeting of the Foundrymen's Association was held at the Manufacturers' Club, 1409 Walnut street, Philadelphia, January 4, at 8 o'clock p.m. In the absence of the president and vice-president, P. D. Wanner of the Mellert Foundry & Machine Company, Limited, Reading, Pa., was chosen chairman of the meeting.

The minutes of the last meeting were read and adopted.

The following persons were present:

Albert E. Hay of Robinson Machine Company, Altoona.

Clemens Jones, Easton.

Isaac P. Chalfant of Chalfant Mfg. Company, Lancaster.

Wm. Green, Jr., of Vulcan Works, Chester

Henry Ruhland of Henry Ruhland & Co., W. C. Henderson of Thos. Devlin & Co., A. W. Howe and Stanley G. Flagg, Jr., of Stanley G. Flagg & Co., L. B. Whitney and Asa Whitney of A. Whitney & Sons, Ed. Bureau of Bureau Bros., E. E. Brown of E. E. Brown & Co., Geo. B. Wood of R. D. Wood & Co., Harry Redmann of G. Redmann & Co., P. Kearns of Stuart Petersen Company, Geo. C. Davies of Chamberlain, Turney & Baird, J. H. Julien of J. W. Hoffman & Co., Howard Evans of J. W. Paxson & Co., all of Philadelphia.

L. S. Wright of Camden Iron Works, Camden, N. J.

James T. Sterling of Harlan & Hollingsworth Company, Wilmington, Del.

Leslie Griscom of Pennsylvania Diamond Drill & Mfg. Company, Birdsboro.

H. J. Herb of Adam Johnston & Son, Reading.

Geo. A. Messick of Pusey & Jones Company, Wilmington, Del.

J. Ogden Hoffman of Frick Coke Company, Pittsburgh.

Andrew McCardell of Pond Machine Tool Company, Plainfield, N. J.

G. T. Marsh, superintendent South Baltimore Foundry.

E. M. Mumford of H. R. Worthington, Elizabethport, N. J.

P. D. Wanner of Mellert Foundry & Machine Company, Reading.

Fred H. Eaton, vice-president Jackson & Woodin Mfg. Company, Berwick, Pa.

The Executive Committee made a report of their meeting, stating that they had decided to send a list of the castings which were presented at the December meeting to the members of the association and others, requesting that they send to the secretary prices for the different castings, f.o.b. at the respective shops, patterns, flasks and core boxes being furnished. It was also decided that samples of coke, with analysis of the same, be presented at the January meeting, so that a discussion may take place on that subject. The secretary stated that he had made arrangements with Mr. Clemens Jones, M.E., late chemist of the Thomas Iron Company, to address the association at the January meeting on the subject of "The Relations of Chemistry to Foundry."

The Railroad and Freight Committee stated that they had attended the meeting at the Manufacturers' Club on December 14, looking toward the formation of a Philadelphia Transportation Bureau, to be composed of 12 different Philadelphia organizations who are at present interested in this matter, the object being to form a grand organization with a wider scope than is existing at the present time, with headquarters at the Manufacturers' Club. A prolonged discussion took place upon this matter, and it was finally decided that this conference deem it expedient to postpone for the present the formation of a general freight bureau. The committee reported progress.

The following new members were then elected: *The Iron Age* of New York, with Thomas Hobson as agent of 220 South Fourth street, Philadelphia; Rogers, Brown & Co., J. M. Warner, manager, pig iron, Bullitt Building, Philadelphia; Yale & Towne Mfg. Company, manufacturers of cranes and foundry; H. R. Towne, president, Stamford, Conn.

The bids on castings, which were presented at the last meeting, were opened and read, and it was found that there was a very slight difference in the prices offered, the figures from the West being lower than those of the Eastern shops. Each bidder was designated by the town in which he was situated, so that names were not used, the feeling being that it was proper to do so, because otherwise information given in confidence might be given away. A discussion took place as to whether it would be best to present other castings and get prices, or whether it would be acceptable to have the association solicit direct from customers orders for castings, having them read before the association and ask for actual bids. It was then left in the hands of the Executive Committee for further action.

Samples of coke were presented with analyses, and a discussion took place on that subject, but the time being limited, was postponed until the next meeting in February.

The chairman of this meeting then proposed a subject which he thought would be of interest to all foundrymen, which was to appoint a committee to report at each meeting current prices at which castings are sold in different parts of the country, the object being to find out as nearly as possible about the price at which castings are being sold. This seemed to be acceptable, and at the next meeting it is expected that all members or others may report any contracts for castings that they might have heard of, together with the price at which they were taken, when a further discussion will be held.

Clemens Jones, M.E., late chemist of the Thomas Iron Company, then made an address upon the subject of "The Relation of Chemistry to Foundry." A vote of thanks was extended to Mr. Jones for the very able manner in which he handled this subject, and the address was ordered to be printed and distributed. The matter contained in this address would seem to show conclusively that chemistry can be better depended upon in foundry practice than the usual plans adopted, and that it was possible, by chemical analysis, to determine the quality of castings and strength, &c., almost to a certainty by a proper mixture, whose chemical analysis is known before it enters the cupola, and that as a rule the analysis, as given by the different parties making iron, could be depended upon implicitly. If the foundrymen would send their orders to the furnacemen for iron with specifications that it should contain certain percentages of carbon, silica, &c., that the furnacemen could furnish it without difficulty.

The minutes are signed by Howard Evans, Secretary.

Contracts Open.

Sydnor & Shepard, water supply contractors, 1445 East Main street, Richmond, Va., inform us that they are in the market for bids on two water towers or stand pipes, to be erected in the State of Virginia. One to be 20 feet in diameter and 80 feet high; the other 25 x 100 feet. They wish specifications and prices for the towers, erected, with plain iron ladder and cornice finish on top. The firm furnish their own foundations.

Treasury Department, office Supervising Architect, Washington, D. C., January 3, 1893.—Sealed proposals will be received at this office until 2 o'clock p.m. on February 1, 1893, and opened immediately thereafter, for all the labor and materials required for the stone and brick work of superstructure, roof covering, &c., of the United States Court House and Post Office Building at Tallahassee, Fla., in accordance with the drawings and specification, copies of which may be had on application at this office or the office of the Superintendent at Tallahassee, Fla. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect or informality in any bid, if it be deemed in the interest of the Government to do so. All bids received after the time stated will be returned to the bidders. Proposals must be inclosed in envelopes, sealed and marked "Proposal for Stone and Brick Work of Superstructure, Roof Covering, &c., of the United States Court House and Post Office Building at Tallahassee, Fla.," and addressed to W. J. Edbrooke, Supervising Architect.

Treasury Department, office Supervising Architect, Washington, D. C., January 3, 1893.—Sealed proposals will be received at this office until 2 o'clock p.m. on January 31, 1893, and opened immediately thereafter, for all the labor and materials required for the cut stone work and brick work, iron and wood floor, ceiling and roof construction and roof covering for the superstructure of the United States Post Office Building at Danville, Ill., in accordance with drawings and specification, copies of which may be had on application at this office or the office of the superintendent at Danville, Ill. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect or informality in any bid if it be deemed in the interest of the Government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be inclosed in envelopes sealed and marked, "Proposal for the Cut Stone Work and Brick Work, Iron and Wood Floor, Ceiling and Roof Construction and Roof Covering for the Superstructure of the United States Post Office building at Danville, Ill." and addressed to W. J. Edbrooke, Supervising Architect.

Steam and Hot-Water Circulation

English Practice in Hot Water Heating—XVIII.*

INDEPENDENT BOILERS.—BRICK-SET BOILERS.

Among types of independent boilers we may mention first Keith's Challenge boiler, Fig. 70, which is well known, and for those purposes to which it is adaped it is decidedly successful. The peculiarity is in its internal construction, which, as before referred to, presents a very large area of direct heating surface in a comparatively small space. It is a cast boiler, and built up in sections as the illustration shows, and it can be seen that the power of the boiler can be increased, or the reverse, within certain limits by the addition or removal of some of the sections. The lower sections which constitute the furnace are convoluted inside, which about doubles the area of surface compared to flat plates. The upper sections are more complex, being partly convoluted, and also having cross waterway bars extending from side to side. Other devices of a similar nature are resorted to to increase the interior heat receiving area. The fact of the parts being cast iron permits of these varieties of surfaces being easily obtained in the manufacture, a result that would be difficult and costly to obtain (to this extent) with wrought plates.

If desired, the sections can be arranged for the feeding door to be placed at a higher position, so that the boiler may be charged with coke to last several hours. This, however, is not desirable if the full power of the boiler is needed. In fact, every boiler is at a disadvantage in being filled up in this manner with fuel, as the black mass in the upper part of the boiler effectively prevents the plates at that part receiving the heat that should be imparted to them, and the boiler is worked almost wholly by the glowing fuel in contact with the plates at bottom.

A boiler of this character must necessarily be coated with non conducting compound, or surrounded with brick work, to prevent loss of heat, and with a boiler having such a large direct heating surface, with comparatively little water, there should always be two or more flow pipes and returns. This boiler is made to heat up to 7000 feet of 4 inch pipe.

The last boiler of the independent order to be mentioned is by the same maker, and termed the Python, as it is of a horizontal shape, and can be shortened or lengthened by the withdrawal or addition of sections. Fig. 71 shows the boiler in front elevation, but with the front casting and its fire doors, &c., removed. This boiler has a convoluted inner surface, top and side, and a multiplicity of other heating surfaces, chiefly in the form of cross waterway bars. This, and also the last boiler mentioned, has fire bars that, by the movement of a lever handle outside, set up a rocking motion to clear the bottom of the fire and assist in preventing clinker forming. This arrangement prevents the too frequent opening of the stoking doors. This is the most powerful boiler made, and is used for such works as public washing and swimming baths and laundries.

The automatic damper, or draft regulater, shown in the flue nozzle at back, is worth describing, as it acts upon a good and reliable principle. This damper is practically an Arnott's ventilator in its action, opening into the flue or chimney and permitting air to pass in, in variable quantity, according to the extent that its flap is open. The flap or door is nicely pivoted at its lower edge, and by the use of a little balance weight it swings to and fro with very little impulse. Now, it is probably known to most of the readers that the draft in a chimney is very irregular, even within the space of a few minutes, at one moment being strong and another moment rather slack. This quick irregular action is generally due to wind, but a slower but just as inconvenient irregularity is brought about by careless or insufficient attention to the fire. If an ordinary damper is left open a little too far and the attendant absents himself, a deal of annoysance may be experienced by the fierce burning of the fire, &c., and this automatic damper obviates this.

If we make an opening in a chimney a short distance above a stove or boiler, we shall find that an inrush of air immediately sets in through this aperture, and the current of air through the fire below will be reduced proportionately. Now, the automatic damper is this opening, but its balanced door or valve regulates the amount of air that passes in. If the fire commences to burn fiercely the draft in the chimney at once becomes strong, but its strength in this case defeats itself, as it causes the valve to open, and the inrush of air robs the fire below of draft, which at once checks its fierceness. With the abatement of the fierceness the draft in the chimney also slackens, and this allows the valve to wholly or partially close until called upon to act again. Any irregularity of draft caused by wind, and which,

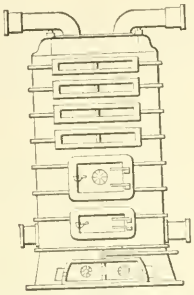


Fig. 70.—General View of Keith's Challenge Boiler of the Independent Type.

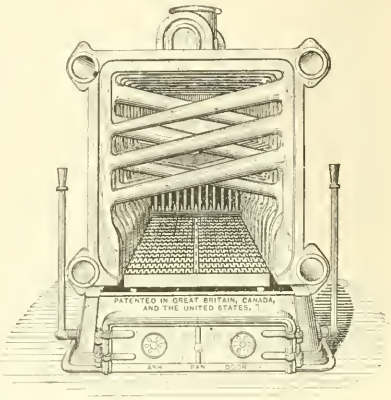


Fig. 71.—Front Elevation of an Independent Horizontal Boiler with Front Casting and Fire Doors Removed.

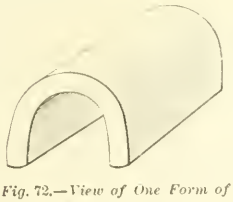


Fig. 72.—View of One Form of Saddle Boiler.

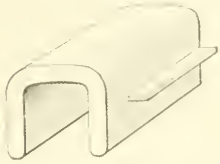


Fig. 73.—View of Saddle Boiler with Square-Shaped Top.

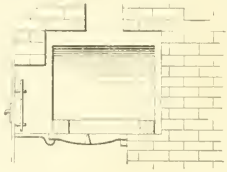


Fig. 74.—Longitudinal Section of Saddle-Boiler in Position.

ENGLISH PRACTICE IN HOT-WATER HEATING.

* Reprinted from the *London Builder*.

would make the fire burn badly, is checked by the same means. Whether the fire or whether the wind is the cause of excessive draft in the chimney, this valve checks it just the same. (The draft in a close-fire kitchen range can be regulated in precisely the same manner by inserting an Arnott's valve in the chimney breast.)

BRICK SET BOILERS.

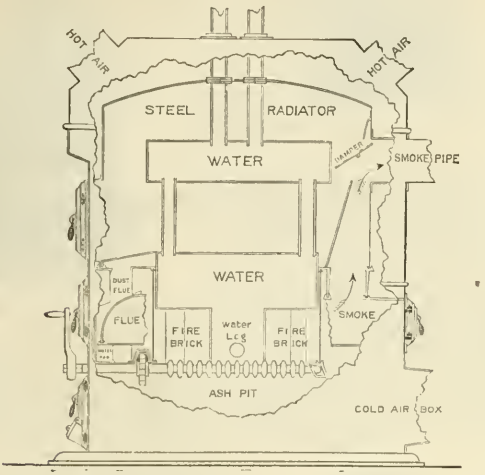
The shape that necessarily takes precedence in this description is the "saddle" boiler. It is one of the oldest forms we have, cheap to make, effective (up to a certain size), and its shape is calculated to benefit by the heat evolved from the fire. The addition of waterway ends front and back makes it as nearly perfect as a wrought boiler can be. When, however, we require a great quantity of pipe to be heated it is more economical in results to have some one of the more complex forms of boiler, which present a greater heating surface within a restricted area.

It will be noticed that with the saddle boiler, Fig. 72, at a point about half way up, the plates begin to describe a half circle over the top, both outside and inside. This, in the writer's opinion, is a disadvantage, not so much inside, however, as outside.

With the outside flue, or indirect heating surface, it has been explained that plates which come beneath the source of heat are practically valueless, owing to flame and heated gases having no efficient contact with surfaces beneath them (unless the flue be choked somewhat, when an objection of another kind presents itself). In addition to this, these surfaces always have a collection of dirt upon them, which by itself would prevent a ready transfer of heat to the water. A square shape, as Fig. 73, would give better results, as the inside and more effective direct heating surface would be increased and the vertical surface outside would be added to: vertical surface, notwithstanding its low value, being more useful than a surface beneath the source of heat. By having the boiler of this shape, the flame can be led up and down its length as usual, but along the side, the midfeather being central, as shown. The top, the useless surface, need not be made use of except to support the brick work above, and this would reduce the cost of fixing. Most of the newer shapes, which follow the saddle somewhat, are of square cross section, and the top outer surface is not used except in the way just mentioned.

In fixing saddle boilers (ordinary shape) there are two methods in common use, one being adapted for the smaller sizes and the other and more usual method for small and large sizes alike. The former method is to fix the boiler so that heat and heated products escape from beneath the boiler at all points, and so envelop the boiler without being specially conducted by flues to this end. It is a very effective method. Fig. 74 shows in longitudinal section the boiler so fixed; it is set upon four fire bricks, one at each corner, these raising it 3 inches above the fire bars. By this means the draft in the chimney causes the heated gases to pass from the fire box under the sides, and then embrace the outer surface of the boiler, as a moderately close fitting arch is thrown over. The space between the boiler and the brick work of the arch would be, say, 3 inches.

The illustration shows the chimney leading off from the center at top. This can commonly be arranged and gives the best results; if, however, the chimney must be carried up at the back, then feathers must be introduced to keep the heat from inclining toward that point too much. It will be noticed that only a narrow space is left between the boiler and brick work at front and back. The object of this is to prevent the too free escape of heated gases at these high points, as otherwise we should not get heat to pass under the lower sides. This space in question should be 1 inch to 1½ inches. If the chimney was carried up at the extreme back, the boiler would be butted tight against the brick work at that end. A damper to regulate the draft would have to be fitted in the brick chimney immediately where it starts at from the top. This is the usual and the best and most convenient position for it. This method, as mentioned, is only suited for small boilers, as will be readily understood. It possesses a disadvantage in the fact that when the fire has been going slowly for a little time without attention, the passageways beneath the lower side edges of the boiler become choked with ash, &c., and the outer indirect heating surface has little of the heat. The less useful spaces at each end of the boiler would be more active then, but it would not do to stop or omit them. Boilers fixed in this manner will more quickly fail with accumulated dirt than when they are fixed with their lower edges level with the fire bars.



The Atlantic Combination Heater.—Fig. 1.—Sectional View of Heater.

The Atlantic Combination Heater.

The accompanying illustrations show the Atlantic combination heater, made by the Portland Stove Foundry Company, Portland, Maine. Fig. 1 is an outline sectional view of the entire apparatus, while Fig. 2 shows the water section complete. The heater consists of a cast-iron ring surrounding the upper part of fire pot, below which a row of fire bricks extends to the grate to permit a low fire to be maintained in mild weather. The upright pipes connect the ring with hollow cast coils directly above it, from which rise pipes to carry the heated water. The self-cleaning grate, large ash pit, dust damper, regulating damper and other features of the Atlantic hot air furnace are retained in the combination heater.

HEATING NOTES.

THE EXCELSIOR STEEL FURNACE COMPANY, 110 to 114 South Jefferson street, Chicago, have issued a revised circular giving their lines of goods for 1893, from which we observe that they have added the Brown patent radiators, claimed to save one-third the space over the usual pattern, the Detroit quick-opening valves, the Detroit union ells and the H. & M. make of altitude gauges and thermometers. They furnish a full line of supplies for furnace dealers and contractors of hot water and steam heating.

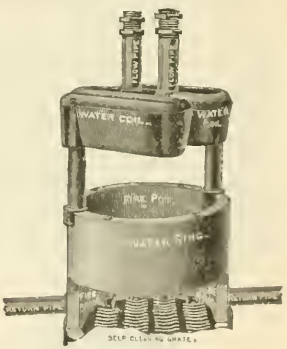


Fig. 2.—Water Section Complete.

GEO. D. HOFFMAN, 82 Lake street, Chicago, Western sales agent for the Economy heaters and Western engine, is to make extensive alterations and improvements to his salesroom. The walls and ceiling are to be decorated, and a new floor laid. The workshop, which at present occupies the rear, is to be moved, thus giving the entire floor for the display of goods. An electric light plant, run by a Western engine, will be placed in the basement for the purpose of lighting the salesroom. The establishment will thus be in good shape for the reception and entertainment of customers who may visit Chicago during the progress of the World's Fair.

THE HOLLAND RADIATOR MFG. COMPANY, 89 Lake street, Chicago, have issued a catalogue illustrating and describing the new Holland radiator. The principle on which this radiator is constructed has already been illustrated in our

columns. The manufacturers lay stress on two points in connection with these radiators. One is that the loops can be disconnected without the use of complicated tools and another that large and unobstructed openings are provided for the passage of steam and water. Minor points are brought forward also to sustain the claim that the Holland will be found efficient and satisfactory in every particular. An illustration is given of a steam or hot-water mantel, consisting of a fire place heater which is used as the basis of the system, utilizing direct radiation in the room in which it is placed and heating other rooms on the same or a higher level by water or steam.

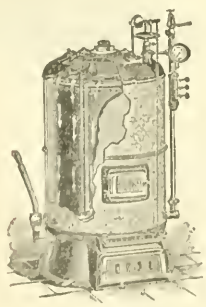
THE JOHN DAVIS COMPANY, heating contractors and jobbers of steam-fitters' supplies, 69-79 Michigan street, Chicago, have secured the contract for supplying the piping for the two electric fountains at the World's Fair.

THE OFFICE AND SALESROOM of the Holland Radiator Mfg. Company, Chicago, has been removed from 48–50 Franklin street to 89 Lake street.

UNDER DATE of January 3 the Missouri Steam Heating Company, 931 North Second street, St. Louis, Mo., inform the trade that James H. Davis and O. L. Fuller are no longer connected with their firm. H. W. Stone, formerly with the St. Louis Steam Heating & Ventilating Company, has assumed the management of the contracting and constructing departments and will act as secretary of the Missouri Steam Heating Company.

Sun Steam and Hot-Water Heaters.

In the accompanying illustrations we show general and sectional views of the Sun steam heater and the Sun hot-water circulator (Lindemuth's patents) manufactured by the Raymond & Campbell Mfg. Company of Middletown, Pa. These boilers, it is said, are constructed wholly of steel of 60,000 pounds tensile strength, or of iron of 45,000 pounds tensile strength. The manufacturers point to the fact that the water spaces are so divided by heating surfaces in fire and drop tubes that positive circulation is obtained in all parts of



The Sun Steam and Hot-Water Heaters — Fig 1.—Broken View of Sun Steam Heater

the boiler. A further feature is the efficient combustion obtained by giving an ample combustion chamber over the fire box where there is plenty of space for the gases to mix and thoroughly consume. The heat, as shown in the sectional views, ascends into the combustion chamber, passes around the drop tubes, then up the fire tubes and along the shell of the boiler, from where it is drawn off into the smoke flue. After the heat passes out of the fire tubes it is carried into a heat collecting chamber divided by deflecting shields which meet angle iron plates to cause the hot gases to pass evenly over the shell of the boiler. These deflecting plates or arms are movable by means of a lever extending to the outside of the casing of the heater. By this means, the manufacturers point out, economy of fuel is obtained and ease of regulation

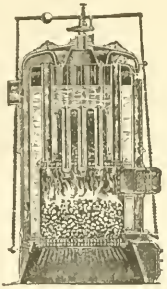


Fig. 2.—Sectional View of Sun Steam Heater.

assured, especially when combined with the use of the draft door in front of base and check door on rear of base of heater, when connected with the automatic regulator. They call particular attention to their check and dust damper at rear of base as assuring economy of fuel. The Sun boilers are said to be very easily cleaned, the steam heaters by the use of flue blowers and the hot water heaters by flue brushes of special design.

Fig. 1 shows the Sun steam heater with shell broken away. It is of the portable form with all the steam fittings attached. The arrows in the cut show the direction of the heat after leaving the heat-collecting chamber. The arms of the draft controller are shown in the cut as meeting with the angle iron riveted to the shell of boiler, which position closes the direct passage to the flue and makes the heater down draft. The hand hole plates on top of heater and on the flange on the bottom of the base are easily removed for cleaning purposes. The casings of the heaters are heavy galvanized iron jackets, lined with asbestos. A sectional view of the Sun steam heater, shown in Fig. 2, reveals the drop tubes, combustion chamber, fire tubes, water and steam space, &c. The steam heaters are made in six sizes, with diameter of fire pot from 17 to 36 inches, adapted to supply from 205 to 1125 square feet of direct radiating surface.

Fig. 3 shows the Sun hot-water circulator, which is of the same general construction as the steam heater, the principal difference being in the distance from the top of the gas chamber head in which the drop tubes are screwed to the outlet of heater, this space in the circulator being about one-third the distance of that in the steam heater. It is mentioned that the fire on the drop tubes and gas chamber head makes the water hottest where it leaves the circulator. It is also mentioned that the vertical position of the heating surfaces is favorable to the free and unimpeded circulation of the water. A sectional view of the Sun circulator is shown in Fig. 4. The water returning enters the water space around the fire pot and is deflected in a spiral direction by a piece of iron riveted to the fire box sheet. The hot water heater is likewise made in six sizes and is adapted to supply from 300 to 1700 square feet of direct radiating surface. The Raymond & Campbell Mfg.

Fig. 3.—Broken View of Sun Hot-Water Circulator.

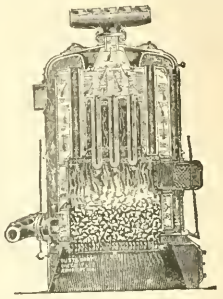


Fig. 4.—Sectional View of Sun Hot-Water Circulator.

Company also made the Sun hot-water heater as a heavy duty or closed tank system heater, and where desired they furnish the Sun as a brick set heater instead of in the portable form.

The final estimates of the yield of cereals for the year 1892, just completed by the Department of Agriculture, gives the following results:

	1892.	1891.
Wheat.....	515,949,000	611,780,000
Corn.....	1,628,464,000	2,060,144,000
Oats.....	661,035,000	738,394,000
Totals.....	2,805,448,000	3,410,328,000

The wheat crop is thus declared to be almost 16 per cent. less than in the preceding year, the corn crop is over 20 per cent. less, and the oats crop is over 10 per cent. less. It will be remembered, however, that the year 1891 was the most remarkable for cereal production this country has ever known. Iowa and Kansas are the two leading States, the former producing over 200,000,000 bushels of corn, while Kansas boasts of nearly 71,000,000 bushels of wheat. As corn States Nebraska, Missouri and Illinois are not far behind.

A large amount of structural iron will be used in what is known as the Park avenue improvement above 106th street, where the tracks of the New York Central railroad will be sustained by an elevated structure. Including the drawbridge over the Harlem River the cost will be about $4 000,000 The contract for the cast iron bases, made with the Allentown Foundry & Machine Company, alone amounts to $16,656.

Extreme depression prevails in the shipping industry of England and the Continent The total number of vessels laid up at English and Scotch ports is 479, and the total tonnage is 856 000 Besides these, there are laid up in Continental ports 99 steamers, with a total tonnage of 100,000.

TIN PLATES.

N. & G. Taylor Company's Tin-Plate Works.

A tinning plant which has an estimated capacity of more than 1,000,000 boxes of tin plates annually has been recently erected and put into operation by N. & G. Taylor Company of Philadelphia, a firm who have been in existence since 1810 as importers, and latterly as manufacturers of tin and terne plates.

Their original manufacturing plant—a small one of but three stacks—was, it will be remembered, destroyed by fire in the early part of last year; but, rising Phœnix-like from its ashes, the works have entered with renewed vigor upon a fresh lease of life, and on a far more extensive scale than before.

A plan of the works is shown in Fig. 1. The ground upon which the new works stand is a rectangular plot of 170 x 385 feet, on Tasker and Meadow streets, in the southeastern quarter of Philadelphia. Its advantages as regards shipping facilities are unequaled, for no less than three lines of railroad run directly past its walls, with all of which it is in communication by side tracks leading into the premises. Beyond this the Delaware River, with its wharves, is but a few hundred feet distant, so that abundant means of transport by land and water are close at hand.

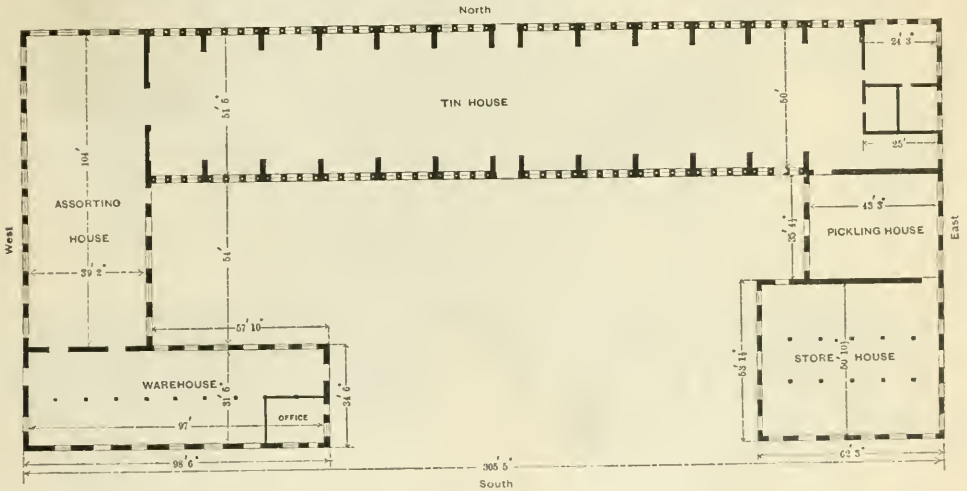
A brief description of this establishment will be of interest to our readers, and will serve to show what manufacturers of American tin plate are doing, in one instance, toward the establishment of this desirable industry on a solid basis and on an adequate scale.

The works, see Fig. 1, so far as they are at present completed—and the most important portions are already finished and in regular operation—are built round three sides of the rectangular plot above mentioned, leaving a vacant space between, which will before long be occupied by a smelting house on a large scale, machine shop, blacksmith's shop, &c., and sufficient room will be left for inserting another tin house with a capacity of a dozen or more additional stacks, when such augmentation is rendered necessary.

On the extreme right of the premises is placed the stock room, where the raw material and all necessary supplies are received and stacked. Here is ample store of black sheets, pig tin and palm oil, the three staples used in the manufacture of tin plates. The black sheets now used by N. & G. Taylor Company are, to a considerable extent, of home production, rolled in the Pittsburgh district; and they are stated to be distinctly preferable to the majority of imported sheets in point of softness, pliability, smoothness of surface and general finish, in addition to which they possess the advantage of not having passed through an ocean voyage with its attendant risk of deterioration from the action of sea air and salt water, and other drawbacks to which foreign sheets are subjected during what is often a lengthy journey with delays, exposure to weather in transference from shore to ship and ship to shore, &c., the effect of which on the material is often that the sheets arrive in a state of rust which necessitates longer pickling before use.

The pig tin used is either Straits or Australian metal, the best yet discovered for tinning purposes, which is delivered in Philadelphia as cheap as the same can be procured in Great Britain.

Connected with the receiving department is a commodious house containing the pickling apparatus, a revolving crane with three cradles, each holding a large number of sheets and working over two immense vats, one of which contains the pickling solution, in which the sheets are allowed to soak for three or four minutes or more according to their degree of cleanliness. From thence the loaded cradle is transferred to the adjacent swilling vat, in which they are thoroughly cleansed, after which they are conveyed to the tinning stacks, the surplus stock being taken to a number of water tanks ranged along one side of the room, there to remain until required in the tinning department. The carriage of all material is rendered easy by a system of small hand cars which operates through the whole extent of the works.



N. & G. Taylor Company's Tin-Plate Works.—Fig. 1.—Plan of Works.

Next to the pickling room, and situated in the northeastern corner of the buildings, are the engine and boiler houses; the former containing a 50 horse power Corliss engine and an electric light engine of 25 horse-power to operate the Thomson-Houston electric light plant which has been fitted throughout the establishment. There are two boilers of 75 horse-power each made by the Sterling Company of Chicago. Between the boiler house and tin shop an artesian well 670 feet deep has been sunk from which an ample supply of pure water is drawn. A 35,000 gallon tank is placed in the yard, which is filled from the well, and from it a system of pipes leads through the tinning house, with taps at each stack, securing a ready and unfailing supply of fresh water to hand.

The most notable feature of the whole establishment is the tinning house, which is of fine proportions. The illustration, Fig. 2, will give a very good idea of the general aspect of the room, which is 305 feet in length and of unusual width. It contains 23 stacks, 12 on the north side and 11 on the south side, with a clear space of 18 feet between each stack. The building is constructed of brick and iron, with

a floor composed of bricks set on edge and filled in with cement, laid over a solid bed of concrete. The tin house is isolated from the rest of the establishment by fire doors at either end so that it is absolutely fire proof. One is immediately struck on entering this department by the unusual lightness, coolness and absence of fumes from the pots. The latter feature is, we learn, secured by an excellent draft arrangement which carries the vapor up the stacks. Skylights of generous size and large grated windows give the workmen ample light and fresh air, and their comfort and convenience appear to have been studied throughout.

At present nineteen stacks are in active operation night and day. The weekly average output is now some 2000 boxes. N. & G. Taylor Company's guaranteed plates, on which a large proportion of the pots are employed, are all turned out on the pure palm oil process. The pots now are in operation on the cheaper grades of terne.

Two coke tin sets are making a special grade of bright tin adapted for canners' purposes, and it is expected that the whole of the 23 stacks will soon be in operation.

At right angles to the western end of the tin house is situated the sorting and packing department, a fine light room of large proportions, fitted with sorting tables on three sides, the fourth accommodating the stamping machines. Here a number of experienced assorters are busily engaged in their apparently monotonous task, while the packers carry on their part of the work in the center of the room; the boxes when filled being transferred to the warehouse and shipping department, a two-story building at the southwest angle of the works. The upper floor is used for the manufacture of boxes. Adjoining the warehouse and fronting

Fig. 2.—Interior View of Tin House.

in use are four old-style sets, without rolls or machinery, in which are made Taylor's Old-Style terne plates, carrying, it is claimed, as heavy a coating of metal as can be deposited. We are informed that no wasters of this grade are sent out, and each plate is stamped and guaranteed. The cost of production is expensive and the process of coating somewhat lengthy, each sheet being passed through no less than seven pots—three tin pots, two grease pots, one dipping pan and a list pot, in which the edge of the sheet is dipped. Eight workmen are employed on each of the Old-Style pots.

Four Morewood sets with three metal and two grease pots are employed on Taylor's Roofing Tin, another of the company's special grades of terne, also produced by the pure palm-oil process. Four other Morewood pots are in use for operating bright tin plates, being of similar description to those just mentioned. Besides these pots, in all of which the pure palm-oil process is employed, four machine pots Tasker street are the offices, which complete the tale of the buildings so far as they are at present finished. A very judicious arrangement obtains in that the different departments are so planned that the whole process of manufacture goes on in a regular progression. The raw material is received at one extremity of the works, and goes through the various stages without any backward steps, until it emerges a finished article ready for shipment at the opposite end.

SCRAP.

United States Iron & Tin Plate Mfg. Company, Demmler, Allegheny County, Pa., have forwarded us a copy of a pamphlet relating to their manufactures, which also contains much useful information in regard to sheet iron and tin plates. The brands of Monongahela, U. S. A. M. and J. H. sheet iron and sheet steel are fully described, as well as the U. S. bright tin plates, U. S. Eagle terne plates, U. S. Redipped ternes and U. S. Monongahela ternes, all manufactured at the company's works. Lists of sizes, weights and prices of the different plates are given, also tables of sheet iron gauges according to the Birmingham scale and that proposed by the Amalgamated Association, as well as the Brown & Sharpe gauge. A further table is included, showing the comparative weight of metals. The U. S. dripping and bread pans are illustrated, with lists of sizes and prices, and several ruled blank pages for notes are interspersed between the printed leaves. A view of the company's mills is shown on the last page.

We learn from the Baltimore Sheet Iron & Tin Plate Company, Baltimore, Md., that they began operations at their works at Canton, near Baltimore, on January 2, and expect to have four sets at work before the end of the month with a productive capacity of 1800 to 1900 boxes per week. Their brands are Arto Siemens bright tin and Lily terne. The company are identical with the Cwmfelin Tin Plate Company of Swansea.

The next move is in the direction of South America and Australia, to whom Government agents will be sent, and it will be seen whether Canada can offer more advantageous terms than those which now exist between the United States and countries which have recently formed new treaty relations. The duty of negotiating with foreign countries is now invested in the new Minister of Trade and Finance.

Several large factories at Findlay, Ohio, are experimenting with crude oil fuel, the natural gas supply being no longer equal to the demand, and at Lima, Fostoria, Bowling Green, Perrysburg and Toledo preparations are making to consume crude oil.

Weekly Prize Competitions.

$25.00.

FOR MORE THAN six months Weekly Prize Competitions ($10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of $12.50, a second prize of $7.50 and a third prize of $5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. These competitions are open to every one, and it is hoped that there will be a general response from business men. Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers to the different questions will be favorably regarded as meeting the purpose for which these competitions are announced. We shall have the privilege of publishing any or all of the contributions received.

Weekly Prize Competition No. 1.

SUBJECT:

How to Avoid the Accumulation of Dead Stock.

This competition is announced in view of the fact that there is a constant tendency toward the accumulation of unsalable goods in the store as a result of injudicious purchasing, neglect of pushing goods, or from the fact that the goods go out of fashion or become damaged, shopworn, &c. The object of the competition is to draw out suggestions as to how such accumulations of dead stock can be avoided and merchants saved the loss which is frequently suffered from the carrying of such unsalable stock. This competition obviously touches upon such points as the following:

To what extent is it desirable to purchase relatively large quantities of goods, in order to obtain low prices?

Whether it is advisable to purchase new goods, such as novelties, specialties, &c., for which no demand has as yet been established;

What methods may be adopted to push the sale of goods which are likely to become unsalable;

Whether it is advisable to sell season goods, such as Stoves, Skates, Refrigerators, &c., at reduced prices, rather than carry them over to the next season;

How to get rid of dead stock.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

Replies are to be received not later than February 4, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Weekly Prize Competition No. 1.

Another subject will be announced in our next issue.

The Balance of Trade.

One of the most puzzling questions which confronts those who aim to study our trade movement is the "balance of trade." The fact that it has been apparently in our favor for years without bringing us large shipments of the precious metals, and of gold in particular, may seem inexplicable to a good many business men.

The figures just issued by the Bureau of Statistics show that the excess of exports over imports was $68,518,275 in the fiscal year ending June 30, 1890, that it was $39,564,614 for the following year, and rose to $202,875,686 in the fiscal year ending June 30, 1892. In other words, the export movement of merchandise in three years apparently exceeded the imports by nearly $310,000,000.

In the precious metals the excess of exports was $18,172,094 in 1889–1890, $72,694,195 in 1890–1891, and $13,351,346 in 1891-1892, or a total of excess of exports in three years of $104,217,635. From this must be deducted an excess of imports of silver and gold in ores and matte of about $22,000,000.

Here, then, we have an apparent excess of exports over imports of very nearly $400,000,000 in three years. Even this does not cover it all, because, as is well known, our export statements of merchandise do not cover the total shipments, overland, to Canada and Mexico, and because, notoriously, a good many goods for certain countries are not invoiced at their full value.

But even waiving these points, we are confronted with a "balance of trade" in our favor of nearly $400,000,000 in three years. The usual explanation given is that this account has been balanced by the return of American securities. It has become quite the fashion to allude to this surrender of the holdings of foreign capital in American railroads and industrial undertakings as one of very great magnitude, and hundreds of millions are glibly transferred to this side of the Atlantic in this manner.

We believe that this is taking a very exaggerated view of a movement which, undoubtedly, is taking place. We are led to this opinion because we are convinced that the value of our imports is very greatly understated. On all articles on which an ad valorem duty is assessed the invoices, upon which the import returns are based, are given in the market values at the point of origin. On goods upon which a specific rate is levied, the temptation to invoice as low as possible is not so great. Still the figures at which the valuations are entered in our import statistics are very far below the prices at which settlement must be made. It may be said, in a general way, that the values which go into our import statistics do not include a large share of the profits of foreign producers, which we pay. They do not take into account the cost of inland carriage abroad nor the ocean-freight moneys which we must pay.

It is generally recognized that there are two minor causes which contribute to swelling an apparent balance of trade in our favor. These are the remittances on account of interest and dividends on foreign investments and the sums drawn from home by Americans living abroad.

It is safe to say that the undervaluation of our imports and the amounts forwarded abroad sweep away a goodly share of our much admired balance of trade and leave the great flood of returning American securities a stream of relatively modest proportions.

New Publications.

THE A B C OF IRON. By Charles W. Sisson, Louisville. Ky. Price, $2.

It was a very praiseworthy undertaking on the part of Charles W. Sisson of Louisville to place before the founders of the country a popular statement concerning the properties of pig iron. The publications of those who have been the leading investigators of the relations between the chemical composition of pig iron and its proportions, so far as they affect the founder, are somewhat obstruse, and Mr. Sisson has attempted to popularize their work, and has succeeded admirably. His brief account of the methods of manufacture of pig iron is good. The short chapters on the constituents of pig iron and their effect upon the strength, fluidity, shrinkage, &c., of castings will be read with a great deal of interest and should be thoroughly studied by those whose principal business is to produce good castings at a minimum price.

Mr. Sisson takes strong ground in favor of grading pig iron by analysis rather than by fracture. His argument is sound, and will meet with the approval of all progressive men. We have no doubt that furnacemen will generally second his efforts in the heartiest manner and will welcome his aid, because it does missionary work where it is most needed—among the founders themselves.

It is only a little over a year since that a leading pig-iron producer in eastern Pennsylvania had his views based upon analysis vindicated in a very striking manner. One of his best customers, a neighbor, came to his works to order some No. 1 iron. The furnace manager urged him to take some metal which looked like rather poor No. 2, and after determined opposition overcame this customer's scruples. Not long after a further round lot of "the same stuff" was ordered, because, as predicted, it was carrying scrap in an exceptional manner, and yet was making excellent castings. The furnace manager furnished an explanation by the simple statement that the particular lot of poor-looking iron ran quite high in silicon.

Success in this direction, so greatly to be desired, can only be attained when founders begin to recognize the value of a chemical laboratory and co operate with the furnacemen in comparing results. We know of cases in which mixtures have been cheapened dollars a ton of castings by chemical study. A first step in that direction is that founders familiarize themselves thoroughly with the first principles, and we know of no better means to accomplish that end than to give Mr. Sisson's neat work a careful perusal.

STOVE TRADE NOTES.

American Stoves Abroad.

We referred in a recent issue of *The Metal Worker* to the fact that a leading coal and iron company in this country are making a strong effort to introduce anthracite coal in the markets of Europe. It was also intimated that, simultaneously with their shipments of fuel, the company has forwarded a number of American stoves in which to burn it. Information has since reached us that several stove manufacturers are considering the matter and will probably take advantage of the next consignment of anthracite to ship stoves of their production, with a view to opening up a foreign trade in these goods.

The outcome of this venture is, as yet, uncertain. But it is quite possible that a new field of supply may be opening out for the American stove manufacturer "on the other side." Indeed, such a field is already open, and has been so for ten years past. A dealer in one of the Eastern States successfully launched a consignment of stoves on the European market some 12 or 14 years ago; and they obtained so favorable a reception that an active demand for his goods has existed there ever since. Protected by patents, these stoves have been made in France for years, from American patterns sent over to that country; and the original owner has been and is drawing a royalty on all goods produced. Thirty thousand stoves are said to be in use in Europe at the present moment which have been made from these patterns. Three hundred were shipped only the other day, direct from this country, in response to an order from Switzerland. A leading Western concern have, we are told, been able to place some thousands of their stoves, made in America, on the European market.

These facts hold out a promise of success for the new attempt. Should the endeavor now being made to introduce our hard coal into Europe turn out well, the market for American stoves, which evidently does not exist there, is likely to receive a decided impetus; and possibly an outlet for surplus production in this line may be secured. Up to the present, the low price of labor and material in Europe has prevented the establishment of any permanent business in stoves manufactured on this side. But, with pig metal at the price at which it is now being sold, that difficulty is less formidable than it was some years ago. Mr. Sargent of New Haven made the statement at the hardware dinner in New York last February that, from personal investigation, he was convinced that, because of their superior skill, his American workmen could turn out more work, at a lower cost, than any European workmen. The same conviction has been expressed by others who have examined into the question. If this is true, there seems to be no reason why our surplus stocks should not be marketed in foreign countries. The first step is to show them our goods, and if the price is not too high there should be no difficulty in finding a market, even for the actual American manufactured article.

The use of American stoves may perhaps become the fashion, and these appliances acquire a name and reputation leading to their permanent adoption in some parts of Europe.

The Wrought Iron Range Company.

In a recent issue of the St. Louis *Globe-Democrat* we find the following item relative to one of the leading stove concerns in that city:

St. Louis continues to show a rapid and healthy increase, both as a commercial and manufacturing city. Statistics recently printed indicate that St. Louis is the largest tobacco manufacturing center in the world, while in the production of boots and shoes it is fast approaching and passing other cities which are noted in this line.

In the manufacture of steel ranges there is no city in the country, or, in fact, in the world, which approaches St. Louis in the production of this line of goods. The manufacture of ranges cannot be mentioned without referring to the Wrought Iron Range Company, whose plant occupies an entire city block from Nineteenth to Twentieth streets, and from Washington to Lucas avenues.

This company commenced operations over a quarter of a century ago, and by a careful attention to the details of the business, and catering to the wants of the people, have achieved a remarkable success, and are to day the largest manufacturers of ranges in the world.

As an evidence of the immense amount of business which this concern are doing, a contract which they have just made with the Missouri Malleable Iron Company is worthy of mention. The contract referred to is doubtless one of the largest, if not the largest, of its kind ever made, and will in round figures amount to over $1,000,000. To enable them to properly handle this work the Missouri Malleable Iron Company have erected an extensive plant, utilizing 15 acres of ground, a portion of which is to be used exclusively for this work. Their plant is equipped with all modern appliances, regardless of cost, and is the finest in the world. They are making malleable iron under a new process which can be hardened and tempered, and in fact has all the qualities of the best open-hearth steel. They have added largely to their force, as it will require between 500 and 600 men, principally skilled mechanics, to turn this work out, thus affording steady support of a liberal character to at least 2000 persons, who in turn patronize the merchants and dealers of St. Louis.

In their own plant the Wrought Iron Range Company employ a force of over 300 hands, to whom they give steady and lucrative employment. They also keep in the field over 400 traveling men, who introduce and sell the Home Comfort steel ranges and furnaces throughout the entire country. In addition to their home trade they ship large quantities of ranges to Mexico, Central and South America, and to other foreign countries. Their trade with Canada has lately grown to such proportions that they have opened a branch factory at Toronto, Canada, where they manufacture a full line of their goods and ship direct to Canadian points.

The entire business is a St. Louis enterprise, inspired and controlled by St. Louisans, and is an establishment of which the city can well be proud.

ODD PLATES.

The Quick Meal Stove Company, St. Louis, Mo., manufacturers of the Quick Meal gasoline and gas stoves, have issued their annual calendar, which will be found useful as well as ornamental. The calendar proper is composed of separate sheets with the week days only appearing thereon, and memorandum space opposite each date for jotting down reminders of daily duties. The back of the calendar is of tin, tinted green, and has the well-known trade-mark of the Quick Meal Stove Company thereon. This calendar will be appreciated wherever received, and the company sending them out are to be congratulated upon securing such good advertising matter.

E. B. Morse, a man entirely familiar with stoves, of Salamanca, N. Y., has accepted a position with the Howe Ventilating Stove Company at Cortland, N. Y.

A. F. Glaessner, for a number of years connected with the Union Stove Works, 70 Beekman street, New York, will continue to visit the trade in New England and New York State in the interests of this concern. Just now Mr. Glaessner is resting at his home in Meriden, where he has quite a collection of high-bred chickens in which he is much interested.

It is not so very long since that the insurance companies throughout the East refused to accept policies where gasoline stoves were used except at a greatly increased premium. That this manner of doing business is getting more or less obsolete is evidenced by the fact that the Quick Meal Stove Company, St. Louis, Mo., have appointed S. M. Howe's Company, Boston, Mass., agents for the sale of their Quick Meal gasoline stoves in that section. This is evidently the opening wedge, and before long the sale of gasoline stoves in the New England States will doubtless be as large as in other parts of the country.

Frank L. Voegtly and John Schroeffel of Allegheny, Pa., have been granted a patent for an open-front stove possessing interesting features of construction. On each side of the grate are vertical rods or bars, on which, at suitable intervals apart, is a series of projections. A front or blower provided with lugs is so placed as to engage with the projections, while wings or flanges formed on the ends

of the blower or front are adapted to engage with the inner faces of the rods or bars in such a way that the rods or bars act as guides for the blower and retain it in a vertical position. Mr. Schroffel has assigned his interest in the patent to Mr. Voegetly.

JOHN M. HARMON, who has had charge of the storage loft of the Bussey & McLeod Stove Company of Troy, N. Y., for 12 years, died suddenly on January 4. of heart disease, from which he had suffered for some time. Mr. Harmon was 72 years of age. He was sexton of the United Presbyterian Church and was well thought of. He leaves a widow and three sons.

THE SUPERIOR FURNACE COMPANY Little Falls, N. Y., have had a very prosperous year, and are now taking inventory and making repairs. Their sales of heaters during 1892 showed a large increase over the year previous and the prospects indicate even a larger business this year. The volume of trade has become so large that it is understood an increase in producing capacity will soon be necessary. The question is at present being considered by the officers and board of directors.

THE ANNUAL MEETING of the stockholders of Superior Furnace Company was held at the office of the company in Little Falls, N. Y., on Tuesday, January 10. The report of General Manager W. H. Switzer for the past year showed the company to be in a most prosperous condition. The following officers were elected to manage the affairs of the company for the ensuing year: President, Watts T. Loomis; vice-president, W. W. Whitman; treasurer, Wm. G Milligan; secretary and general manager, W. H. Switzer. The company is to be congratulated upon the re-election of Mr. Switzer as general manager, for a more faithful and efficient officer would be hard to find.

BEAILEY WOODRUFF of Milwaukee, formerly of Rochester, N. Y., has been visiting in the latter city. He is on his way to Philadelphia, where he will enter the employ of the Abram Cox Stove Company.

E. J CRIDGE of Detroit, Mich., who has been superintendent of the Michigan Stove Company's works at that city, is visiting in Troy. Mr. Cridge is considering an early return to his old home. He is very popular in Troy and is an ex-Alderman of that city. His many friends are pleased to note his good health.

W. L. MERSFELDER, proprietor of the Cincinnati Pattern Works, formerly at 177–181 E. Pearl street of that city, owing to the rapid but steady growth of his patronage, has been compelled to seek larger quarters, and on the 1st inst. removed his shops to 140–150 E. Front street, one square south of former location. The change provides double the former capacity and decidedly increased advantage.

WE UNDERSTAND that a slight fire occurred in the Lansdale works of the Abram Cox Stove Company a few days since, but the flames were extinguished before any important damage had been done.

FOUR CARTON FURNACES have been placed in the buildings owned by Backert & Tempert on Oakdale avenue, by Jacob Retterer, 83–85 Wabash avenue, Chicago.

D. S COOK, F. W. Stevens, A. Midgley and O. P. Chamberlain are named as the incorporators of the Invincible Mfg. Company, at Chicago, authorized to manufacture gas and gasoline machines, stoves and burners. The introduction of natural gas into Chicago has created a demand for natural gas appliances, and D. S. Cook, as the agent of the Chicago & Erie Stove Company, is fully prepared to meet the necessities of natural gas consumers with specially devised apparatus for the use of that fuel.

FROM THE MICHIGAN STOVE COMPANY we have received this week an advertising device in the form of a water-proof card, 9 x 10 inches in size, on which is printed in black letters on a white background the injunction, "Post No Bills." The company state that these signs will prove very acceptable to persons having fences or other places where they do not wish bills posted. As the sign bears a conspicuous reproduction of the company's Garland trade-mark, it thus becomes an attractive and lasting advertisement of their line of stoves and ranges.

A HANDSOMELY ENGRAVED CIRCULAR, adorned with a portrait of the late P. D Beckwith, and issued by the Beckwith estate of Dowagiac, Mich., informs us that in his honor the Beckwith Memorial Theatre will be opened January 20 and 21 by Mlle. Rhea and formally dedicated January 25 by Col Robert G. Ingersoll. Mlle Rhea and her company will present "Much Ado About Nothing" and "Josephine, Empress of the French," on the two evenings respectively mentioned, and Colonel Ingersoll will lecture on Shakespeare. We observe that the price of boxes ranges from $6 to $15. and of seats from 50 cents to $2, according to location and with regard to the character of the entertainment. These prices will give the outside world some impression of the high character of this temple of amusement as well as the wealth of the community in which it is located. And the fame of the Round Oak stove is thus perpetuated.

JACOB RETTERER, 83 and 85 Wabash avenue, Chicago, now represents the Victor Stove Company of Salem, Ohio, Keeley Stove Company of Columbia, Pa., Empire Stove Works of Troy, N. Y., and the Carton furnaces.

THE FULLER-WARREN COMPANY of Milwaukee, Wis, favor us with a sample of the very neat wall calendar which they are distributing to the trade. It bears a pretty seaside view lithographed in bright colors, representing two sweet-faced children hiding from their companions behind the shelter of a convenient rock. Leaflets for the months are attached to the card bearing this picture. Each leaflet carries a line referring to P. P. Stewart stoves and ranges. On the reverse of the card is printed a full daily calendar for the year, a list of the various products of the company and also a list of their branch offices in various parts of the country.

ACCORDING TO A PRESS DISPATCH from West Superior, Wis, under date of January 3, some of the molders of the Superior Stove Works went out on strike the day before. It is stated that John D. Green, manager of the company, announced a reduction of 10 per cent. in the wages of the molders, but the men refused to accept the proposition and 35 went out. We understand that other departments of the works are not affected.

KNOWLTON BROTHERS of Camden, Me., have recently commenced the manufacture of cast-iron stoves, for which a good demand had developed The construction is said to be very economical in the use of fuel and is a powerful heater.

IT HAS BEEN the custom of the Ringen Stove Company of St. Louis, Mo., for a number of years to present their friends in the trade with a calendar and the year 1893 is proving no exception. The company have just sent out a very convenient calendar and daily reminder combined, mounted upon a metal easel, the top of which is embellished with the name of the company and an indication of the line of goods manufactured. The easel is finished in colors and is also furnished with an eye so that it may be hung upon the wall if desired. The days of the week and month are arranged down the left of the pad, constituting the calendar proper, while the greater portion of the width of the paper is ruled for purposes of memoranda.

THE CALENDAR for 1893 which is being distributed by the Co operative Foundry Company of 15 Hill street, Rochester, N. Y., differs somewhat in its general make-up from those which are being sent out by other members of the stove trade. It takes the form of a poster, with metal strips at the top and bottom, and an eye for suspending it upon the wall. The greater portion of the hanger is occupied by a picture of a cosy interior, one of the features of which is a Red Cross base burner under full head of steam, if one may judge from the fiery glow of the mica lights. The picture is lithographed in bright colors, producing a rich effect. Directly beneath the stove in large blue figures appears the date 1893, while at the right and left are the names and addresses of the managers of the Milwaukee and Chicago warehouses. The 12 leaves forming the calendar proper are attached to the lower portion of the poster and framed in an oblong panel partially lost in a design of flowers. The days of the week and month are printed in clear black upon a white ground which enables them to be seen at some distance. There is also given in connection with each month the various phases of the moon.

HESSLER & SCHAFER of Syracuse, N. Y., send us a copy of a catalogue which they have recently issued of stoves, range and furnace repairs. It consists of nearly 100 pages, bound in stiff covers with gilt side title. The list of repairs printed are kept in stock and can be furnished with celerity and dispatch. The firm state that they have long lists of patterns for stoves for which there is but little call. They do not keep such repairs in stock, but can furnish them on short notice. Arrangements have been made with several large stove manufacturers to furnish the firm with all parts of their stoves, thus enabling the trade to be supplied with original castings at reasonable prices. Directions are given for ordering repairs and remarks concerning freight and breakage. The names of the stoves for which repairs can be furnished are arranged in alphabetical order, followed by an indication of the kind of stove, the name of the manufacturer and the parts which can be supplied. We also have from the firm a two-fold circular relating to the Andes stoves and ranges. On opening it we find the center panel occupied with an illustration of one of these constructions which are said to be "The best cookers and bakers made." The left-hand panel is occupied with an excellent likeness of H. E. Hessler, while at the right is a reproduction from a photograph of G F. Schafer.

AT A MEETING of the directors of the Auburn Stove Foundry Company held at Auburn, Maine, on Thursday, December 29, it was decided to erect a 30-foot addition to their plant. We also understand that at this meeting a semi-annual dividend of 3 per cent. was declared.

THE DETROIT STOVE WORKS, Detroit, Mich., have a well-organized staff of traveling salesmen who will look after their interests during the new year. The list includes G M Sovereign, who will visit the trade in New York and Pennsylvania; George W. Patterson, who will travel in Western Ohio; George S. Grey in Indiana; James G. Insole in Eastern Ohio and Western Pennsylvania; George Fifield in Southern Michigan and Northern Indiana; J W. Thorn in the State of Michigan; H. A. Furber in Detroit and

its suburbs; H. W. Peak in Texas; M. C. Bennett in Nebraska; C. H. Conner in Minnesota and South Dakota; R. J. Millar in Michigan, Northern Dakota and Montana; William Randell, in Southern Illinois; W. J. Anderson in Northern Illinois; George F. Cady and F. Goldsmith in Chicago and its suburbs; A. B. T. Moore in Eastern Iowa; P. C. Jones in Western Iowa; H. D. Bell in Wisconsin; Theodore Gale in Missouri; C. F. Dietrich in Kansas; H. D. Schall in the Southern States and P. K. Armstrong in the far West.

THE HERSH FURNACE COMPANY, Leighton, Pa., have brought out a calendar for the new year mounted upon a cardboard measuring 11 x 14 inches in size. The name and address of the company are printed in large blue letters on a white ground and occupy the upper half of the card. The lower panel, inclosed by heavy blue lines, carries the calendar proper, which consists of 12 white sheets upon which in black letters and figures appear the days of the week and month and the various phases of the moon. The thirteenth sheet, on a tinted paper, contains a calendar for the year.

THE FAVORITE STOVE & RANGE COMPANY of Piqua, Ohio, and with branch establishment at St. Paul, Minn., have just issued a very neat catalogue illustrating the Favorite gas range. The stove is made in a great variety of styles and sizes, under a uniform design and embodying the latest improvements. One of the features to which reference is made by the manufacturers is the perfectly fitting joints, doors, &c. The castings, fittings, ornamentation, &c., are of first-class workmanship, while the ovens are of good size. All the burners are operated with steel needle point valves with stop to prevent thread from entering the packing. The hot-water heater which is attached to some sizes of the Favorite is of good capacity and is arranged with two cooking holes. The Favorite is made with two, three and four burners in the top surface, some sizes being fitted with hot-water heater, others with a double burner and attachment, while still others have a combination of the two. The ornamentation is exceedingly attractive, and the constructive parts are so arranged that any kind of gas may be employed as a fuel.

THE VICTOR STOVE COMPANY, Salem, Ohio, will be represented during the year 1893 by I. Ritterer, who will cover the territory west and northwest of Chicago; Louis Waldecker, who will look after the interests of the company in Indiana, Eastern Illinois and Michigan; R. A. Thompson, who will travel in Ohio and Western Pennsylvania, and Charles Koll, who will cover Southern Ohio and Western Virginia.

THE STOVE FOUNDRIES of Taunton, Mass., have been busier during the past month than for the corresponding period in a number of years. The foundry of O. G. Thomas, which usually shuts down about New Year's in order to take account of stock and make repairs, will not be able to cease operations for some weeks as yet owing to the rush of orders.

WALTER G. SEELY, alderman of the Fourth Ward, Detroit, Mich., has been appointed general manager of the Sherman S. Jewett Stove Company, Buffalo, N. Y. Mr. Seely has been manager of the Detroit branch since 1872, when it was established. He entered the stove business at Buffalo, traveling for John C. Jewett, through which connection he became acquainted with the officers of the Sherman S. Jewett Stove Company, and was engaged by them to establish the Detroit branch. It is also interesting to state in this connection that Mr. Seely's son, Walter G. Seely, Jr., has been appointed to take charge of the Detroit office. Mr. Seely will enter upon his new duties at once, but has not yet determined whether he will remove his residence from Detroit

CHARLES C. HEATH & Co. of Baltimore, Md., send us a copy of a very pretty calendar which they have issued for the new year. It consists of a piece of white cardboard measuring 11 x 14 inches, the upper portion of which is occupied with a steel engraving entitled "The Deluge." Above this is the inscription "The Ideal Furnace," while below is the name and address of the concern printed in chocolate-colored letters. The 13 slips forming the calendar proper are printed in an ink of a bluish tint upon a white ground, there being a sheet for each month and one carrying a yearly calendar. At the left is a list of the company's line of fire-place heaters, while at the right are the names of a number of ranges which the company are producing. Considered as a whole, the calendar is very neat and attractive and is likely to be appreciated by those into whose hands a copy may come.

THE GEM CITY STOVE MFG. COMPANY of Quincy, Ill., are distributing to the trade an attractive calendar for the new year embellished with a panel picture entitled, "Fight for the Standard," by the artist Ansdell. This occupies fully one-half of the card, which measures 7 x 14 inches in size. Below the picture is the name and address of the company, and attached to the lower portion of the card is the calendar proper, consisting of 12 leaves, upon which the days of the week and month, together with the moon's phases, are printed in black.

THE BRIDGE & BEACH MFG. COMPANY of St. Louis, Mo., are much pleased with the volume of business during the year just brought to a close. Out of 305 possible working days they operated their works with a full force on 295 days, the ten-day shut down being for inventory and necessary repairs. The company have a capacity of 180 molding floors and it was necessary to keep the department under full headway the entire year in order to supply the demand for their line of superior stoves and ranges. The company are making preparations for a still larger increase in their business for the ensuing year, and on Tuesday, January 3, the works started up with a full force in all departments.

THE CULTER & PROCTOR STOVE COMPANY of Peoria, Ill., will have a force of salesmen on the road during the year 1893, consisting of C. H. Cowles, who will look after the trade in Illinois; L. H. Loomis, who will cover Illinois and Indiana; John C. Hoagland, who will visit the trade in Southern Iowa and Missouri; Charles Rentz, in Missouri and Iowa, and Frank Bosworth, in Minnesota and South Dakota. The company have a new line of four-hole coal and wood ranges, which will be offered the trade this season.

SAM S. UTTER of 113 Beekman street, New York, and with Boston office at 12 Pearl street, sends us a copy of a neat catalogue of 36 pages which he has issued relating to oil stoves of various descriptions. The little pamphlet is printed in tinted ink and bound in colored covers, with gilt side title. The opening pages are devoted to the Game lamp stoves, in which the oil tank is made in one piece, while the wick tube is in one piece, of brass, and removable. Following this construction attention is invited to the Summer Girl, a neat lamp stove made in three sizes, having 1, 2 and 3 burners. The oil tank is cast in one piece, while the wick tube is of chilled cast iron. The feeder cap and wick raiser are of brass. Next in order is the New Game oil stove, shown in a great variety of sizes, the Star Heater and Illuminator, the Ladies' Delight, and sad iron heaters for burning gas. Full directions for using oil stoves constitutes a feature of the work.

THE DANGLER STOVE & MFG. COMPANY, Cleveland, Ohio, make a number of strong claims for their line of Dangler stoves and ranges, stating, among other things, that they possess every desirable feature essential to satisfactory operation. Special reference is made to the Dangler Surprise and also to their New Cabinet range. Their New Process is said to be a novelty in design and is very attractive.

A. WEISKITTEL & SON, Baltimore, Md., are pushing with a great deal of enterprise the sale of their Patapsco six hole range, made in three sizes and the usual varieties. The firm say they have been manufacturing this range the past 35 years and have yet to hear the first complaint.

GEORGE M. CLARK & Co. of Chicago, Ill., state that the Process stove for 1893 is the Jewel of 1892. It is referred to as being very attractive in appearance, satisfactory in operation and well made in every particular.

WILLIAM H. SHEAR, New Scotland, N. Y., sends us a circular of his patent pedal attachment or oven-door opener, which has proven so popular with the stove trade. The merits of the device are carefully set forth and a comprehensive description of its construction and operation presented.

MCLEOD & HENRY COMPANY of Troy, N. Y., have issued a New Year Greeting, in which reference is made to an idea which they say has long been clear in their minds, and the object of the greeting is to make it clear in the minds of the trade. This idea is that the company "make the best goods under the sun" in their line of business, which is the manufacture of New Process fire-proof linings. The greeting winds up with the quotation, "To us the idea is so clear, so shining, so evident, that it will glimmer through a blind man's eye."

Changed Conditions in the Stove Trade.—II.

BY STOVEMAKER.

With the incoming of 1879 the tide turned and the autumn of that year brought the first edge of prosperity to many industries that had languished for five years. Railroad building had taken a fresh start, iron goods were advanced in prices, the stove trade started upward with a boom, and prices rose to something like a paying basis. Old men of business, noted for their great sagacity, brilliant plans and bold business ventures, who had felt themselves tied hand and foot and compelled to let their business simply take its course during the years of decreased demand, scarcity of money and depreciation of values, were stimulated to greater activity than ever and the determination to reap all the benefit and advantage possible from the revival of trade.

The working people, who had suffered through the long years of depression, deprived of not only the luxuries, but of the necessaries of life, felt the influence of the general cry of better times, and set about to get many things of which they had previously been forced to deny themselves. It seems unquestionable that they were tempted into indiscretion in the matter of contracting debts, as the houses adopting the partial payment plan, which had come into existence at this time, were patronized more generally than ever before.

These installment furniture houses were phenomenally successful, and, to take the tide at its flood, they added to their stock in trade anything and everything in reason which they might sell to housekeepers along with their furniture. What they introduced affecting the stove business were stoves themselves, and all the utensils and appurtenances thereto except the repairs;

in fact, they took in practically the whole business of the ordinary stove dealer.

FURNITURE HOUSES SELLING STOVES.

Previous to 1879 there were probably not more than a dozen furniture houses selling stoves in all New York City and surrounding towns, whereas to-day there are thousands. In fact, it is exceptional to find one that does not sell stoves and fittings.

The disturbance to the regular trade was not generally felt at first, only those complaining whose near neighbor in the furniture line went in the stove business, but it spread to all sections and cities in the course of a few years, crowding out the old-line dealers one after another either completely or else causing such a reduction in their stove business that they were no longer factors in the trade. During the three or four years of good demand in stoves after the boom of 1879 the loss to the old-time dealer was not seriously felt; but as soon as the trade settled back the changes that had been going on were noticeable to an alarming extent. Many of the dealers more distant from the trade centers, who had always done a good local business, were astonished at the falling off in their custom and were unable for a long time to account for it. Complaints more or less bitter were lodged against the wholesalers for selling to furniture houses on the ground that they were not legitimate dealers, but the manufacturers could hardly see it in that light when such concerns formed a large proportion of their customers, and considering, too, that supply must follow where demand leads

Old-time city dealers who ten years ago gave stock orders in the fall for from 100 to 200 stoves, which they piled away in their cellars and warehouses, found their trade reduced from year to year and their order to the salesman smaller and smaller, until finally they met the agent making his annual call with the remark: "No more stock orders for me; I will order as I want." Many have become so disgusted that they have given up stoves entirely and confine themselves to jobbing, tin work and roofing.

The furniture houses are not alone responsible for curtailing the trade of stove dealers, however, as many of the large department stores have established stove departments, and while they always sold house-furnishing goods, it is easy to see how much more custom they are taking away from the smaller stores on such utensils by selling the stove itself. They have injured not only the city dealers, but the country dealers as well, as many such stores make deliveries with their own wagons anywhere within 25 or 50 miles of New York.

The evils that have sprung up on account of this freak of trade are many, and while they have fallen most heavily on the retail stove dealers, the manufacturers have also suffered. The people have not burned up any more stoves because others sold them, hence nothing has been gained, but, on the other hand, the scramble after the trade by wholesalers when furniture men started to sell stoves encouraged a host of concessions and inducements that have proven to be very costly indeed. The traditional customs of the trade were unknown to these people, and they refused to be educated up to them. They proposed going into the stove business at the smallest possible bother to themselves, and would not put up with such annoyances as deigning to black stoves, pay the expressman every time he delivered them, pay for any breakage in transit or for any screws or bolts that may have become lost on the way, while the number of salesmen, the frequency of their visits and their persistency in trying to sell goods led them to believe that they could avoid all such detail, having those things conceded, if not by one firm then by another.

OLD AND NEW LINES OF COMPETITION.

Hence the old lines of competition have all been broken up. Arguments that used to prevail with the stove dealer are found to be beyond the comprehension of the furniture dealer. The arrangement of the flues was of no more account to him than the arrangement of the salesman's hair, and the size of ovens and fire boxes had nothing to do with the case. What they wanted to know from the salesman was, how cheap he could sell a 7-inch range, the length of time allowed for payment and what other inducements he could offer? Competition being thus defined, abuses crept in that have cut deep into the wholesaler's profits and which will take another revolution to reform. Things scarcely to be thought of ten years ago in the nature of concessions are matters of ordinary trade now. Free delivery, free blacking, free castings to repair breakage, free bolts and nuts and the privilege of returning unsold heating stoves at the end of the season, are among the many concessions made by the wholesalers from time to time that are now recognized as settled conditions in the sale of stoves. Besides all this it has not infrequently happened that wholesalers have been obliged to send workmen to distant places to repair stoves which through the ignorance or neglect of the furniture dealers' employees to loosen the bolts have cracked with the first fire, not from any imperfection in the casting itself. To decline compliance with such a request would endanger the customer's trade and an explanation from the wholesaler of the custom in the trade regarding such cases would be entirely useless Calls have also been made on the wholesaler to send a man to look at a stove which some person had complained did not work right, and on account of which installment payments were withheld; an expert has been sent simply to find that the stove was either improperly set by an incompetent man or had been purposely abused by the owner himself. A charge for such little services would call forth an indignant protest from the dealer.

PRICES.

In addition to all this prices have been cut and slashed in order to get custom among such dealers. Cutting of prices is not a new element in the stove business by any means, but in the midst of all the other innovations that have cropped out during the new era of the stove business, cutting of prices has not taken a back seat, but has come in for its full share of recognition along with all the rest.

INCREASED COST OF DOING BUSINESS.

It should be stated perhaps that there were and are many exceptions to the class of furniture dealers referred to, who have fully equipped stove departments with competent superintendents and practical workmen to whom some of the remarks made do not apply. Their trade being larger, the delay caused by ordering stoves blacked would be unprofitable and their demand such that small deliveries were unnecessary. But, excepting all such, the trade with the main body has fostered abuses innumerable that will take a long time to cure and that only a general advance in prices, warranted by unusual prosperity in the stove industry, will furnish manufacturers an opportunity to cover. It has made more clerical work necessary to do the same amount of business; taken more salesmen to cover the same territory with its added number of dealers, more porters to handle the same number of stoves distributed in smaller quantities, increased the entering and posting of sales, stationery, postage; and hence to sum up, vastly increased the general expense account and lopped off thousands of dollars of profit, and this is but one of the three great convulsions the trade has suffered from 1882 to 1892.

(*To be continued*)

Franklin N. Drake.

Franklin N. Drake, president of the Corning Stove Company, Corning, N. Y., died at 7 o'clock in the evening of December 28, at North Adams, Mass., where he had gone three weeks before to receive treatment for a cancerous development. He underwent an operation, but his system failed to rally from the shock. Mr. Drake was born in Milton, Vt., December 1, 1817, and 12 years later, his father having died, the family removed to Le Roy, N. Y., where he became a clerk in a drug store. He remained three years, after which he went West for a time. Soon after attaining his twenty-first birthday he established a hardware and grocery store in Le Roy, conducting it with success until 1854, when he began the manufacture of lumber at Cohocton, N. Y. In this he was successful, and after a dozen years was reputed worth $100,000 in cash as the result of his perseverance and enterprise. In the meantime he served in various public offices, being elected supervisor several times. In 1865–66 he became interested with the elder John Arnot, Constant Cook, H. H. Cook, Henry Sherwood, F. C. Dimming, Lorenzo Webber and M. P. Bush in a large track of land south of Blossburg, Pa., now known as Arnot. Mr. Drake became superintendent and manager of the property, which became very valuable. Under his administration the company purchased the Tioga Railway, built the State Line to Elmira, N. Y., and he became, as its president, superintendent and manager. He was a director of the Erie Railway for years, and was urged to accept a like position in the Lackawanna, when it was extended to Buffalo in 1880, but did not do so.

He became a resident of Corning in 1867, and, though engaged in many affairs, took an active interest in the progress of the place. He declined public duties, except the office of town auditor. However, in 1881, he consented to become president of the village, and also became a member and the president of the Park Commission. In 1882 he established the only national bank ever organized in Corning.

Mr. Drake married Miss Abigail Manwaring of Bethany, N. Y., in 1840, while a resident of Le Roy. The fiftieth anniversary of the wedding was pleasantly celebrated September 9, 1890, as was Mr. Drake's seventy fifth birthday on December 1. He had three sons and three daughters. His son, James A. Drake, had been his business confidant for years, to whom the business interests will doubtless fall. Mr. Drake was public spirited and regarded with the highest esteem.

A special meeting of the trustees of the Corning Stove Company was held January 3, and an election of officers took place to fill the vacancy caused by Mr. Drake's death. The company adopted the following preambles and resolutions:

Whereas, Franklin N. Drake, president of the Corning Stove Company, has departed this life; therefore

Resolved, That in the death of Mr. Drake the community has lost one of its most influential citizens and business men and this company a wise counselor;

Resolved, That we place on the records of this company this testimonial of our appreciation of him, and express to his family our sympathy in their bereavement.

The commissioners of Drake Park held a meeting the same day and passed suitable resolutions on Mr. Drake's death.

The Corning Stove Company elected the following officers to serve until the next annual election: President, George W. Drake; vice-president and secretary, L. D. Strecter; treasurer, James A. Drake.

PRIZE COMPETITIONS.

WE HEREBY ANNOUNCE a series of six prize competitions relating to trade matters in which our readers are interested. Four prizes of $50, $25, $15 and $10 will be awarded in each competition.

The competitions are open to all and a general participation on the part of the trade is invited.

We shall have the privilege of publishing any or all of the contributions received.

The committee of award in assigning prizes will take into account the merit of the different contributions and their suitability for publication.

PRIZE COMPETITION No. 6.

How Retailers Can Best Advertise and Extend Their Business.

The object of this competition is to obtain practical suggestions as to the methods which the retail dealer in Hardware, Stoves, Tinware, &c., can advantageously adopt in building up his business, and is intended to cover such points as the following:

Advertising in the local papers, with suggestions as to how such advertising should be done and to what extent;
The manner in which circulars and other printed matter may be used;
A description of any special or unusual methods of attracting and holding trade; and
General suggestions in regard to ways in which the business can be extended.

An account of any methods which have been found useful in building up trade will be suitable under this competition.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 6.

PRIZE COMPETITION No. 7.

Travelers' Yarns.

The traveling salesman is proverbially happy in the stories which he narrates, and this competition is for the purpose of calling out a collection of good yarns for publication. While the attention of travelers is specially invited to this competition, it is open to all. Stories relating more or less closely to trade or business matters will be preferred.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams 96–102 Reade street, New York, and marked Prize Competition No. 7.

PRIZE COMPETITION No. 8.

How to Treat Clerks.

Under this competition, beside a general discussion of the subject, such questions as the following may be considered:

The extent to which clerks should be given an opportunity of obtaining a knowledge of the business, and of price-lists, prices, &c.;
Whether it is desirable to have formal rules for the regulation of employees and for the management of the store. If so, a set of rules should be submitted;
To what extent clerks should be held responsible for their mistakes;
Suggestions as to how clerks should be treated in order to secure their most intelligent and efficient work;
Mistakes made in the treatment of clerks.

This competition opens an important subject and it is hoped that it will be discussed fully by merchants and by their clerks from their different points of view.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 8.

PRIZE COMPETITION No. 9.

Shop System of Keeping Track of Jobs.

This competition is intended to call out information in regard to methods of keeping account of the cost of labor and material on tin-shop work, repairing and new work, inside and outside. In connection with the general subject such points as the following may be touched upon:

Whether blanks or forms are used in connection with such work. (If so, samples should be submitted);
What record is kept of orders, costs of jobs, charges, &c.;
How time occupied in going to and from the job is covered;
Suggestions in regard to the profitable conduct of the shop.

To illustrate the system it is desirable that a specific job (as for example, repairing down spouting and eave trough, or other job of repairing in which new material is used) be referred to and the method of keeping track of the costs in such job fully explained.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 9.

PRIZE COMPETITION No. 10.

Business Maxims—At Least 10.

Those entering this competition will send at least ten maxims relating to the conduct of business, presenting in a brief and pithy manner practical suggestions which may advantageously be followed.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 10.

PRIZE COMPETITION No. 11.

How Small Retailers May Keep a Record of Prices.

The object of this competition is to call out information or suggestions in regard to the best methods to be adopted in keeping a record of prices, showing cost or selling prices, or both cost and selling prices, of Hardware, Stoves, Tinware, &c., in a small retail store employing not more than four persons in the selling and bookkeeping departments, including the proprietors. Those entering the competition are expected to give a concise and clear explanation of their system, and if a price book is used, to submit as illustrating the system at least three specimen pages. If a price book is referred to it may be of any design or arrangement best adapted to the purpose, and may be original with the contributor or may be one of the different price books on the market. Fictitious names should be used instead of the real names of jobbers and manufacturers.

The committee in awarding prizes will take into account the merit of the different systems described, the character of the descriptions given, and the general utility and interest of the contribution.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business, February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 11.

Britton's Floor Jack.

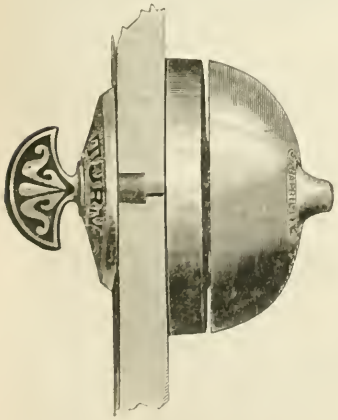
Horace E. Britton, Stoughton, Mass., is introducing this article, as illustrated herewith. It is built throughout of steel, the

Britton's Floor Jack.

lever, sliding wedge and the spike that drives in the floor are nickel plated, the frame japanned and the handle of rosewood. The letter A in the cut represents a small friction roll. The advantages claimed for the jack are that it is quick in operation; that the workman does not have to step off the work to operate it; that it will work within 10 inches of a base board; that by means of the wedge fastening device, every particle of pressure applied is held, and that the spike or dog will not tear the under floor. The tool is compact, taking but little room it can be packed in a tool chest, and is easily moved from place to place, weighing as it does but about five pounds. It is referred to by the maker as light, handy, strong, durable and as an efficient machine.

New Improvement Door Bell.

Hardware Specialty Company, Newark, N. J., have modified the appearance and construction of their New Improvement



New Improvement Door Bell.

door bell, and are now putting it on the market as represented in the accompanying illustration. From an inspection of the latter it will be observed that the company have done away with the old cumbersome base with the lugs for screws on the outside, being now screwed on from the inside by removing the gong. The frame, also, which was formerly japanned, is now highly polished in nickel, so that the entire bell has a nickel finish. The manufacturers call attention to the beauty and neatness of the bell as thus offered. This door bell requires no winding and has no springs.

Immel's Lightning Drain Cleaner.

The Buckeye Mfg. Company, Union City, Ind, are manufacturing this drain tool, as shown in Fig. 1. It is a hand machine to be used as a shovel. The dirt pan is made of No. 18 steel, 3 inches deep

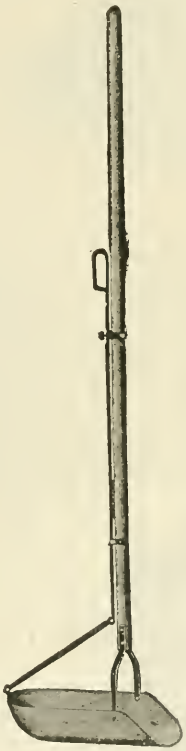


Fig. 1.—Immel's Lightning Drain Cleaner.

and 12 inches long, with vertical end in the rear. It may be used for dipping water and dirt, for letting down tiling

Fig. 2.—Adjusted to Pull.

into ditches, and is found convenient and saves the extra labor of standing and working in muddy ditches. The iron adjusting rod extending up the handle, it is stated, can be used with great rapidity and ease, and can be adjusted to pull or push, as shown in Figs. 2 and 3, as quickly as the hand can be moved up or down the

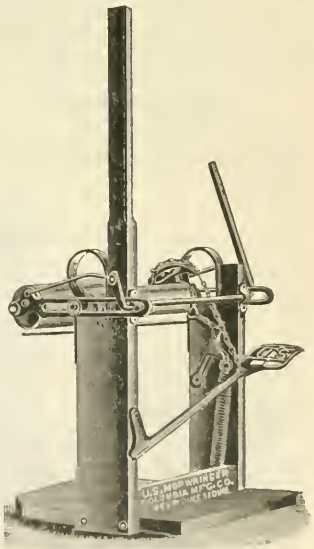
Fig. 3.—Adjusted to Push.

handle. The blade may be held in any position by tightening the screw.

The U. S. Mop Wringer.

The Columbia Mfg. Company, Des Moines, Iowa, have just put upon the market the wringer illustrated herewith.

The base of the wringer is 12 x 15 inches, the uprights are 4 x 16 inches, with a handle or rest extending 15 inches above on the one side, all of hardwood ¾ inch stuff. The two wooden rollers are of unequal size, the smaller one is journaled in two oil-tempered springs and is actuated by foot power. The larger roll is journaled to the horizontal slotted bars, which are mounted on the journals of the small roll and on the outer ends of the clamping lever. In use the rolls are separated by throwing the lever forward. The mop is introduced between the rolls and passed into the bucket below, then raised be-



The U. S. Mop Wringer.

tween rolls, and the rolls are brought together by throwing the lever back, when it becomes automatically locked. By pressing the foot upon the treadle a revolution of the small roll is effected; when the pressure is released upon the treadle the coil spring causes the oscillating segment to return to its normal position, ready for a second stroke. The large roll is driven by its contact with the small roll directly or indirectly through the mop. Five strokes of the treadle are sufficient to drive an ordinary mop between the rolls. Wire guides are provided to prevent the mop cloth passing laterally beyond the rolls. The entire act of wringing a mop can be performed without stooping. Its weight is 17 pounds.

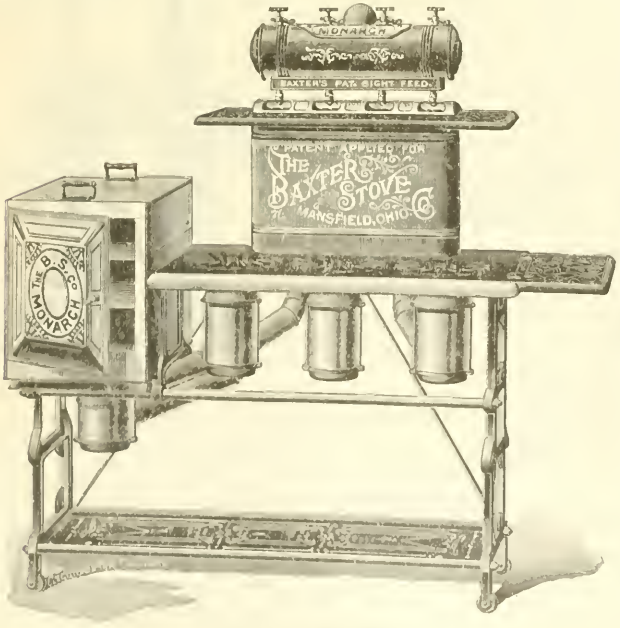
A New Money Drawer.

Tucker & Dorsey Mfg. Company, Indianapolis, Ind., manufacturers of hardware specialties, are introducing a medium-priced money drawer called Tucker's Alarm Till No. 2, illustration of which is shown herewith. The lock and general construction are the same as in the regular old-time Tucker money drawer, but the materials used are somewhat lighter and less expensive. It is intended for a low-price money drawer which will give good service, and bears the same guarantee the No. 1 Tucker's Alarm Till has always had. The company have recently put in improved special machinery for the manufacture of these goods, by which they are enabled to do the best work, and attention is called to the improvement in the workmanship and finish of their product.

Tucker & Dorsey Mfg. Co.'s New Money Drawers.

Monarch Vapor Stove.

In the accompanying illustration we present a general view of the No. 300 Monarch vapor stove, which has been brought out for the season of 1893 by the Baxter Stove Company, Mansfield, Ohio. The special features embodied in this construction include, among others, Baxter's patent sight feed, consisting of mica sections over the top of the vaporizing chamber, thus bringing in sight of the operator the whole internal arrangement and disclosing the dropping of the fluid upon perforated cones. This feature is referred to by the manufacturers as one of great importance and one on which patents are now pending. There is also embodied in the stove a device said to dispense with the heating pipes by a chamber entirely surrounding the evaporating cones, the arrangement being such that great heat is secured and the vaporizing accelerated. At the same time the mechanical constructon is simplified to a considerable extent, rendering the operator much less liable to become confused, while rendering the stove easier to keep clean. The finish of the stove is neat and attractive, nickel plating being used to a considerable extent. The cylinders are made of polished brass, having cast-iron bottoms and cast-iron heat collectors at the top. The stove is jappaned in bright colors and ornamented with gold striping. In offering this stove to the trade the company state that they dispense entirely with the use of sheet iron and make all parts in such a way as to insure absolute durability. The company have in preparation a new catalogue showing other improvements in the Monarch line of stoves, which will be ready for distribution to the trade about February 1.



Monarch Vapor Stove.

Enameled Cooking Pot.

Boas Brothers, 80 Beekman street, New York, and Hamburg, Germany, are just bringing out a new cooking utensil, as here illustrated. Near the rim of the pot there are three lugs, designed to keep the cover on when pouring off water, through the opening and holes seen in the cover on the left of the cut. To release the lid it is only necessary to turn it slightly until the opening is under any of the projections, when it may be taken off without difficulty. The pot is designed particularly for vegetables, although almost anything of that nature may be prepared in it. This is made in their mottled gray adamant ware, in 14 sizes ranging from 1½ to 14 quarts. The firm will keep in stock in New York, however, only the following sizes: 2, 2½, 3½, 4½, 5½ and 6½ quarts, although any or all sizes may be imported to order.

Enameled Adamant Cooking Utensil.

The entire article will be made regularly in adamant ware, covers included, no tin covers being supplied with these goods. On importation orders, in sufficient quantities to warrant, these goods will be made in any colors desired, including blue, brown or red; and instead of fixed handles, a bail and ears, or long rigid handle will be furnished. The manufacturers refer to the fact that these goods have a triple coating of enamel and that in baking care is taken not to allow spots to form on the bottom of the ware, thus adding much to its smoothness and finish.

S. E. Dibble and Mr. Curtiss of Curtiss & Pierpont of New Haven, Conn., were in New York on Monday to attend a meeting in which both firms were interested.

L. H. Tourey, Waterbury, Conn., was in the city on Tuesday. He states that he had a good trade in 1892. The object of his visit at this time was to settle up accounts for 1892 with the New York wholesalers.

The firm of Webb, Hinchman & Co. of Tuxedo was dissolved on the 1st inst. The business will be continued by J. B. Hinchman.

T. F. Kelley, for many years in the stove and furnace business in Newark, N. J., has sold out to Dean & Price. Mr. Dean has been in Mr. Kelley's employ for several years, and the new firm will continue the business just as it has been conducted for so long a time by Mr. Kelley.

The city debt of Boston is $30,500,000. During the coming year $4,000,000 can be expended for improvements without adding to the amount.

TRADE REPORT.

The Iron Market.

The condition of the Pig Iron trade throughout the country is naturally quiet at this season of the year, and in view of the low prices prevailing and the uncertainty of future business conditions, there is a disposition on the part of buyers to supply immediate requirements only, keeping in close touch with the market, however, satisfied to await further developments. Eastern foundrymen as a general rule are very indifferent, and sellers complain that it is difficult to make sales. New York quotations are as follows: Northern brands $14.75 @ $15.25 for No. 1; $14 @ $14.50 for No. 2; tidewater. Southern Iron, same delivery, $14.75 @ $15 for No. 1; $13.75 @ $14 for No. 2 and No. 1 Soft; $13.25 @ $13.50 for No. 2 Soft.

The situation at Philadelphia is somewhat more encouraging, as there is a better movement noticable in Pig Iron, though chiefly in small lots. Stocks in consumers' yards were reduced to such small proportions that renewals have been imperative; so that along the entire line there has been more or less activity. Some bids were for large lots, but not on terms that makers could accept, so that the practical result has been small orders at figures showing a compromise on both sides, the ultimate outcome in regard to prices being still undecided. Some good concerns say that it is quite impossible for them, or any one else, to meet the demand at prices now obtainable for large lots, and that for the present they are simply lookers-on; if they can get their price well and good, if not, they are not in the business. These remarks are based on bid prices, not on actual selling prices, the difference being from 25¢ to 50¢ ₱ ton. It is a satisfaction, however, to find that there is a market at a price—pretty good evidence that business is starting up, and that in course of two or three weeks prices will probably become fairly settled. Quotations are about as follows for Philadelphia deliveries:

American Scotch, No. 1x	$17.00 @ $17.25
American Scotch, No. 2x	16.00 @ 16.25

The Pig Iron trade at Pittsburgh is in rather a discouraging condition, as indicated by the fact that it is almost impossible to make sales of Iron even in the face of the very low prices prevailing. Although prices on nearly all kinds of raw and finished material are considerably lower now than they were a month ago, the volume of business continues small, buyers seemingly having no fears that prices will go higher for some time at least. Expectations that business would revive and buying would commence after the holiday season are not being realized, nor does a much better feeling prevail. Buyers continue to confine their purchases to lots for immediate requirements, and as long as this policy is pursued no improvement in prices can reasonably be expected. A peculiar characteristic of the market just now is the fact that, notwithstanding prices are much lower to-day than six months ago, and stocks have very much decreased, there is more disposition among furnacemen to force sales of Iron at this time than at any period within the last six months. If this course is persisted in there will be very little chance of any improvement in prices, but, on the contrary, it may result in values being pushed down still further, although this is not expected. The condition of the market during the past week at this point is reflected by the following quotations:

No. 1 Foundry	$14.00 @ $14.10,	cash.
No. 2 Foundry	12.00 @ 13.10,	"
Charcoal Foundry No. 1	19.00 @ 20.00,	"
Charcoal Foundry No. 2	18.50 @ 19.00,	"

Advices from Chicago indicate that there has been a slight increase in the demand and sales of Pig Iron in the West during the past week over that of the week preceding, although business has been of a moderate character, and for small lots for immediate shipment. Sales of Foundry Iron were made at full figures, and negotiations are now in progress for further lots, representing considerable quantities. Hopes are entertained that the buying movement predicted for January is now beginning, though many buyers who are now making inquiries are apparently in no hurry to contract to any extent for their requirements, but are keeping close watch of the market to be prepared to take advantage of any change which may occur. Quotations, f.o.b. Chicago, are as follows:

Local Coke Foundry, No. 1	13.75 @	14.25
Local Coke Foundry, No. 2	13.50 @	14.00
Local Coke Foundry, No. 3	13.25 @	13.75
Local Scotch	14.50 @	15.00

Southern markets have not seen enough of a revival in the demand for Pig Iron to call for any change in quotations; large buyers are not in the market, but sellers are not disposed to make any material concession as long as there is a decrease in stocks going on from month to month, but at the same time they are free sellers at the current quotations. Taken as a whole the market cannot be said to have changed in any essential particular, and sellers appear to have confidence in the future. Quotations are as follows:

Foundry.

Southern Coke, No. 1	$13.75 @ $14.00
Southern Coke, No. 2	12.50 @ 12.75
Southern Coke, No. 3	12.00 @ 12.25
Ohio Soft Stone Coal, No. 1	16.00 @ 16.50
Ohio Soft Stone Coal, No. 2	15.00 @ 15.50
Mahoning and Shenango Valley	15.75 @ 16.75
Hanging Rock Charcoal, No. 1	19.15 @ 19.50
Hanging Rock Charcoal, No. 2	18.60 @ 19.00
Tennessee and Alabama Charcoal, No. 1	16.50 @ 17.00
Tennessee and Alabama Charcoal, No. 2	15.50 @ 6.00

Sheets.—Demand for Black Sheet Iron is only moderate, and the orders taken represent little profit to manufacturers. In the West dealers are ordering Iron freely, and there are indications that large buyers will generally follow their usual custom of placing orders during February. The demand for Galvanized Iron is a little better than for Black, but the mills have evidently caught up with their orders, as stocks in local warehouses are getting in much better shape than any time since last summer. The demand is confined at present to small lots for quick shipment.

Billets and Rods.—Eastern mills have been able to contract for delivery during the second half of the year. There is nothing doing in Foreign Billets, reexport orders having been covered some time since.

Merchant Bars.—A slight increase in orders since the first of the year is reported, but the volume of business is very much smaller than was expected by manufacturers. It is the impression that orders will come in more freely toward the latter part of this month and during February, for the reason that buyers have not had time as yet to size up their requirements, and will probably not be ready to place their orders for two or three weeks yet.

Steel Rails.—The market is again very quiet so far as the Eastern mills are concerned, the reduction in the price having apparently not stimulated buying. In other sections the mills do not seem to be taking a very heavy business.

Structural Iron and Steel.—Current business is restricted to moderate requirements. There is, however, a good deal of figuring going on and some very large work will come into the market when the season fairly opens.

Metal Market.

Copper.—Nothing new has come to the surface in the market for this metal during the past week. Consumers are still drawing from receipts on old contracts sufficient supply to cover immediate wants, and, having probable requirements for a little time ahead well provided for, purchase in a perfunctory manner at the present time. Shipments to Europe are fair, but new export orders continue to be few in number and chiefly for unimportant quantities. Despite this inaction, however, prices remain quite steady.

Pig Tin.—The record of Metal Exchange dealings shows a total of over 500

tons turned during the past week, including 110 tons prompt delivery, 100 tons ex-steamships then afloat but now in port, and the balance for February delivery. Nearly all the sales ex-ship were on terms involving payment on presentation of shipping documents, and suggested not only a willingness on the part of some importers to turn Tin into cash as quickly as possible, but some desire to prevent accumulation of individual holdings. Current month and February deliveries also declined, despite careful nursing of the market by a few operators, and, upon the whole, the market reflected what would appear to be a natural effect of rather burdensome stocks in the hands of some operators. Still the information is volunteered that supplies on spot and afloat are unusually well distributed among the large handlers of the metal, that consumption in this country is above the January average, if anything, and that, despite the somewhat peculiar character of speculative operations here latterly and the small dealings in London, the market is not as weak as surface appearances would indicate.

Pig Lead.—No change has taken place in the situation here or at the West, the market as a rule being quiet. What the National Lead Company and other "combine" buyers (whose purchases are very difficult to trace) may have done is problematical, but other buyers have purchased very indifferently, and the demand at present is exceedingly slow. Still the offering is comparatively light and reserved at that, while prices are held quite firmly.

Spelter.—The demand in this quarter is without visible improvement. Efforts to draw out bids on round lots a shade below the prices at which sales have been making latterly prove fruitless, and the presumption is that consumers are not taking a great deal of liberty with the facts when they state that near future wants are well provided for. Reports from the West indicate that the production of Spelter will be something over 90,000 tons, which is a heavy increase over 1891. The increase in consumption is not commensurate with this, which fact, of course, tends to depress the market. The outlook cannot be called encouraging.

Financial.

That the currency question is uppermost in the thoughts of financiers appears from the simultaneous action of the New York and Boston Chambers of Commerce, pointing out the increasing difficulty of redeeming the Government obligations in gold so long as the heavy monthly purchases of silver bullion are continued. At Washington the conflict of opinion in both Houses upon the silver question is so sharp that there is little hope of any agreement during the term of the present Congress, so that the purchase of silver bullion under the Sherman act of July 14, 1890, will probably continue until the next Congress can act. Meanwhile the exports of silver bullion are unprecedented owing to commercial conditions. The bulk of the metal eventually finds its way to the Orient in payment for commodities. Of $5,000,000 specie exports from New York since January 1, over one-third is silver.

The stock market was irregular. Pending the action of Congress respecting silver investors stand aloof to await events. Western stocks were affected by a report that the Legislature of Nebraska would take measures still further to oppress railroad corporations in that State, and Reading was freely sold on reports of contemplated adverse legislation; also by the action of the managers in borrowing money with which to pay interest on bonds, giving as security the best collateral in the treasury.

The merchandise markets are generally firm. The Government crop report making the yield of wheat 515,949,000 bushels and corn 1,628,464,000 bushels—the former valued at $322,000,000, the latter $642,000,000—checked the upward course of prices. Western wheat receipts continue large, being 12,000,000 bushels greater since August 1 than a year ago, while exports for the month are about 3,000,000 bushels less. Pork prices in Chicago reached $19.10 a barrel, the highest point for ten years. Whisky was marked up to $1.35 ₱ gallon, the highest for years. Flour is unusually dull. Cotton advanced $\frac{1}{16}$¢. Foreign imports are again larger. Coffee declined. Raw sugar quiet. The dry goods market is strong,

Coal.

Events in the Anthracite Coal trade follow in rapid succession. A week ago reference was made in these columns to the action of President Maxwell of the New Jersey Central Railroad in practically withdrawing from the Reading combine, at the same time taking along the Lehigh & Wilkesbarre Coal Company. This proceeding was commonly supposed to be in anticipation of possible legal proceedings prejudicial to the combine arrangement. The tendency is still toward a return to the conditions previously existing, but so far as the Coal trade is concerned there is no further change in the situation. Prices are maintained and restriction continues as before. Pea and Buckwheat are still scarce and dear, some dealers being out of the market for these sizes. Quotations are: Pea, $2.40 @ $3 15; Buckwheat, $1.85 @ $2.15. In regard to some other sizes large deliveries cannot be promised at once on account of difficulties in transportation. One effect of talk about a coming dissolution of the combine is to check sales, as consumers are keeping aloof to await events.

The total amount of Anthracite Coal sent to market for the week ending December 31 was 502,067 tons, and the total amount of Anthracite mined during 1892 was 41,476,688 tons, compared with 40,416,193 tons for the same period in 1891, an increase of 1,060,495 tons.

The Pennsylvania Railroad brought to market last week 230,000 tons of Coal and the Reading 360,000 tons, of which 28,000 tons were sent to New York.

CONDITION OF THE

Hardware Trade.

It is as yet too early for a general movement of business, but there is a good deal doing by the larger houses in the way of completing their orders for the coming season. Jobbers and manufacturers are giving considerable attention to the preparation of price lists, circulars, &c., and making their arrangements in many ways for a vigorous prosecution of business, the situation being such that there is a general impression that the volume of trade will be large, and the various parties competing for it are desirous of securing their share. Travelers are many of them already on the road, but it is rather early as yet for them to be sending in many orders. It is expected that in a week or ten days there will be a more general activity. Prices continue without material change, the market as a whole not being characterized by much strength. Quotations are, however, on many lines exceedingly close, leaving but narrow margins for the manufacturers, which they are endeavoring to widen by economy and improved methods in making the goods. In some lines revised quotations are announced, as referred to below.

Notes on Prices.

Cut Nails.—The Cut-Nail market continues quiet and in substantially the same condition as for the past few weeks. There is a disposition on the part of manufacturers to move conservatively and by a diminished production to avoid the accumulation of Nails and at the same time to adhere quite rigidly to the prevailing price, refusing to make concessions. For small lots from store in New York the regular quotation is $1.75 to $1.80. Carload lots on dock are held at $1.60 to $1.75, according to average.

Advices from Chicago.—Cut Steel Nails are quiet but firm. Jobbers quote small lots from stock at $1.65 to $1.70, depending on the average.

Wire Nails.—There has been no important change in the Wire Nail market since our last report. There is a good deal of inquiry for Nails from the trade, and the aggregate of business since the opening of the year has been fair.

Advices from Chicago.—Manufacturers report a better inquiry from large buyers than for some weeks and indications point to an active trade in the near future. Sales are being made from stock at prices very close to manufacturers' quotations from factory, but manufacturers claim that this is done for special purposes and not because of the lowering of rates at works. Some go so far as to claim that prices will be higher rather than lower. Carload lots are quoted at $1.60; small lots from stock are quoted $1.65 to $1.70.

Barb Wire.—During the past week the Barb Wire market has been sluggish, with only a limited amount of business, and prices are without material change. Small lots from store in New York are still

quoted at $3 10 for Four-Point Galvanized, carload lots being held at $3.

Advices from Chicago.—While the outlook for spring business is good and manufacturers take a cheerful view of the situation because they have booked a good number of orders, the trade of the immediate week under review has not been large, and further buying may be deferred for a little time until some movement is made in the smaller jobbing and retail trade. Jobbers sell small lots at $2.25, Painted, and $2.70, Galvanized, with 5 cents off for mixed carloads.

Wringers. — The American Wringer Company, 99 Chambers street, New York, in connection with their 1893 catalogue, just issued, announce a new list, in which net prices are given on their line of Wringers, subject only to a discount of 2 per cent. for cash in ten days, the goods delivered f.o.b. factories or at warehouse in New York City.

Auger Mortise Sash Pulleys.—Palmer Hardware Mfg. Company, Troy, N. Y.; Empire Portable Forge Company, Lansingburg, N. Y; Stover Mfg. Company, Freeport, Ill., and Shepard Hardware Company, Buffalo, N. Y., make a joint announcement to the trade to the effect that until further notice quantity orders for Auger Mortise Sash Pulleys may be made up of the following: Common Sense, Empire, Ideal Nos. 2 and 4, Star and Acme.

Planes.—The following advanced prices on Planes were recently adopted by the manufacturers, subject to a discount of 2 per cent. for cash:

	Per cent.
Fancy Planes	40
First Quality Bench Planes	45
Second Quality Bench Planes	50

Tin Plate.—Arrivals of 35,000 boxes or more during the past week have served to replenish jobbers' assortments, and the supply is better at present than it has been for some little time past, since spot business has not only been slow but chiefly of retail character. Prices are a shade easier on some lines of Ternes and very light weight Bessemer Cokes. Contracts for forward delivery have been unimportant, and interest in futures is momentarily tame. Importers are ordering largely for immediate requirements, and those handling American Tin are pursuing an equally conservative policy. It is too early in the season to predict the extent of demand for either Bright or Terne Plates.

Cordage.—Within the past week or two there has been a further shrinkage in the price of Manila Rope and also in Sisal, New Zealand, however, remaining substantially without change. The market is somewhat irregular in tone, owing to the active competition between the National Cordage Company and the outside manufacturers. The National Cordage Company in order to carry out their plans for controlling the market are negotiating with John Good and the Travers Bros. Company for the purchase of their Cordage plants, and are, it is understood, offering them large inducements. Thus far, however, nothing has been consummated. The company are also endeavoring to control the Hemp market, to further their plans in regard to a control of the manufacured product.

Mica.—Eugene Munsell & Co., miners and wholesale dealers in Mica, 218 Water street, New York, have issued a revised price-list which represents some additional sizes and some slight changes in price.

Tinners' Tools.—Peck, Stow & Wilcox Company, 27 Chambers street, New York, and Southington, Conn., have issued a revised discount sheet relating to their 1890 catalogue. It gives prices on their large and varied line of General Hardware and also on their Tinners' Tools and Machines and Tinners' Hardware. We print below their revised prices on Tinners' Tools and Tinners' Hardware. Special goods, marked A, are subject only to a cash discount of 2 per cent. beyond the prices printed. Other goods, not marked A, are subject to an additional discount of 25 per cent. on large orders.

Tinners' Tools and Machines.

	Discount per cent.
Stow's Patent Folders	A Net.
Grooving Machines	A Net.
Stow's Patent Incased Machines	A Net.
Columbian Machines, No. 152 Folder, Grannis' Groovers	A Net.
Add Nos. 21 and 22 Groovers, with Kennedy Attachment, 20 and 30 inches. List, $21 and $27	Net.
Change list on Kennedy's Grooving Attachment to $7.	
Wire Straightener, Feed and Cutter	A 10
Add No. 7 12-Roll Wire Straightener. List, $45	A 10
Add No. 27 Combined 12-Roll Wire Straightener, Feed and Cutter. List, $80	A 10
Stow's Improved Standards	A Net.
Raymond's Patent Machines	A Net.
Read Raymond's Large and Small Burrs, without Standards. List, $8.25 and $7.75.	
Raymond's Machine Standards	A Net.
No. 1 Machines	A Net.
No. 1 Machine Standards	A Net.
Jones' Rim Machine	A Net.
Tucking Machine	A 10
Stove Pipe Crimper and Beader	A 16⅔
Crimping Machines	A 5
Notching Machine	A 5
Beading Machines	A 5
Moore's Double Seamers	A Net.
Stow's Double Seamers	A 5
Olmstead's Double Seamers	A 25
Hulbert's Double Seamers	A 25
Burton's Double Seamers	A 5
Stove Pipe Formers, Nos. 1, 2, 100, 200, 01	A 20
Tin Pipe Formers, Nos. 1, 2, 101, 102	A 20
Stove Pipe Formers, Nos. 0½, 0, 0100	A 5
Tin Pipe Formers, No. 5	A 5
Forming Machines	A 5
Can Top Folder	A 5
Boiler Expander	A 5
Tube Formers	A 5
Sheet Iron Folding Machines	A 5
Patent and Improved Gutter Machines	A 5
Gutter Benders and Rods	A 20
Squaring Shears	A 15
Squaring Shears, new styles and new numbers, see "Tinners' Book," 1893.	
Slitting Shears	A 15
Lever Shears	A 10
Lowe's Parallel and Beveling Shears	A Net.
Combined Bench and Slitting Shears	A 20
Circular Shears	A 5
Waugh's Circular Shears	A 10
Shear and Punch	A 10
Samson Punch	A 10
Tailors' Pattern Snips	A 30
Bench Shears and Snips	A 20
Roofing Shears, change list: Nos. 80 90 100 20; Each, $2.00 1.50 1.40	
Shear Holder and Bench Plates	A 20
Hammers	A 30
Stow's Stake Holder	A 20

Tinners' Hardware.

Set of Tools and Tinners' Stakes	A 20
Swedges	A 20
Square Pan Machines	A 5
Solid Punches	A 60
Hollow Punches	A 20
Tinners' Rivet Sets and Chisels	A 60
Cast-Steel Rivet Sets	A 70
Hand Groovers	A 20
Tinners' Awls and Cutting Nipper	A 25
Roofing Tongs	A 30
Reese's Patent Roofing Tongs	A Net.
Roofing Tools	A 20
Kenney's Double Seamer	A Net.
Burritt's Double Seamer	A "
Burritt's Cross-Lock Seamer	A "
Change list on Cross-Lock Seamers as follows: 20 inch, $44.00 " 28 " 52.00	" "
Cornice Brake	A "
Metal Belting Machine	A 10
Bell's Edger	A Net.
Machine Parts	A "
Wire Gauges	10
Tinners' Bevel and Rule	25
Candlesticks	25
Fine Stops	40
Parallel Vise	Net.
Tinners' Fire Pots	25
Soldering Coppers, subject to change	25
Soldering Pan and Gas Furnace	25
Handles, Mallets, Melting Ladles	25
Malleable Kettle Ears	16⅔
Kettle and Tea-Kettle Ears	40&10
Malleable Ears and Clips	25
Malleable Handle and Clip	3 &5
Globe Coffee Roasters	Net.
Boiler Handles	40
Malleable Clips	33⅓
Tea Pot Handles	40
Paste Jaggers	25
Sad and Coffee Pot Stands	25
Coal Tongs	25&5
Stove Cover-Lifters	16⅔
Stove Pokers	50
Coal Shovels	30
Shovels, Tongs and Pokers	50&5
Shovel and Tong Stands	50
Fire and Kitchen Sets	55&5
Blower Stands	55
Fire Dogs	50
Brass Andirons	50
Umbrella Stands	33⅓
Match Safes	33⅓

Leader Pipe.—Bruce & Cook, 190 Water street, New York, inform us that as New York agents for W. Austin Obdyke & Co.'s corrugated leader pipe, they have made no change in the price of the latter and their list remains as heretofore, which is 12 cents per foot for 2 inch and 15 cents per foot for 3-inch, for both round and square, subject to the usual discount.

Glass.—Reports from Pittsburgh indicate that the cold weather of the past week or more has not affected the orders for Glass to any great extent, as the demand remains steady. Since December 1, 1892, the number of pots in operation at American Glass factories has increased, owing to the completion of plants then in course of erection. The number of pots, or their equivalent in tanks, as given by a Pittsburgh paper devoted to the Glass interests, that are now in operation is 1715. There are 410 pots out of operation and 188 in course of erection. Prices of American and imported Glass are unchanged, though local demand is limited. It is understood that three New York firms who handle Plate Glass in connection with their Sheet Glass business have consolidated this branch of their business, and thus expect to reduce expenses in handling Plate Glass. The new concern will be known as the Manhattan Plate Glass Company, with offices at 49-53 Lafayette place, and expect to be in working order by February 1. Quotations on Glass are as follows: American Window Glass, 1000-box lots or more, 80 and 15 per cent. discount; carloads, 80 and 10 per cent. discount; less than carloads, 80 and 5 per cent. discount. French Window Glass, 75 and 10 and 5 per cent. discount.

American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 2½ per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ₱ lb.	@	$0.03½
Rubber Shoes, in ton lots ₱ lb.	@	.03
Large Hose, ₱ ton	@	9.00
Wringer Rolls, ₱ lb	@	.04½
Wringer Wire Rolls, ₱ lb	@	.02
Syringes, ₱ lb	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	₱ lb	10¢
Light and Tinned Copper	₱ lb	9¢
Heavy Brass	₱ lb	7¢
Light Brass	₱ lb	6¢
Lead	₱ lb	3½¢
Tea Lead	₱ lb	3½¢
Zinc	₱ lb	2½¢
No. 1 Pewter	₱ lb	14¢
No. 2 Pewter	₱ lb	7¢
Wrought Scrap Iron	₱ gross ton,	$17.00
Heavy Cast Scrap	₱ gross ton,	10.00
Stove Plate Scrap	₱ gross ton,	7.00
Burnt Iron	₱ gross ton,	5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags	₱ lb	4 ¢
No. 2 White Rags	₱ lb	3 ¢
Mixed Rags	₱ lb	1½ @ 1¾¢
Blues and 3ds	₱ lb	1¾ @ 2 ¢
Hard Sized White Shavings	₱ lb	3 @ 3½¢
No. 1 White Book Shavings	₱ lb	2½ @ 2⅝¢
No. 2 White Book Shavings	₱ lb	1½ @ 1⅝¢
Light Book Shavings	₱ lb	⅞ @ 1 ¢
No. 1 Mixed Shavings	₱ lb	1¼ ¢
No. 2 Mixed Shavings	₱ lb	¾ @ ⅞¢
No. 1 Printed Books	₱ lb	1½ @ 1⅝¢
Ordinary Mixed Books	₱ lb	1 ¢
Newspapers	₱ lb	⅝¢
No. 1 Manila Paper	₱ lb	1¼ @ 1¼¢
No. 2 Manila Paper	₱ lb	⅞ @ 1 ¢
Bogus Paper	₱ lb	⅝ @ ¾¢
Common Paper	₱ lb	½ @ ⅝¢
Straw Chips	₱ lb	½ @ ⅝¢
Binders' Clippings	₱ lb	½ @ ⅝¢
Jute Butts	₱ lb	1¼ ¢
No. 1 Jute Bagging	₱ lb	1¼ @ 1⅜¢
Mixed Bagging	₱ lb	1 ¢
No. 2 Bagging	₱ lb	¾¢
Hemp Twine	₱ lb	2¼¢
Manila Rope	₱ lb	2¼¢
Jute Rope	₱ lb	1¾¢
Mixed Rope	₱ lb	¾ @ ⅞¢

Chicago Report.

Scrap.—Old material has been so dull of late that dealers hardly know what policy to pursue. Quite a number of merchants in distant localities have written here to learn whether their accumulations of Scrap could be disposed of in this market, but discouraging replies were given. Dealers continue their old schedule of buying prices, but, of course, these are only nominal under the circumstances.

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malleable Cast	8.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.50	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single sheets and Rings	11.50	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	7.00	....
Horseshoes	14.00	....
Copper Bottoms	....	9¾
Copper Clips and Heavy	....	9½
Heavy Brass	....	8½
Light Brass	....	4
Pipe Lead	....	3½
Tea Lead	....	3
Zinc	....	3
Rubber	....	2¼

Coal.—There is no change to note in prices of Anthracite, but the long continued spell of cold weather promises to have an early effect in stimulating the demand from consumers. Thus far the Northwest has been experiencing the coldest January in five years. Quotations are as follows for carload lots of 12 net tons:

	Egg, Grate.	Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

Trade Notes.

THE AMERICAN WRINGER COMPANY, 99 Chambers street, have issued a new catalogue and price list of 56 pages, containing the goods manufactured by them, including Clothes Wringers and household and Hardware specialities. Among the goods recently added to the line of Wringers are the Handy, Magic, Rival, Relief and Superior with pressure screws The latter is new to the domestic trade, although having been exported by them. There are a number of Folding Wash Benches. A new one known as the Household is referred to by the company as capable of holding two Tubs and a Clothes Wringer. Any Wringer can be placed on the Standard, thus leaving the Tubs entirely free to be handled, obviating the necessity of constantly changing the Wringer from one Tub to the other. It is so constructed that when not in use it can be folded up with the Wringer attached and put away in a small space. There is also a number of articles in addition to the Wringers, such as Washing Machines, Clothes Washers, Mop Wringers, Mangles, Clothes Horse, Clothes Drying Bars, Lawn Swing, Mouse and Rat Traps, Step and Extension Ladders, Lemon Squeezers and Cork Pullers. Attention is called by the company to the fact that the large plant for the manufacture of Rubber Rolls, having a capacity of 6000 rolls per day, that has been in course of erection during the past year, is now completed, and they are now making their own rolls.

THE NORTHWESTERN TRAVELING MEN'S ASSOCIATION met in annual session at the Palmer House, Chicago, on December 28, 1892. President George J. Reed occupied the chair. After the address of the president the report of the secretary was read. It showed a disbursement of $1,810,850 to beneficiaries since the foundation of the organization, while during the year just closed the sum of $175,000 had been paid out in benefits to the relatives of deceased members. After the election of officers, in which the old officers were re-elected, President Reed received a surprise in the shape of a money present of $500 as a mark of appreciation of his services.

WALDO G. BROWN, Houlton, Me., has disposed of his Hardware store, closing out his Light Shelf and Builders' Hardware, and removing his heavy Hardware, Bar Iron, Saws, Belting, Mill Supplies, Pumps, Wrought-Iron Pipe, Steam Fittings, &c., to warerooms at the Houlton foundry and machine shops, where his office will hereafter be located. Mr. Brown will continue his already established machine shop business, and also the manufacturing of Rotary Saw Mills, Shingle Machines, Gang Lath Machines, Wood-sawing Machines, Land Rollers, Spring-tooth Harrows, Horse Hoes, Cultivators, Plows, Stoves, Mill, Implement and Machinery Castings, and will continue to carry in stock Heavy Hardware, Bar Iron, Steel, Belting, &c. Mr. Brown advises us that the largest plant of the kind in Eastern Maine, newly equipped with the latest improved machines for both wood and iron working, is nearing completion, and that orders for the season of 1893 are coming in with a gratifying outlook for a good year's business.

THE HABERMAN MFG. COMPANY and their auctioneer, Julius E. Mosheim, through their attorneys, recently made a strong effort before Judge Coxe in the United States Circuit Court for the Southern District of New York to have him suspend the injunction granted the Lalance & Grosjean Mfg. Company restraining the Haberman Mfg. Company, their agents, &c., from dealing directly or indirectly in Enameled Wares infringing on the Kegreiz patent. The ground taken by the judge was that the complainants were the owners of a valid patent, and the motion was denied, the court ordering a permanent injunction to issue.

BURN STAMPING & MFG. COMPANY, 66 State street, Chicago, issue a catalogue relating to dairy supplies and other specialties. Their aim is to supply everything in the line of milk cans and articles used in the dairy. Illustrations are given in their catalogue of a variety of patterns of steel-clad milk cans, dairy pails, dippers, measures, strainers, ash cans, oily waste cans, &c. Their factory, just completed, at Chicago Ridge, 103d street, is 50 x 200 feet, four stories high. The tinning and galvanizing houses are separate from the main building. They have their own gas plant and use fuel oil. The Messrs. Burn of the firm were, up to a few months since, connected with the Buhl Stamping Company, Detroit.

IT IS ANNOUNCED that the firm of Kegler, Weinschenk & Ahlers, Bellevue, Iowa, have been dissolved by mutual consent. Messrs. Kegler and Weinschenk will hereafter conduct the Agricultural Implement business, while Messrs. Kegler, Weinschenk and Ahlers, under the style of the Bellevue Pump Company, will continue the business of manufacturing Kegler's Patent Chain Pump Curb and Tubing. The Bellevue Pump Company advise us that they are moving into new quarters and enlarging their manufacturing facilities, so as to be in a position to meet the increased demand for their goods.

THE TEA TRAY COMPANY, Newark, N. J., established a quarter of a century ago and incorporated in May, 1892, manufacture at their plant, 156 and 158 Summit street, a full line of Hotel, Children's and Tea Trays, also Japanned Ware, Shades for electrical purposes, Metal specialties, &c., Hoods and Reflectors, Horns, Typewriting Covers, and other articles of any shape or size are made to order from drawings. The various processes in the manufacture of perfect Trays have each its fully equipped department in the factory. The company have their own tool shop, where they make their own Dies, some of which weigh over half a ton. The details of the large establishment are under the personal supervision of either the president or treasurer, thus insuring goods of uniform standard and promptness in executing orders.

UNDER DATE of January 9, Lalance & Grosjean Mfg. Company advise the trade that they have acquired all patents relating

to the manufacture of the ware known as Onyx, including the process of making Onyx Ware, and the trade-mark Onyx as applied to such goods.

Scovill Mfg. Company, 210 Lake street, Chicago, issue a catalogue of Aluminum fancy goods. This is a 12-page pamphlet, in a neat cover, devoted to illustrations of fancy goods which the company are now manufacturing of Aluminum. They comprise Vases for holding Toothpicks, Matches, &c., Napkin Rings, Bon-bon Boxes, Drinking Cups, Envelope Openers, Panels for holding Thermometers, Photograph Frames, Mirror Frames, Smokers' Sets, Card Trays, &c. The workmanship on these fancy articles is of the highest order of artistic merit, and demonstrates the capabilities of Aluminum for ornamental treatment, rivaling the precious metals in appearance and superb finish.

The Griswold Mfg. Company, with office and works on West Tenth street, Erie, Pa., have issued a catalogue and price list of Erie Hollow Ware and Stove Furniture. It is a neat little volume of 84 pages, of a size convenient to carry in the pocket. It is printed in tinted ink, upon good paper and bound in stiff covers. Its pages show a long line of Stove Hollow Ware, together with Waffle Irons, Gem Pans, Dampers, Stove Lifters, Scrapers, Shovels, Stove Pipe Shelves, Fire Sets, Coffee Pot Stands, Sad Iron Stands, Copying Presses, Tobacco Cutters, Umbrella Stands, &c.

The Joseph F. Kernan Company, 59 Wabash avenue, Chicago, report that the Kernan Smoke Consuming Furnace for soft coal is giving universal satisfaction where used.

The new pipe plant which Curtis & Co. have begun to erect at Cohoes, N. Y., to take the place of the one recently burned, will be a modern establishment in every respect and a great improvement over the old shop. The works will be lighted by electricity generated on the premises.

The Pittsburgh Reduction Company, Pittsburgh, Pa., manufacturers of pure aluminum, with works at New Kensington, Pa., have recently made some extensive additions to their plant which will materially increase their capacity for the production of aluminum. For some time past they have found it very difficult to keep up with orders, and as the demand for aluminum is constantly increasing, it became absolutely necessary to increase their facilities for production.

The Baxter Stove Company, Mansfield, Ohio, make a prominent announcement this week of the Monarch Stove of their manufacture. A general view of the Stove is shown in the advertisement, and a list of agencies of the Baxter Stove Company is printed in connection with it.

J. F. Barber & Co., Hazleton, Pa., send us a copy of a circular illustrating the Excelsior Baking and Roasting Pan manufactured by them. It is claimed that this Pan combines all the advantages of other pans, is easily handled and cleaned, as well as being very durable. Wire shoes on the bottom prevents burning of contents, and an improved catch has lately been added to the utensil. The Pans are made from polished steel.

The firm of Lyon, Conklin & Co., Baltimore, Md., Tin-Plate and Sheet-Metal merchants, were reorganized on December 31, 1892. The following are the present members of the firm: William L. Lyon, Oliver P. Lyon, Thos. W. Crook, and Cardiff T. Lyon, general partners; and Daniel E. Conklin, special partner.

A notice is issued to the trade under date of December 31 that the copartnership existing under the firm name of Exeter Brass Works, Eben Folsom & Co., proprietors, Exeter, N. H., was dissolved by mutual consent, the Exeter Brass Works, a corporation organized under the laws of New Hampshire, succeeding to the property and business.

The announcement of the Grand Rapids Refrigerator Company, Grand Rapids, Mich., in our advertising columns this week directs attention to the Leonard Cleanable Refrigerator in new designs for 1893. The chief features of these goods are commented upon and their advantages pointed out. A long list of agencies is presented for the information of buyers.

A notice is issued from Liverpool under date of December 31 that the partnership existing between Henry Nash and Elisha Smith under the name of Henry Nash & Co., Tin Plate and Metal merchants, 12 and 14 Tower Building, North Water street, Liverpool, has been dissolved, Elisha Smith retiring from the firm. Under the same date Henry Nash announces that he will carry on the business under the name of Henry Nash & Co.

Letter from a Tin Plate Maker.

We are in receipt of an interesting letter from James B. Scott & Co., Pittsburgh, from which we quote as follows:

In entering the new year we beg to congratulate you on the enterprise shown in the change of form of this very popular publication. The new form certainly will be very popular and be of advantage to both the readers and the advertisers.

In entering the new year we naturally are all inclined toward a retrospect of the one that is past. In the metal trade certainly there have been many interesting features in the year 1892, and the tin-plate business certainly for a year or more has been unusually influenced owing to the peculiar condition of affairs, resulting from the political situation and the influences which have been at work because of tariff matters. Following the higher duties, the entire trade from largest importers to smallest consumers has felt the influence occasioned by the passage of the McKinley tariff, increasing the duty on tin and terne plates.

As regards our own business, where formerly it was customary to look abroad for our entire source of supplies, to day we are in the position of still doing some importation business, but in addition have the new features, both of being manufacturers ourselves and also buyers from other American manufacturers.

Located as we are individually in this center of the American iron industry, we naturally are greatly influenced by the tendency toward the manufacture of tin and terne plates in this country.

Somewhat over a year ago, we ourselves commenced the manufacture of our Scott's Extra Coated high grade guaranteed roofing plate, which for many years we imported from Wales. The Welsh manufacturer who formerly made the Scott's Extra Coated for us some time ago entirely withdrew from the manufacture of plates, and accordingly, since we ourselves began the manufacture of the Scott's Extra Coated, we have depended entirely upon our own output for supplies of this favorite brand.

During the past year we have also purchased large quantities of American plates from others who are manufacturers of medium grades. It has been gratifying to know that the plates thus purchased have given very general satisfaction in their respective qualities.

As we are entering the new year we are confronted by the change in political outlook following the last election. Irrespective of any desires that we may have personally, we feel that all those in the metal trade cannot help but regret the influences that political matters are now having upon the tin-plate business. We only hope that before long we may be able to consider that, as regards tin plates, the political situation has been settled definitely one way or the other in order that all concerned may be able to adopt a policy as regards this business, feeling that it will not, for a considerable time at least, be again disturbed by outside influences.

The Sheet Manufacturers.

On Tuesday, the 10th inst., the regular monthly meeting, which was also the annual meeting, of the Iron and Steel Sheet Manufacturers' Association, was held at their headquarters in the *Times* Building, Pittsburgh. The attendance was very large, 21 members being present. Officers were elected as follows: J. G. Battelle of the Piqua Rolling Company, Piqua, Ohio, was re-elected president; W. T. Graham of the Standard Iron Company, Bridgeport, Ohio, was elected vice-president, and John Jarrett was re-elected secretary and treasurer. During this week H. M. Garland, president of the Amalgamated Association of Iron and Steel Workers, and John Jarrett, representing the Iron and Steel Sheet Manufacturers' Association, will be in Washington to appear before the House Committee on Coinage, Weights and Measures to urge the adoption of a standard gauge for uniformly measuring the weight and thickness of steel, iron and sheet steel.

Calendars.

Tucker & Dorsey Mfg. Company, Indianapolis, Ind., send a view of the cataract at Spencer, Ind., below which are enumerated the goods manufactured by them. Attached to the card are calendar sheets for 1893. The goods are the company's well-known line of Alarm Tills, Stove Trucks, Kraut Cutters, Step Ladders, Saw Bucks, Towel Rollers, Lemon Squeezers, Furniture Casters, &c.

The Nubian Iron Enamel Company, Cragin, Ill., send a calendar of their first quarter of 1893's stock of Squibs on Black Art. They do not claim the Squibs to be a collection of literary gems, but state that they are willing to sink their naturally poetic, literary and æsthetic temperament in the cause of Nubian, if by their imitation of wit and wisdom they can impress consumers with the good qualities of their Nubian Iron Enamels.

Waterbury Brass Company, 296 Broadway, New York, and Waterbury, have calendar sheets for 1893 attached to a handsome picture of Sunset at Capri. Underneath the picture is a list of goods manufactured by the company. The date sheets are attached by colored cords and the figures are large and distinct.

The *New York Trade School Journal* is the name of a paper issued by the Printing Class of '93 of that institution. It is a four-page paper, measuring 11½ x 16 inches in size, and is an extremely creditable specimen of printing work. The matter with which it is filled will be of interest to the Trade School graduates and all who concern themselves with the work of that excellent institution. There are also several interesting articles on educational matters that will repay the attention of the general reader. The first page of the paper gives experiences of graduates, showing how they have succeeded in business.

Electric Motors and Battery Outfits.

Electro Novelty Company, 9 Knapp street, Boston, are introducing these motors, as shown in Figs 1 and 2. The 2 mouse power motor and battery outfit, Fig. 1, has a base consisting of a cast-

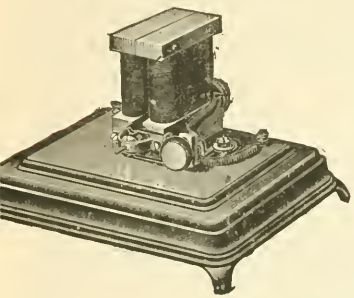


Fig. 1.—Novelty Electric Motor

iron frame in which rests the battery tray. The tray contains two compartments, making two cells in series, the connections being made by copper springs underneath the motor base.

In the bottom of the battery tray are placed a piece of sheet copper and piece of sheet zinc, and between the two is placed a patented battery pad. To each copper is riveted a small copper stud, and when the pad is moistened with a little water and the cover of motor is replaced the motor is ready for operation.

Each charge will, it is stated, run the motor from two to six hours at about 1500

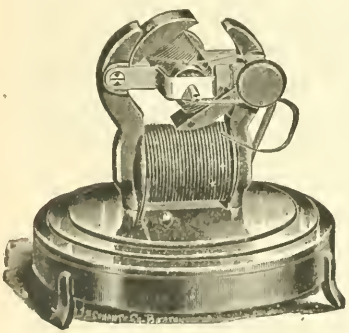


Fig. 2.—The E. A. C. Electric Motor.

revolutions per minute, and the battery can easily be replenished at any time by using new pads.

The motor is represented as a working model of the Edison dynamo, and is especially adapted for running small mechanical toys, fans, &c. Accompanying it is a 24 page book, in which the workings of both motor and battery are fully explained, together with detailed drawings of the same.

The E. A. C. electric motor and battery outfit, Fig. 2, is similar in operation to the motor shown in Fig. 1, and is run by a pad, composed of an envelope of absorbent material, made circular in form, which incloses the exciting material. The simplicity of this pad, together with its harmlessness, constitutes its chief value, as all that is necessary to set the motor in operation is to moisten the pad with water.

The point is made that with these motors there is no poisonous dust which can arise from chemicals to irritate the eyes and poison the lungs, no acids to stain the fingers and ruin the carpet, no fire to burn the children or set fire to the house, and no possibility of a steam boiler explosion, such as may take place in the use of steam toys; all of these dangers are obviated by the use of the battery pad.

The Fletcher Fire Mat.

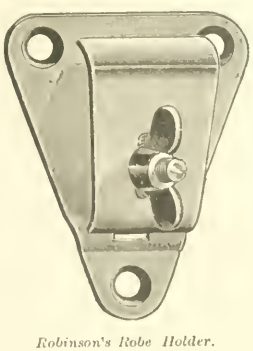
The Fletcher Fire Mat Company, Cincinnati, Ohio, are putting on the market what they call their fire mat, an illustration of which is shown herewith. The mat is made of indestructible material and bound in metal and is said to be serviceable in many ways about a kitchen. It is recommended for use on a stove to prevent the burning of foods while cooking, as by putting the mat under the utensil the heat is tempered. It also prevents tea and coffee from boiling over. The mat can be used on a grate fire, gas, gasoline, oil, coke, coal or coal range. For use in the

The Fletcher Fire Mat.

laundry it is noted that it prevents the irons from being soiled by coming in contact with the flame. Also that the irons retain their heat for a greater length of time when these mats are used for a stand. If the mat become dirty it is cleaned by putting in the flame.

Robinson's Robe Holder.

C. W. Crary & Son, 90 and 92 Illinois street, Chicago, are manufacturing for the inventor the Robe Holder as herewith illustrated. It is intended to be attached



Robinson's Robe Holder.

by screws to any vehicle by means of the clamp, for the purpose of holding the lap robe. Thus the robe is prevented from sagging, flapping against the wheels, or requiring readjusting when getting out of buggies or cutters. By attaching them to a child's crib the quilt or bed clothes may be held in place. The holder may also be used for holding towels, curtains, &c.

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THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, January 21, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....220 South Fourth Street
BOSTON.....146 Franklin Street
PITTSBURGH.....Room 500, Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI..... S. E. cor. Fourth and Main Streets
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....219 Superior Street

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Havoc Caused by Zero Weather.

With the advent of zero weather whole communities at once become inspectors of water pipes and plumbing work generally. And this from sheer necessity. It was the exception, rather than the rule, during the recent cold snap, when a housekeeper, rising from his slumbers, found that the whole lead-pipe system for distributing water through the dwelling was not frozen solid. All ordinary preventives had failed of their purpose. This was more particularly true of rural neighborhoods where frame houses prevail, the space between the weather boarding and the inside lath and plaster, which, theoretically, is so conducive to healthful conditions, having suddenly become a chamber for the circulation of frigid currents of air. Consequently all water pipes contiguous to the walls were quickly congealed, despite the extra fires built in furnace and stove. The effects of such a situation in early morning are truly exasperating. Even the most amiable are tempted to denounce the stupidity or neglect everywhere apparent at such a time in bursted pipes and dripping ceilings. The damage often occasioned must be endured with heroism, and perhaps the less said about it the better. We have in mind a handsome dwelling that had been frescoed and otherwise made attractive while the owner was absent in the South. All the precautions against freezing had been taken except turning the water off from the pipes. The watchman in charge awoke only to find that a pipe had burst and that water was streaming through every floor. How effectually to protect lead water pipes from frost following all their ramifications through a building is a puzzle A dictate of prudence is to keep all plumbing work as remote as possible from the outside walls. Another device is to protect all exposed parts by a covering of some non conductor of heat. Now is the time to inquire into these matters and to gather in all the wisdom possible from the suggestions volunteered in such profusion, perhaps when the consequences of neglect are visible, not only in the damage inflicted, but in the size of the bill presented for payment. The wisdom to be gained is lying around literally in chunks—chunks of ice.

A School for Sanitary Plumbing.

In class 287 in the exhibits that will be made at the Columbian Exposition at Chicago under the direction of the Bureau of Hygeine and Sanitation will be found one of the best schools for sanitary plumbing ever organized in this country, perhaps ever organized in the world. But this display, that will represent the most advanced state of the art in all its branches, and also the kindred arts of warming and ventilating buildings, will be of little avail to him who merely takes it in as part of a great show to be looked at as a whole and admired as one admires a show window in a modern city store, merely on account of its artistic arrangement and the number, variety and finish of the articles exposed to view. He who expects to see it, together with the rest of the exhibition, devoting perhaps a week or fortnight to "doing" the whole affair, will bring away with him very little of the valuable knowledge that might be gained by devoting the entire time named to a critical examination of what will be shown in this class. And if only from two to three weeks can be made available it is good counsel to every plumber and steam fitter to advise that all but four or five days of the time be devoted to making sketches and notes of systems and appliances directly connected with his calling. One should not be diffident in asking questions. People will be employed to make explanations and answer inquiries, and the intelligent plumber, steam or hot water fitter seeking knowledge should not be content with the statement that this or that does something claimed for it without knowing just how and why it does it. Assertions, unless their truth is self-evident, should be heard with the spirit of skepticism, which is the true scientific attitude toward every proposition until it be proved accurate, at least in theory. That which is theoretically false should never be accepted as practically true unless actual practice prove the theory to be wrong—a thing that has not infrequently happened. The risk is that in the coming exhibition many will accept statements without proof and will attempt to imitate methods without an adequate understanding of the principles on which they are based, and thus come to grief. Many a beginner has had such experience in attempts at imitating methods of plumbing, heating and ventilation, simply because the attempts were made without the guidance of principles necessary to meet varying conditions. He who visits and studies class 287 as a matter of business and not for play may carry away with him increased skill and knowledge that he could not acquire by years of practice in his trade at home.

Cheapness Not Economy.

Prices of American tin plates average rather higher than those of the imported material. The quality of the former is, however, said to be generally better, grade for grade, than that of the foreign article, especially of such as has been received lately. Consumers have not, however, recognized this fact to any extent. They do not care to pay even 20 to 25 cents more for a box of native-made plates than they are asked for one of (nominally) similar quality made abroad. When, however, an exceptionally fine grade of roofing plates is required for some special purpose, price being of no great object, it is frequently found that the home-made material is selected. And the same has been noted in the case of bright plates when desired for specially fine work in stamping or otherwise. Then the higher priced American sheets are preferred, because of their intrinsic value. A case in point was recently brought to our notice. A large concern in this city, who are manufacturing fancy goods, have for years been using the best Welsh bright plates for making rims and clasps of cheap bag purses and pouches, a fitting which necessitates very accurate bending and close folding of the metal. The firm have for a long time tried various brands of imported plates for this purpose with most unsatisfactory results. From eight to nine tenths of the material used is stated to have been absolutely wasted through splitting of the tin during the process of folding. American plates, at a slightly higher cost, have recently been tried by them, with the result that, of 50 boxes used, not one sheet was wasted. All the material stood the test, and a large saving will be thus effected in this particular branch of manufacture. This is a practical indorsement of the value of American bright plates which is very gratifying.

The Revival of Kansas City.

As the general prosperity of a nation is so vitally dependent upon the individual well-being of its component parts—that is, of the various cities and communities which go to make up its entire body politic—we must greet with special satisfaction every evidence of progress in the cities of our own country. Few reports have been more cheering in this respect than those which come from Kansas City. As is well known, the collapse of "boom" speculations in that city a few years ago left it stranded upon shoals of financial difficulty. As an article which appeared in the *Kansas City Star* of December 22 put the situation: "For a time it seemed as though

bed-rock in the downward course would never be reached. But it has been reached at last, and in the 12 months of the present year progress on the upward scale has been rapid and pronounced."

The returning tide of prosperity appears to have set in in full flood, and the revival which the past year has witnessed appears to be one based on really solid and stable grounds, giving promise of an era of steady growth and of permanent weal for Kansas City.

From the article above mentioned, as well as from reliable correspondents in the city, we learn that the increase of population in 1892 amounted to 15,000. The receipts of the cable lines have increased as much as 40 per cent., while the holiday trade is reported as unusually heavy, merchants in all branches of business having been taxed to the utmost to supply the demands of their customers. Much Eastern capital is being invested in local enterprises, and securities are stable, houses long tenantless are filling up quickly and agents report the supply of good residences at reasonable rents to be unequal to the demand. Manufacturers in many lines report having given employment to double the number of hands that were on their pay roll during the previous year; while the increased enrollment of pupils in the public schools (a very reliable test of progress) reaches the large figure of 1500 over 1889, the largest ever hitherto recorded. It is stated, too, that the additional scholars are children of new families in the city and not those who have been born there. These facts speak for themselves, and we are glad to be able to chronicle so pleasant a change.

Street Railway Postal-Car Service in St. Louis.

In an appendix to the annual report of the Postmaster-General for the fiscal year ending June 30, 1892, Postmaster John B. Harlow of St. Louis, Mo., describes his application of the railway post office principle to street cars in that city; an innovation which appears to promise very satisfactory results in expediting the delivery and collection of mail. Mr. Harlow considers the new system destined to revolutionize the present methods of collections from street letter boxes, as well as the dispatch of city mail on the line of the road to carriers for delivery. The car used in St. Louis is described as follows: "The car is a miniature railway postal car, 20 feet long and the regulation width of a street car. It is run under the electric system with its own motor on front and rear platform, with motorneer and conductor; sliding doors at each end and wide sliding doors with four windows on each side of car, with slot for mailing letters on each side bearing appropriate signs. The interior is well lighted with electric lights; the furniture, consisting of stove, letter case amply large enough for all distributing, a rack for sixteen sacks, a stamping table, and all the conveniences of a modern railway postal car. Its run is from Sixth and Locust streets westward to the city limits — about six miles — the schedule time being 40 minutes." There are three sub-stations on this route, each with a number of carriers attached, the mail for whom is made up at the main office, leaving the clerk in charge of car free to handle and distribute mail received on the route. It is calculated that by the twelve carriers reporting at the sub-stations instead of at the main office an aggregate saving of time is made to the extent of 10 hours daily. More sub-stations are to be placed on the line of the road with a number of accumulation street letter boxes at intervals, where carriers will deposit their collections. These boxes will be picked up by the car as it passes going either east or west. It would seem that this system might be very advantageously adopted in other cities in place of the far from speedy method of postal delivery and collection which at present obtains. The report does not state whether any steps have been taken to apply the St. Louis method to other districts.

Defective Flues.

About this season of the year when "the cold begins to strengthen" it is usual to hear of tragical scenes at some of our country residences caused by the sudden breaking out of fires at untimely hours and in the most unexpected places. In most cases little more is attempted than to tumble out the furniture and to shelter the family with the nearest neighbors. Scarcely one of our readers can fail to call to mind one or more distressing occurrences of this sort occurring not long ago. We might mention a town near New York where, on an average—and the population is not numerous, either—at least one good house has burned up every winter for several years past. The circumstance to be especially noted is that in so many instances the fire has first been noticed breaking out somewhere near the chimney and most likely in the roof itself. While it may rarely be possible to say precisely how the wood ignited, all traces of the fact being obliterated in the general ruin, the affirmation may safely be made that very frequently the trouble arises from the disintegration of the mortar in the chimneys from alternate freezing and thawing, until finally a crevice is opened from which a tongue protrudes, licking up the shingle first and then the entire structure. Anybody who takes the trouble in the autumn to prance over the roof of his dwelling, in search of possible defects of the character described, of course meanwhile grabbing at lightning rods, dormer windows or other projections for personal safety, is almost sure to detect imperfections in the masonry which need an application of cement or something of the kind to make everything secure. This annual inspection should not be neglected, otherwise a newspaper paragraph may appear chronicling "a disastrous fire," and ending with the trite observation: "Cause, a defective flue." Or, better still, run up an earthenware pipe inside of the brickwork, and so get a smooth flue and the fewest possible joints.

Asbestos.

A feature of the trade in asbestos is that the demand for it is constantly increasing. Its fire-resisting quality has not only brought it into extensive use in the heating trade, but it has found many other important applications. It is hardly worth while to dwell on these applications, since the catalogues of dealers in the material afford all needful information on this point. The increase in the trade is very notable. Some comprehensive as well as authentic information upon this subject has been made accessible to the public through a recent interesting and instructive paper read before the Mining Association of Quebec by L. A. Klein, who is thoroughly conversant with the details of asbestos mining as it is now extensively carried on in the Province of Quebec, Canada. In 1880 the output of these mines was 380 tons. In 1890, 8860 tons were mined, or more than 23 times the output at the beginning of the decade. A large quantity of this product finds a market in the United States. In the year 1890 the importation was a little over 2000 tons. Yet while the output has grown so much and is likely to become greater, the price has increased with marked fluctuations, up and down, till in 1890 it reached an average of $127 per ton. In 1880 it averaged $65 per ton. The increase of demand that could thus constantly advance the price in the face of so large an increase of output is strikingly shown in this brief statement.

Why Asbestos is High Priced.

Most people are wont to consider fibrous asbestos as simply a crude mineral, requiring very little preparation to fit it for the market, and are apt to suppose that its high price results from control of the market by those engaged in mining it. While the fluctuations in price give some ground for such a view, the fact remains that the mining of the material and its separation into grades for market involve a great deal of expense for labor. In some cases 150 tons of rock have to be blasted out to obtain a single ton of asbestos. Mr. Klein, in the paper above referred to, estimates that, on the average, 100 tons of rock are excavated in the Canada mines to get 1 ton of the fibrous asbestos. After blasting a considerable portion of the rock has to be broken with sledges or by machinery, in order to completely separate the fiber which occurs in the small veins. Stone crushers are now employed for breaking up the rock finer than it can be broken by the blasting; but their use has the disadvantage that the fiber is more or less injured by the action of these machines. The grading is mostly done by hand, but machinery for this purpose has been introduced in some of the mines. It is inevitable that the labor involved in these operations will continue to make asbestos a rather costly material, even if speculation should cease to affect its price in any material degree.

Spring floods threaten to be more than usually destructive.

WORLD'S FAIR NOTES.

A Government Standard Measure of Length.

T. C. Mendenhall, Superintendent of Weights and Measures, United States Coast and Geodetic Survey, has arranged for an interesting exhibit from a scientific point of view. Desiring to secure a standard measure of length, he has ordered from the Illinois Steel Company a bar of steel 50½ feet long, 2 inches wide and ½ inch thick. This will form a so-called bench standard, which will be particularly useful for the comparison of steel tapes used by engineers. It was desirable to have this standard in a single bar, instead of two or more pieces, so that the execution of the order will be a nice piece of work. It will be rolled at the Milwaukee Works of the Illinois Steel Company and will afterward be planed smooth on all sides by the E. P. Allis Company. It will be placed in the Government Building on the exposition grounds.

What Exhibitors Will Have to Pay.

The rates that will be charged exhibitors for light, water and all kinds of power were practically fixed last week at a special meeting of the exposition directors.

It is now possible for exhibitors to estimate the exact cost of making their displays—a thing they have not been able to do until the rules were published. Loud calls have lately been made for these rules, and because they were not issued many firms that intended to make displays withdrew from the fair. The opinion obtained to an extent that the directors of the fair were holding back the prices they intended to charge with the idea of collecting exorbitant rates after exhibits were located in the buildings. This impression was wholly erroneous. The delay in issuing the scale of prices was due to a difference of opinion between Director-General Davis and Chief Burnham as to which should execute the rules. So far as the rates to be charged are concerned, the prices might just as well have been announced two months ago, for the scale adopted by the National Board last October is practically unchanged. A few concessions in the way of prices were made, but in the main the rates remain the same.

An important section of the rules and one in which nearly every exhibitor at the fair will be interested is that setting forth the course to be pursued in getting different kinds of power, gas, light or water. This section reads as follows:

Exhibitors desiring to contract for service of electricity, steam, compressed air, power from shafting, gas or water, must make application to the chiefs of the departments in which their exhibits are installed. No application will be entertained unless made upon a blank furnished by the chief of department; and when an application has been approved by the Director-General a contract will be executed on the part of the World's Columbian Exposition by the Director of Works, if practicable, on the terms set forth in the rules. In no case will service be furnished except under authority of contract in writing, the payments for which shall be made by the applicant to the World's Columbian Exposition at the time of the execution of said contract.

In all cases the supply of power, &c., will begin May 1 and end October 30. It is agreed that a limited quantity will be furnished free. For instance, a certain number of electric lamps will be hung in all the buildings. These are supposed to illuminate the aisles and exhibit spaces. If any exhibitor wants his section more brilliantly illuminated, he can get all the lights he wants by paying for them. The same principle applies to power to operate machinery. The Exposition Company will furnish free of charge enough power to start an unloaded machine. If the exhibitor wants to put the machine to the test of turning out a certain product—in other words, loading it—he must buy the additional power.

The rate for each incandescent electric lamp of 16-candle power for the period of the exposition is $8. The Westinghouse system is used, and wiring, which is done at the expense of the customers, will be under the direction of Mr. Burnham's men. State buildings and national headquarters are to be wired by their own boards on plans approved by the Director of Works.

The charge for connecting motors with the main supply line varies from $10 to $15, according to the power used. The rates for electric power, after connections have been made, are as follows per horse-power:

For ¼ horse-power and less	$20
For more than ¼ horse-power and not exceeding ½ horse-power	40
For more than ½ horse-power and not exceeding 1	75
For more than 1 horse-power and not exceeding 2	70
For more than 2 horse power and not exceeding 3	60
For more than 3 horse-power	50

The charge for electric lamps of 2000 candle-power is $60. The rate for steam power is $40 per horse-power. The rate contemplates continuous service, or power that can be demanded at any time at the option of the consumer. Those requiring power for a few hours only each day will be charged at the rate of 4 cents per horse power per hour. The hours that this extra power will be furnished are to be determined by the chiefs of departments.

Compressed air is more expensive, the rate for that being $60 per horse-power for the period of the exposition and 5 cents per hour per horse-power when used at irregular intervals. Power from shafting is listed at $60 per horse-power. The following rates for electric power in electricity building were agreed to:

For one-quarter horse-power and less	$15.00
More than one-quarter horse-power and not exceeding one-half horse-power	30.00
More than one-half horse-power and not exceeding one	50.00
More than one horse-power, not exceeding two, per horse-power	45.00
More than two horse-power and not exceeding three, per horse-power	42.50
More than three horse-power, per horse-power	40.00

An important provision of the rules relating to all kinds of power is that exhibitors who want to operate their machines but one or two hours a day can do so without paying for power all the time. This was different in the old rules and many complaints were made in consequence. Under the new order of things, department chiefs fix several hours each day when exhibitors who want to operate their machines can do so. The rate charged for this service is about 4 cents an hour per horse-power.

Assignments of Space.

Chief Allison of the Department of Manufactures being too ill to continue the allotment of space in his building, Director-General Davis assumed charge of the office on the 9th and decided to close up the business within the next few days. He called about him Chiefs Skiff, Buchanan and Smith, and Assistant Chief Hornsby of the Department of Electricity, and each was given one or two groups in which to make the assignments. The Director-General and the four chiefs, with Assistant Chief Williams of the Manufactures Department, met shortly after and allotted space with a great degree of rapidity.

"There will be no cessation of this work until the space is all awarded," said Col. Davis. "Mr. Allison is too ill to continue the work, and it has become a necessity to push it forward. Before the end of the week there will be no space left unassigned in the department."

Chief Robinson of the Machinery Department has cleaned up everything in his building, with the exception of a few thousand square feet, which will be retained for emergencies.

The foreign countries are ahead of domestic exhibitors from the fact that their space was awarded many months ago to commissions representing the several governments. Domestic exhibitors have been less fortunate because of their great number and the desire to discriminate fairly between their applications. When Chief Robinson closed his office last Thursday evening he had ruled out 500 of the 1200 applicants for space. In the manufactures department the eliminations will be much greater; not more than one in eight will receive an allotment.

Allotments in the mines, electricity, agriculture, horticulture, forestry, live stock and fine arts are also practically made.

"L" Road at the Fair.

The standards for the elevated electric railway at the World's Fair grounds are all in place. A force of eighty men are now engaged in putting up the beams, and by February 1 the entire road will be ready for track laying. Within 30 days the first train will be running over a part of the road, in an experiment as to equipment and speed. By April 1 the railway will be in active operation, as it is estimated that Jackson Park will contain a population of 10,000 people by that time engaged in the work of preparation for the opening.

The foundations for the Power-House and Office Building are in place, just southwest of the Forestry Building, and work on the superstructure has begun. The news of the early completion of the elevated road will be received with much satisfaction by the small army of fair employees who have been tramping to their offices through a mile or more of snow from the nearest railway station.

The cars for the first train are nearly completed at Wilmington, Del. They are open summer cars, with two trucks and eight wheels and a carrying capacity of 100 passengers each. The motor cars will also have eight wheels, with power applied to each wheel, and will carry passengers.

It is estimated that trains will run over the road 12 miles per hour, including the ten stops in the full run of three and a half miles. The stations will be covered platforms, with stairways leading to the tracks above. Tickets will be collected at the stairways, the same as on ordinary elevated roads.

Outside the standards, which are of wood, the construction will be practically the same as the Alley "L," except somewhat lighter. The electric wires or trolleys will run alongside the tracks, and not above in the usual way of the trolley system.

The company constructing the novel railway is the Western Dummy Railway Company, and was organized solely to build this one road as an experiment. Twenty-five per cent. of its gross receipts will go to the exposition. The fare charged will be ten cents, long or short haul.

The Boilermakers' Fight.

A bill for an injunction against the World's Columbian Exposition was filed in the Superior Court at Chicago on the 9th inst. by the Babcock & Wilcox Company of New Jersey. The bill sets forth that the complainant, one of six firms of boilermakers known as the Temporary Association, received a contract for boilers from the World's Fair. The companies of the Temporary Association make boilers

of a certain approved type, and the device of any one of the firms may be safely used in connection with the devices of all others. The six firms are the Abendroth & Root Mfg. Company of New York, the Campbell & Zelt Company of Baltimore, the Stearns Mfg. Company of Erie, Pa.; the National Boiler Company of New Brunswick, N. J.; the Heine Safety Boiler Company of St. Louis, and the complainant company of New Jersey. The complainant, under the impression that only the six named companies were to construct boilers, having been awarded a contract, deposited a bond of $10,000 for the satisfactory performance of the work and expended a large sum of money in pursuance of that contract. Now it is informed that the Stirling Boiler Company, maker of another type of boilers, is to be allowed space for boilers of that type, and the complainant company demurs against this action of the World's Fair on the ground that it increases the complainant's risks under its bond and establishes a condition under which the Babcock Company would not, knowing it to exist, have offered to bid for work. Therefore the complainant prays that the defendant, the Columbian Exposition representatives, be enjoined from allowing the Stirling boilers to be put in.

On the 12th inst. Harlow N. Higinbotham, President of the World's Fair, filed his answer to the bill of the complainants, in which he places the matter in a different light. In the first place Mr. Higinbotham repudiates the Temporary Association, and denies that any contract was made with the companies of that association to the exclusion of other companies. Mr. Higinbotham denies that the World's Fair ever assured the firm of Babcock & Wilcox that it should be allowed to furnish all additional power required for the main steam plant or an exclusive right to put in boilers. It is admitted as a fact that the Babcock & Wilcox Company were awarded a contract in May to put in 10 boilers for certain rentals, but it is further alleged that the company have failed to meet the terms of the contract, which specified that the boilers were to be in place by September 1 and ready for continuous service after September 15, and it is averred that the apparatus is not even now ready for service. Concerning the allegation that Chief Engineer Sargent contracted with the complainant company for additional steam capacity, the answer declares that the power to make awards rested in the Council of Administration and in no other body whatever.

Of chief importance, however, is the reply of President Higinbotham concerning the conditions under which the Babcock Company is allowed to put in its boilers. The answer states that they were accepted and assigned space simply as exhibits, and that it would contravene the spirit and letter of the act of Congress creating the exposition to allow one company to exhibit and to exclude another equally desirable exhibit. The Stirling Company, declares the answer, applied for space for an exhibit upon the same conditions as were imposed upon the Babcock & Wilson Company, and their application was allowed. The claim that the introduction of Stirling boilers will bring an element of danger into the concern is denied on the ground that the Stirling device is not of perilous construction.

Judge Ewing referred the matter to a master.

Vehicle Men Pleased.

Work in the vehicle division of the transportation department is now completed. Supt. A. A. Abbott of the vehicle division has finished the allotment of space and received receptances and information for the catalogue from all exhibitors and turned the same over to Chief Smith, who has approved the work. The plats with the list and information and plans of allotment will be delivered to the Director-General for his approval, when the permits to occupy the space will be made.

The vehicle division is the first one of those in the department of transportation exhibits to be completed. The space applied for in this division amounted to 232,000 square feet, the amount allotted 90,000, and exhibitors seem to be well pleased. All applicants have been accommodated, although many have not received as much space as they would like. The special committee appointed by the Carriage Builders' National Association visited the city last October. After examining the floor of the building they recommended that it be covered with wood carpet with handsome borders on the boundary of each space. As there was no charge for space, they thought exhibitors could afford to expend something in fitting it up. The recommendation was received with hearty approval. A very handsome design of glass sign has been ordered by the department. It is mounted on metallic standards. These features will add very materially to the general effect of the exhibit and show up the goods to the best possible advantage, the details of which are looked after by the chairman of the committee, C. Frederick Kimball of Chicago.

Miscellaneous.

The Galloway engine to be used for driving the machinery in the British section is to be supplied by Messrs. Galloway of Manchester. It is of horizontal superposed compound condensing type, and is to indicate 70 horse-power at 70 revolutions per minute with 100 pound boiler pressure. The high-pressure cylinder is 17 and the low-pressure 30 inches in diameter, both having a stroke of 3 feet 9 inches.

Secretary Hirst of the installation department received notice of the shipment of a model of a modern steamship from the great shipbuilding firm of Furnace & Co. of West Hartlepool, England, and a quantity of ores from Mexico.

Space has been allotted the Consolidated Mfg. Company of Philadelphia to show a model brush factory in operation. Ten or twelve brushmaking machines will be set up, so as to show the making of brushes in all its branches.

The unexampled development of the advocation of electricity for street railroads is well shown in the statistics compiled by the *Street Railway Journal*. During the year 1892 there was an increase in the mileage of electric roads of 1878 miles, a decline of 842 miles in the horse roads, a gain of 52 miles in cable roads, and a decline of 22 miles in steam dummies, thus showing how largely horse railroads have been converted into electric lines. At the close of last year there were in operation in the United States 11,665 miles of street railways, the motive power being distributed as follows: 4460 miles horse; 5939 electric; 646 miles cable and 620 miles steam. The number of cars in use has reached the large figure of 38,400, which is nearly 15,000 in excess of the number of passenger cars in steam railroad service. It is stated that the investment in electric roads during 1892 has been probably not far inferior to that in railroad extensions during the past year.

The Chicago, Rock Island & Pacific Railway Company have just issued a new through freight tariff book of 261 pages, covering rates from Chicago and its vicinity to all points in the West, Northwest and Southwest. We have also received from the same company a copy of the Western classification in full, but in miniature form, of date January 1, 1893.

Southern Pig Iron Freights.

The Queen & Crescent route has issued supplement No. 4 to East-Bound Pig Iron Tariff No. 3, effective January 2, giving the rates on pig iron in carload lots from Southern furnaces to Boston, New York, Philadelphia, Baltimore and points east and north of a line drawn from Buffalo, N. Y., to Bristol, Tenn., thence to the Atlantic Coast. The rates of some of the more important points are given below:

To	From— Chattanooga, Dayton and Rockwood, Tenn.	Rising Fawn, Ga., and Fort Payne, Ala.	Birmingham district.	Decatur, Florence and Sheffield, Ala
Connecticut.				
Bridgeport	*4 90	5.01	5.01	....
Delaware.				
New Castle	*4.40	4.50	4.50	....
Massachusetts.				
Boston	*4.90	4.86	4.86	....
New Hampshire.				
Concord	5.90	6.15	6.40	6.15
New Jersey.				
Camden	4.43	4.68	4 68	..
Jersey City (rail and water)	*4.05	4.01	4.01	...
Trenton	*4.56	4.81	4.81	....
Vermont.				
Burlington, Montpelier	5.90	6.15	6.40	6.15
New York.				
Albany	5 60	5.85	5.85	5.95
Attica	4 40	4.65	4.90	4.65
Auburn	4.70	4.95	5.20	4.95
Binghamton	5.30	5.55	5.80	5 55
Elmira	4.69	4.94	4.94	5.04
Glens Falls	5.90	6.15	6.40	6.15
Hoosick Falls	6.00	6.25	6.25	6.35
Ithaca	4.90	5.15	5.70	5.15
Middletown	5.35	5.60	5.60	5.70
New York (rail and water)	*4.05	4.01	4.01	....
Painted Post	*4.70	5.15	5.40	5.15
Rochester	4.40	4.65	4.90	4.65
Rome	5.15	5.70	5.65	5.40
Syracuse	4.95	5.20	5.20	4.95
Troy	5.60	5.85	5.85	5.95
Utica	5.15	5.40	5.65	5.40
Watertown	5.70	5.95	6.20	5.95
Pennsylvania.				
Allentown	4.50	4.61	4.61	....
Bellefonte	4.56	4.81	4.81	4.91
Bethlehem	4.50	4.61	4.61	....
Birdsboro	*4.21	4.31	4.31	....
Catasauqua	4.50	4.75	4.75	....
Chester	*4.21	4.31	4.31	....
Dunbar	4.20	4.45	4.70	4 45
Easton	4.50	4.61	4.61	....
Harrisburg	3.56	3.77	3.77	....
Lancaster	*4.06	4.16	4.16	....
Lebanon	*3.93	4.03	4.03	....
Lockport	4.65	4.90	4.90	....
Nicetown	*4.21	4.31	4.31	...
Philadelphia (rail and wat'r)	*4.05	4.01	4.01	....
Philadelphia (all rail)	*4.35	4.31	4.31	....
Philipsburg	4.56	4.81	4.81	....
Pottsville	*4.40	4.55	4.55	....
Reading	*4.21	4.31	4.31	....
Scranton	4.84	5.09	5.09	5.19
Steelton	*3.80	3.90	3.90	....

* Dayton and Rockwood only.

The Deep Waterway Convention at Washington completed its work on Friday, forming a permanent organization to continue the agitation in favor of a ship canal on American soil, to connect the great lakes and the Atlantic. Resolutions were adopted urging the passage by Congress of the bill providing for the necessary surveys.

The Commissioner of Navigation, in reply to a circular sent out by him asking for information, represents that the shipping interests of the country, so far as the foreign trade is concerned, are in a desperate condition. He therefore urges the necessity of measures for its restoration and advocates the establishment of a mercantile marine and naval reserve on the principles established by Great Britain. This suggestion seems to meet with a general favorable response.

ROOFING AND CORNICE.

The Country Cornice Shop.

XIII.

By Cornice Worker.

GUTTER SPOUTS.

Fig. 17 represents a hanging gutter with spout attached. These spouts can be made of tin, galvanized iron or copper. In putting up angle spouts, as shown at A', Fig. 17, it is customary to cut a scallop, as shown, so as to make a neat finish. As this is often done by hand, and hardly ever gives accurate results, Fig. 18 has been prepared showing how to obtain the pattern, for when we once have the pattern it can be saved for future use or a dozen spouts made and kept in stock to be used when required. To obtain the pattern of the scallop cut, no matter what size the pipe is, proceed as follows: Let A, Fig. 18, represent the plan of pipe and B the elevation. Care should be taken to draw the scallop in its correct position in elevation, as shown. Divide the plan A, Fig. 18, into an equal number of parts, as shown by the small figures 1, 2, 3, 4, &c, from which drop perpendicular lines until they cut the scallop line, as shown in elevation. At right angles to the perpendicular lines or lines of the pipe draw the stretchout of the plan A, Fig. 18, as shown by C D, the small figures on the stretchout corresponding in number to those on the plan. At right angles to the stretchout line C D draw lines indefinitely from the small figures, as shown, which intersect with lines of corresponding numbers, drawn at right angles to the lines of the pipe from the intersections on the scallop line, as shown. Referring to the elevation, Fig. 18, it will be seen that we have two points, namely, E and F, which we carry upward, as shown by the dotted lines, until they cut the plan as shown by X X X X of plan to the stretchout, as shown.

At right angles to the stretchout line C D draw lines from X X X X, which intersect with lines drawn at right angles to the lines of the pipe from the points E and F, Fig. 18. A line traced through these intersections will be the required pattern for the scalloped mouth of spout,

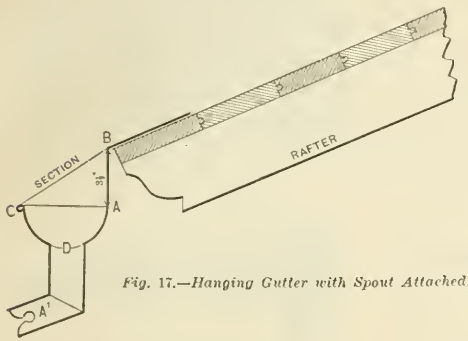


Fig. 17.—Hanging Gutter with Spout Attached.

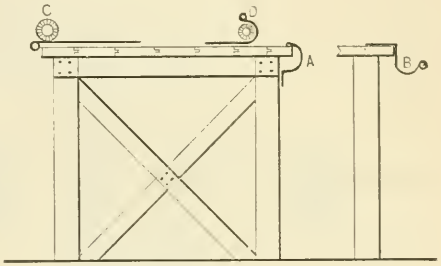


Fig. 20.—Rolling the Gutter on the Bench.

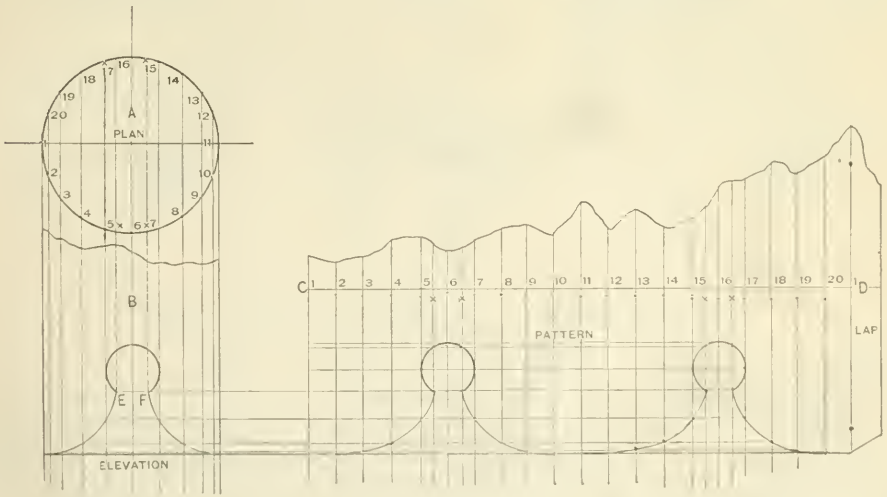


Fig. 18.—Plan, Elevation and Pattern for Mouth of Spout Shown in Fig. 17.

as shown in Fig. 17. A lap is allowed for riveting, as shown.

MAKING EAVE TROUGHS.

Now let us suppose that we have a hanging gutter or eave trough to make, 24 feet 6 inches long, the water to run from left to right standing in front of the gutter and the wire bead to be on the outside,

Strike any chalk line upon the floor or bench, as shown by A B, Fig. 19. Assuming that 7-foot sheets of iron are used, then for 24 feet 6 inches there would be required three sheets 7 feet long and one piece 3 feet 9 inches, allowing 3 inches for laps, as shown by the dotted lines C, D and E, Fig. 19. We now bead the three sheets and the one piece. Next get the

place the line drawn through the double dots upon the line on the piece M to the right, and on the chalk line to the left, performing the same operation with the sheets K and J. As the double dots shown at F, Fig. 19, represent the high part of gutter, the next step is to measure 3½ inches from the double dots H, Fig. 19, as shown at P. Then strike a chalk

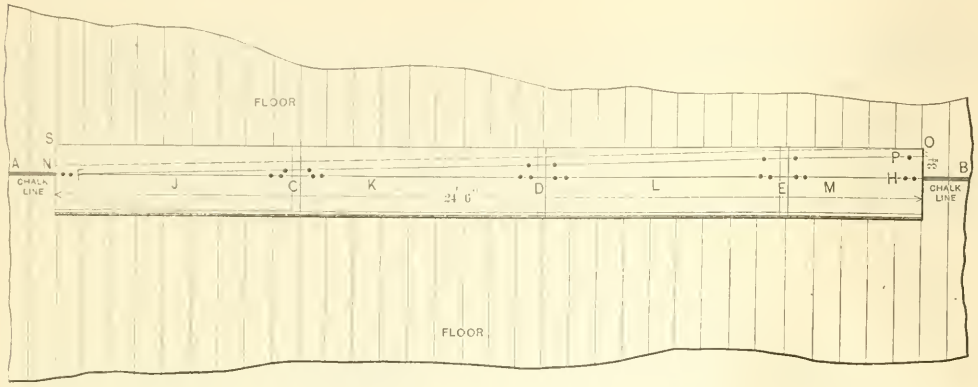


Fig. 19.—Method of Laying Out Gutter on Floor to Obtain Pitch.

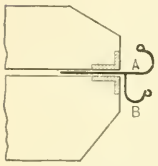


Fig. 21.

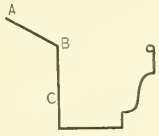


Fig. 22.—Section of Molded Gutter.

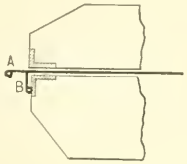


Fig. 23.

Fig. 24.—Gutter Tongs.

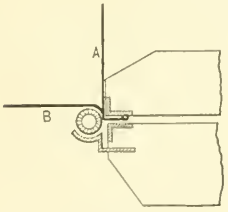


Fig. 25.

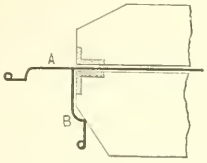


Fig. 26.

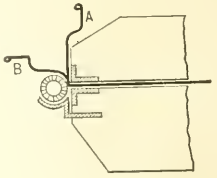


Fig. 27.

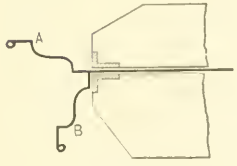


Fig. 28.

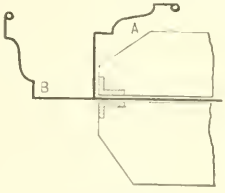


Fig. 29.

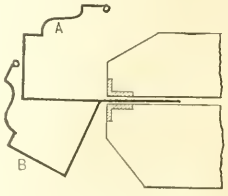


Fig. 30.

THE COUNTRY CORNICE SHOP.

the pitch to be 3½ inches on 24 feet 6 inches—or, in other words, the pitch to be 3½ inches from A to B, Fig. 17. Two flat heads will be required, which can be pricked from the section shown by C A D for the highest point of gutter, and B A D C for the lowest point, allowing for wire on C A for the small head and C B for the large head. There are different ways of laying out the pitch, Fig. 19 showing one method.

stretchout of C D A, Fig. 17, place upon and lay it off across the beaded sheets, marking at each end of the sheet the double dots, as shown on the line F H, Fig. 19. Draw a line through each sheet on the double dots. As the water is to run to the right, we start on the right side with the piece M, placing the line drawn through the double dots upon the chalk line A B, Fig. 19. Then take the sheet L, and giving 1 inch lap, as shown at E,

line from P to F, as shown, and which will be the line on which to make the bend. If a straight line is desired on roof, strike a line as shown by N O, Fig. 19, parallel to the line P F. The portion at S O to be cut away. In striking the pitch, as shown in Fig. 19, the bead should be laid downward.

In rolling the gutter, as shown at C, Fig. 20, place the bead downward as shown, and, taking a gas pipe or bar to suit the

size of the gutter, place it on top of the sheet. Now grasp the pipe and bead, and holding the bead firmly against the pipe, roll the pipe gradually until it has the position shown to the right at D. It is understood that the rolling shall go no further than up to the double dots shown on the sheets in Fig. 19. In selecting the pipe to roll the gutter, it is better to take a smaller size pipe and have the gutter rolled smaller, for as soon as it is released after rolling the metal has a tendency to spring back.

Let Fig. 21 represent a section of the brake shown before in Fig. 1. After the gutter has been rolled accurately to the profile, place it in the brake as shown by A, Fig. 21, being careful that the dots are placed at the corner of the angle iron. Close the brake, fasten the hooks, press down the gutter, taking care to keep as close as possible to the angle iron so as not to press the half-circle out of shape, then, holding the gutter firmly with the left hand against the bottom of the brake and using the mallet with the right hand, make a sharp corner and the gutter will be in position, as shown at B, Fig. 21. In putting the gutter together strike a chalk line on the bench and with solder tack the bead on the line, as shown by A, Fig. 20. Then reverse it and hang it on the bench, as shown at B, Fig. 20. After the gutter is tacked with solder, rivet first and then soak seams well with solder.

OPERATING THE CORNICE BRAKE.

Let Fig. 22 represent a section of a molded gutter, which we desire to form on the cornice brake. After the sheet has been beaded, and the stretchout taken of the mold, the dots are placed where the bends are to be made.

obtain a sharp corner. Next place the molding as shown at A, Fig. 27, using the clamp and bar; press down over the bar, which will give the shape B. Again place the molding as shown at A, Fig. 28, press down firmly, being careful not to flatten the molding already made, and it will look as shown at B. Place the gutter as shown at B, Fig. 29, press upward until it has the position shown at A. Finally, place the gutter in position as shown at A, Fig. 30, press downward to the angle A B C, Fig. 22, and the gutter will look as shown at B, Fig. 30, corresponding to Fig. 22, the shape desired.

In bending different shapes of moldings it is advisable to take a strip of iron about 1 inch wide, bending it to the shape required, so as to find out which way the molding forms best.

PATTERN OF MOLDED EAVE TROUGH.

In Fig. 31 is shown the plan, elevation and pattern of molded gutter or eave trough, at other than a right angle, where it miters around a bay window, for example. To obtain the pattern proceed as follows: Let A, Fig. 31, represent the elevation, B C F G part of the plan. Divide the profile A into a number of equal parts, as shown by the small figures, 1, 2, 3, 4, &c., from which drop perpendicular lines until they cut the miter line D E. At right angles to B D lay off the stretchout of the profile A, as shown by the small figures on H J. At right angles to the stretchout J H drop lines indefinitely from the points on the stretchout, as shown, which intersect with lines of corresponding numbers drawn at right angles to B D from the miter line D E. A line traced through these intersections will be the required pattern for a miter at other than a right angle. It will be noticed that we have not proven the accuracy of the miter line shown in plan view, Fig. 31. To do so set the point of the compass at D and strike an arc which will intersect the line B D and D F at M and N. Then from the point N strike an arc, as shown, from O to E, and from the point M as center strike an arc intersecting the arc struck from the center N, as shown by O and E. Draw a line through the intersections O and E, which must correspond to the miter line drawn through the angle D and E, thus proving the accuracy of the miter line.

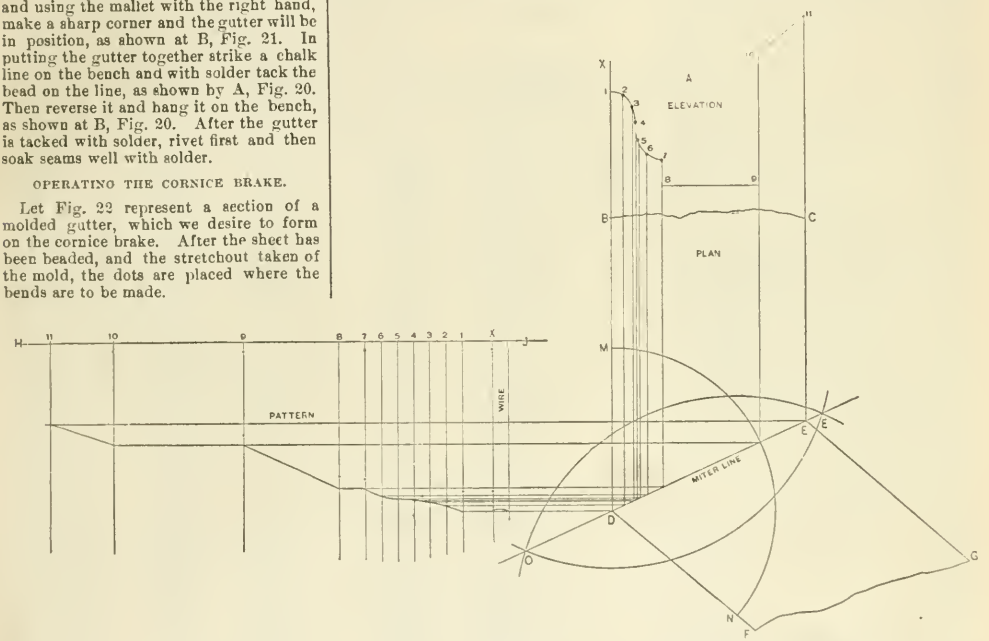


Fig. 31.—Plan, Elevation and Pattern of Gutter at Other than a Right Angle.

National Iron Roofing Association.

In *The Metal Worker* last week we printed a brief telegraphic report of the seventh annual meeting of the National Iron Roofing Association, held at Wheeling, W. Va., on January 11 and 12. We take pleasure this week in presenting a more detailed account of the proceedings, together with the table of gauges, which is to be brought to the attention of Con-

THE COUNTRY CORNICE SHOP.

In Fig. 23 is shown the first operation. As the bead is to go on the inside of the gutter, place the bead downward, and the dot in the right position, as shown at A, Fig. 23. Press down A and it will look as shown at B, Fig. 23, using the mallet as before explained to obtain a sharp corner.

As a right-angle bend cannot be obtained on account of the bead butting against the bottom of the brake, use the gutter tongs shown in Fig. 24, so as to obtain a right angle. These tongs are usually made of steel and cost about $3. Fig. 25 shows the second operation. Place the bead inside of brake, as shown at A, Fig. 25, being careful that the wire is placed in bead to keep it from being flattened; and having obtained the right size bar and clamp, press A over the bar, and the molding will look as shown at B. Now place the sheet as shown at A, Fig. 26, and press down to the position shown at B, using a mallet to

gress with a view to having it adopted as the legal standard.

MORNING SESSION.

The convention was called to order at 11 o'clock a.m., with President Battelle in the chair, 21 representatives being present, representing 14 firms, as follows:

E. A. Langenbach, the Berger Mfg. Company, Canton, Ohio.
J. H. Eller, J. H. Eller & Co., Canton, Ohio.
T. C. Snyder and Harry Ball, Canton Steel Roofing Company, Canton, Ohio.
G. E. Needham, B. F. Powers and E. C. Powers, Garry Iron Roofing Company, Cleveland, Ohio.
W. T. Graham and J. J. Holloway, Standard Iron Company, Bridgeport, Ohio.
J. G. Battelle and James Hicks, Cincinnati Corrugating Company, Piqua, Ohio.
R. J. Hyndman, W. G. Hyndman & Co., Cincinnati, Ohio.
C. H. Connor, Charles H. Connor, Louisville, Ky.
W. A. List, W. A. List & Co., Wheeling, W. Va.

E. C. Ewing and Alexander Glass, Wheeling Corrugating Company, Wheeling, W. Va.
Charles Aldrich, Missouri Iron Roofing & Cornice Company, St. Louis, Mo.
F. E. Codding, E. E. Souther & Co., St. Louis, Mo.
M. H. Crittenden, M. H. Crittenden & Son, Minneapolis, Minn.
W. C. Cowgill and S. W. Nicholson, Cambridge Roofing Company, Cambridge, Ohio.

Letters of regret were read from James A. Miller & Bro., Chicago: The Heberling Metal Roofing Company, Havana, Ill., and Porter Iron Roofing Company, Cincinnati, Ohio; also a communication from Decatur Steel Roofing Company, Decautar, Ill., who hoped to join the association at its next annual meeting.

On motion of Mr. Connor the printed minutes of the semi-annual meeting were approved without reading. Mr. Connor, as chairman of the Executive Committee, made the following report, which was read by the secretary:

"The chairman of the Executive Committee of the National Iron Roofing Association begs leave to report that his absence in Europe during most of the year has made it impossible for him to meet with the committee or attend the mid-summer meeting of the association. The work of the year must, for these reasons, be reported by the secretary. The interest and enthusiasm shown by our Wheeling members in hospitably providing for the entertainment of this meeting, not only gives promise of a good session, but augurs well for the future of our association. The value and necessity of our organization is each year more apparent."

Mr. Snyder of Canton, Ohio, chairman on Gauges, made a verbal report that the committee having received the unanimous support of the members, has been working in conjunction with John Jarrett, secretary, representing the Association of Sheet Iron Manufacturers, the Galvanized Iron Manufacturers' Association and the Amalgamated Association of Iron and Steel Workers for the necessary legislation to secure the passage of a bill by Congress establishing by law the proposed United States standard gauges for all uncoated iron and steel sheets.

He also said that he would leave the same evening for Washington, D. C., to appear on the following day before the Congressional Committee on Weights and Coinage, in reference to the subject and representing the above-named associations.

President Battelle spoke of the value of the proposed gauge, its completeness, giving weights in even ounces in fractional pounds, and the thickness in decimal fractional inches; also the equivalents in the metric system, this latter feature being added at the suggestion of the Association of Mechanical Engineers.

Mr. Aldrich, chairman of the Committee on Freights, made a verbal report showing that in the present state of the various freight associations it was almost impossible to secure even a hearing. Mr. Snyder made a report upon the same subject, stating his efforts to secure same classification on returned roofing tools as upon roofing. Upon motion the action of Mr. Snyder was heartily indorsed and he was asked to report to the secretary at the earliest moment the result of his efforts, these results to be reported to the members by the secretary.

Secretary Hyndman then read his report, followed by the treasurer's report showing the financial condition of the association.

Mr. Connor then offered the following resolution:

Resolved, That the imperative interests of this association demand the united, as well as individual, influence of its members should be used against the use for roofing purposes of iron lighter in gauge than 81 pounds to the 100 square feet in the flat.

After hearing from each member present it was found that the firms represented were fully in accord in their practice for the year just past with the resolution offered. The resolution was unanimously approved.

The chairman then appointed Messrs. Needham, Eller and Aldrich a committee to nominate officers for 1893, their report to be presented at the afternoon session. On motion of Mr. Aldrich it was resolved that the minutes of the morning session be read at the opening of the afternoon session for the benefit of the members who might come in, and they be allowed to express their views on the subjects discussed at the morning session. Adjourned to meet at 2 o'clock p.m.

AFTERNOON SESSION.

The afternoon session was called to order at 2.30 p.m., and the minutes were read for the benefit of the members not present at the morning session.

Expressions upon the matters under discussion were made by the representatives of the Standard Iron Company and the Cambridge Roofing Company. On motion of Mr. Aldrich it was unanimously resolved that the matter of prices be referred to the Executive Committee, with instruction to investigate and report at the semi-annual meeting and report a final plan at the next annual meeting.

Mr. Aldrich invited the members to hold the next annual meeting at St. Louis, Mo., and the invitation was unanimously accepted, the date fixed being the second Thursday in January, 1894.

On invitation of James Hicks, the semi-annual meeting was appointed to be held at Piqua, Ohio, in July next.

The Nominating Committee made the following report:

Chas. H. Connor, president.
Jas. Hicks, vice president.
R. J. Hyndman, secretary.

COMMITTEES.

Executive.	*Freight.*
Jas. G. Battelle,	Chas. Aldrich,
Chas. Aldrich,	Alex. Glass,
W. T. Graham.	B. F. Powers.

Gauges.
T. C. Snyder,
H. P. Lloyd.

On motion of Mr. Aldrich the secretary was ordered to cast the vote of the association for the above officers.

Mr. Connor and Mr. Hicks then responded, thanking the association for their appointments.

The thanks of the association were extended individually and collectively to Mr. Snyder, who although engrossed with his own affairs was willing to forego the pleasures of the banquet and the excursion to go to Washington, D. C., in behalf of the association on the gauge question.

Gauges and Weights of Uncoated Iron and Steel Sheets and Plates.

Number of gauge.	Thickness in fractions of an inch.	Thickness in decimal parts of an inch.	Thickness in millimeters	Weight per square foot in ounces.	Weight per square foot in pounds.	Weight per square foot in kilograms.	Weight per square meter in kilograms.	Weight per square meter pounds.
(0000000)	1-2	0.5	12.7	320	20.00	9.072	98.80	217.81
(000000)	15-32	0.46875	11.90625	300	18.75	8.505	92.66	204.28
(00000)	7-16	0.4375	11.1125	280	17.50	7.938	86.45	190.59
(0000)	13-32	0.40625	10.31875	260	16.25	7.371	80.28	176.99
(000)	3-8	0.375	9.525	240	15.	6.804	74.19	163.56
(00)	11-32	0.34375	8.73125	220	13.75	6.237	67.92	149.77
0	5-16	0.3125	7.9375	200	12.50	5.67	61.77	136.18
1	9-32	0.28125	7.14375	180	11.25	5.103	55.55	122.36
2	17-64	0.265625	6.746875	170	10.625	4.82	52.52	115.79
3	1-4	0.25	6.35	160	10.	4.536	49.40	108.90
4	15-64	0.234375	5.953125	150	9.375	4.253	46.29	102.14
5	7-32	0.21875	5.55625	140	8.75	3.969	43.25	95.25
6	13-64	0.203125	5.159375	130	8.125	3.686	40.15	88.50
7	3-16	0.1875	4.7625	120	7.5	3.402	37.03	81.78
8	11-64	0.171875	4.365625	110	6.875	3.119	33.98	74.88
9	5-32	0.15625	3.96875	100	6.25	2.835	30.89	68.09
10	9-64	0.140625	3.571875	90	5.625	2.552	27.77	61.18
11	1-8	0.125	3.175	80	5.	2.268	24.70	54.45
12	7-64	0.109375	2.778125	70	4.375	1.985	21.55	47.62
13	3-32	0.09375	2.38125	60	3.75	1.701	18.52	40.89
14	5-64	0.078125	1.984375	50	3.125	1.418	15.40	34.04
15	9-128	0.0703125	1.7859375	45	2.8125	1.276	13.93	30.59
16	1-16	0.0625	1.5875	40	2.5	1.134	12.37	27.22
17	9-160	0.05625	1.42875	36	2.25	1.026	11.12	24.50
18	1-20	0.05	1.27	32	2.	0.9072	9.880	21.78
19	7-160	0.04375	1.11125	28	1.75	0.7938	8.645	19.06
20	3-80	0.0375	0.9525	24	1.50	0.6804	7.419	16.36
21	11-320	0.034375	0.873125	22	1.375	0.6237	6.792	14.98
22	1-32	0.03125	0.79375	20	1.25	0.567	6.177	13.62
23	9-320	0.028125	0.714375	18	1.125	0.5103	5.555	12.24
24	1-40	0.025	0.635	16	1.	0.4536	4.94	10.89
25	7-320	0.021875	0.555625	14	0.875	0.3969	4.325	9.53
26	3-160	0.01875	0.47625	12	0.75	0.3402	3.703	8.18
27	11-640	0.017187	0.436562	11	0.6875	0.3119	3.398	7.49
28	1-64	0.015625	0.396875	10	0.625	0.2835	3.089	6.81
29	9-640	0.014062	0.357187	9	0.5625	0.2552	2.777	6.12
30	1-80	0.0125	0.3175	8	0.5	0.2268	2.47	5.46
31	7-640	0.010937	0.277812	7	0.4375	0.1985	2.153	4.76
32	13-1280	0.010156	0.257968	6½	0.40625	0.1843	2.003	4.42
33	3-320	0.009375	0.238125	6	0.375	0.1701	1.852	4.09
34	11-1280	0.008593	0.218281	5½	0.34375	0.1559	1.700	3.75
35	5-640	0.007812	0.198437	5	0.3125	0.1418	1.549	3.40
36	9-1280	0.007031	0.178593	4½	0.28125	0.1276	1.393	3.06
37	17-2560	0.006640625	0.168671875	4¼	0.265625	0.1205	1.317	2.90
38	1-160	0.00625	0.15875	4	0.25	0.1134	1.237	2.72

The secretary was authorized to extend the thanks of the association to the proprietors of the McClure House for the use of their parlors, and the meeting then adjourned.

Wednesday evening was given up to a banquet, at which 60 covers were laid, and which was participated in by all members and a large number of rolling mill representatives.

On Thursday the members spent the day inspecting the various establishments in and about the city, and made an excursion upon the terminal railroad.

As of interest in connection with this report, we print above the table of gauges and weights referred to, which the association desire to have established as the legal standard.

THE CHESTER SLATE COMPANY, whose quarry is located near Chapman Quarries, held their annual meeting at Easton, Pa., Saturday, January 7, and the followirg Board of Directors was elected: Theodore

Whitesell, president; J. A. Weaver, vice-president; B. F. Schnabel, secretary and treasurer; Charles A. Morrison and H. C. Cavanaugh. John H. Geiser was re-elected superintendent.

FLASHINGS.

An article in the Denver *Republican* of recent date states that there are about ten firms in that city engaged in the manufacture of cornices, &c., with about 60 employees, the annual production of the shops amounting to about $200,000.

With the beginning of the current year the Sagendorph Iron Roofing & Corrugating Company of Cincinnati made a new departure. They will continue to manufacture and sell their specialties which are covered by United States patents in all respects as heretofore. Their general business of selling corrugated iron, sheet steel roofing, V-crimped and roll-cap roofing will be conducted under the name of the American Roofing Company, a corporation having large plants at Cincinnati and at St. Louis. The authorized capital of the American Roofing Company is $150,000 and, this company will have the advantage of two of the largest plants in the country for the manufacture of their products. The company will supply their customers with all varieties of iron and steel roofing of the best material and most approved construction. The *personnel* remains unchanged. Geo. M. Verity, the very popular and successful manager during the past four years, will continue in the same position, and R. C. Phillips will remain as superintendent. The Cincinnati plant, which was lately destroyed by fire, is being rebuilt at the old site, on the very latest improved plans, and will be admirably adapted to their business. Their shipping facilities are excellent, the city wharf being only 100 yards distant, while they are centrally located between the upper and lower railroad freight yards, besides having a switch of the Pennsylvania Railroad directly in front of their factory, thus giving them shipping facilities for handling their products.

M. F. Conner, secretary and treasurer of the Eclipse Machine Company, Troy and Cohoes, N. Y., will leave about February 1 for an extended trip through the West, visiting the trade interested in the use and sale of the Eclipse Gutter Beading & Forming Machine made by that company.

The Montreal Roofing Company of Montreal, Canada, enjoyed a good volume of business during the year just brought to a close, and their work is to be seen in connection with many prominent buildings in the city named. Among the structures may be mentioned the new Queen's Hotel, roofed with rock asphalt; the Balmoral Hotel, roofed with actinolite cement; the St. James Club, the roof of which is covered with actinolite asphalt; the warehouse of Evans & Brothers, covered with composition roofing 1¼ inch thick, and said to be practically indestructible; the Temple Emanu-El and the main building of the Royal Victoria Hospital. In addition to these were a number of residences, schoolhouses, colleges, and a portion of the Montreal Seminary.

R. G. Kelso, Cleveland, Ohio, has recently patented an eave-trough fastener consisting of an end-slotted cross bar which is curved at one end around a bead, while the other end is formed with a groove which fits in the inner edge of the eave trough. A band passes around the bead under the cross bar and around the body of the eave trough, one end being passed through this cross-bar slot and bent down to make it fast, while the other end is carried a little beyond the middle cross bar and under it, where it is riveted. The roof band is so bent as to fit over the eaves of the roof, and is provided with holes by which it may be nailed to the roof. The three pieces are held together by a rivet on top and by the engagement of one end of the band first referred to in the slot of the cross bar.

J. C. McFarland, manufacturer of cornices, skylights, &c., 2511 to 2519 State street, Chicago, is to furnish the Spanish tile roofing, copper work, skylights, slate roofing, &c., for the new depot building of the Illinois Central Railroad at Twelfth street, in that city.

The Pennsylvania Hard Vein Slate Company, whose quaries are located at Edeimans, held their annual meeting at Easton, Pa., Thursday afternoon, January 5. G. W. Geiser, N. A. Fulmer, James Young, Birge Pearson and R. H. Trach were elected directors. The board organized by the election of G. W. Geiser as president, James Young vice-president, N. A. Fulmer secretary, and Birge Pearson treasurer.

The plant of the Sagendorph Iron Roofing & Corrugating Company, Cincinnati, Ohio, which was recently destroyed by fire, will be rebuilt according to plans which have just been drawn. As the material has been purchased, operations will commence as soon as the weather will permit. The new structure will consist of two sections covering a total depth of 204 feet by 60 feet in width. The front section will be three stories high, having a depth of 134 feet, and the rear section will be two stories in hight, with a depth of 70 feet. The two sections will be divided by a substantial fire wall. The first floor of the front section will be used as a stock and receiving room, also for the heavier machinery used in the production of the company's specialties. The first floor of the rear section, 17 x 70 feet, will be fitted up for stabling purposes. The center room of the rear section, 21 x 70 feet, extending to the roof, is to be constructed of fire-proof material, entirely isolating it from the remainder of the premises and will be used for the paint department, in which all paints will be ground and mixed and applied. The west side of this section, 18 x 70 feet, will be given up to boiler, engine and fuel room. The second floor of the front section will be occupied by the company's offices, 30 x 60 feet, stock room and light manufacturing. The rear of the second floor section will be used for the tin and galvanized iron work department. The third floor will be occupied by storage paints, as will also the basement. The company will have one third more room than in the old plant, and 25 per cent. additional productive capacity. The new plant will be operated under the name of the American Roofing Company, of which Charles Aldrich is president, H. B. Lloyd vice-president, Geo. M. Verity general manager, and R. C. Phillips superindent. It will be noted that no change in management is made, the business of the Cincinnati plant being conducted as heretofore, with added advantages of increased capital and facilities.

In response to inquiries made by the Canal Committee of the New York Board of Trade and Transportation, Horatio Seymour, ex-State Engineer and Surveyor, has sent an elaborate discussion on the question of a ship canal between the lakes and the Hudson, with the conclusion that it is impracticable. He estimates the cost of the canal at about $600,000,000 and describes the difficulties in the water supply as unparalleled in canal construction heretofore.

Shop Stories.

CONCERNING FISH.

Our shop recently had a job of considerable magnitude to execute for a customer whose residence is situated on the banks of a small river famous for bass fishing. Competent mechanics with assistants were sent to put up the work.

A few days after their return, and during the noon hour, while the "kids" were discussing the contents of their dinner buckets, their conversation turned on fishing. Jack, who had gone as a helper on the job referred to, related his luck at taking in the "black beauties," as he called the bass, and succeeded remarkably well. His story had, no doubt, been materially helped out by listening to real fish stories told by summer boarders at Jack's boarding house Sunday afternoons during his stay.

Frank, who has a very imaginative mind, responded by giving his piscatorial experiences in the waters of the Big Sandy. Others in turn related their most wonderful adventures except Bill, who had never been sent out of town. In fact there did not appear to be anything left for him, and we felt a good degree of compassion for the youth. However, we were not long left to waste our sympathies. He either believed all the stories related to be real fishy or real lies, and promptly objected to having the curtain rung down.

He told them that several years ago, when he was only a boy, the Ohio River rose so high that it flooded the streets of the town where his parents resided, and he actually went boating in second stories of dwellings and business houses. Directly the flood subsided his people set about cleaning up the filth and mud left in their premises. They were unable, however, to get the water-closet to work, and sent for a plumber to search out and remedy the difficulty.

The plumber, having urgent domestic duties of like character himself to execute, did not respond to the call for several days. When he came he found the closet trap obstructed with something, and reaching down into it with his hand, seized and pulled out a fine large and live catfish weighing ever-so-many pounds.

Some of Bill's shopmates seemed disposed to doubt the truth of this, while others thought it possible for a fish to have found its way there while the river was so high. Bill stoutly asserted to the truthfulness of his story, stating that he saw the fish taken out himself, but added that that did not relieve the trouble with the water-closet.

A further examination was made, and resulted in finding that while the catfish had been imprisoned in the closet trap it had raised a whole litter of kittens. They found six well grown ones with their eyes open. After their removal the closet was all right. Swiped Joint.

N.B.—Bill got the pie.

The American Federation of Labor, in session at Albany, recommend that all machine labor in State prisons be abolished, also the system of convict labor in State prisons. The latest report of the State prison officials fails to show that the efforts made thus far to abolish machinery and to restrict the labor of convicts have had any effect to reduce the burdens of the taxpayer, or to promote the welfare of the convict, but quite the reverse.

A bill to make the records of the Interstate Commerce Commission and certified copies of them *prima facie* evidence in courts of law was favorably reported to the House from the Committee on Commerce. This provision was neglected when the Interstate Commerce act was passed, and copies of the records have only been admitted in evidence by consent of counsel.

"The Metal Worker" Competition in Skylight Pattern Cutting.

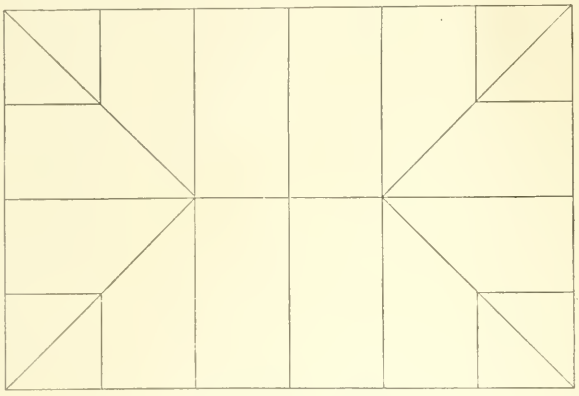
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker.*

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

THE TIN SHOP.

Triangulation in Pattern Cutting.—XVII.

By Triangle.

PATTERN FOR THE FRUSTUM OF AN OBLIQUE PYRAMID.

In Figs. 126 and 127 let A B C D be the side elevation of article, E F G H the plan of base and K L M J the plan of top. E'' K'' J'' H'' is the elevation of front, under which is drawn the corresponding plan, as shown by E' F' G' H' L' M' J' K'. An inspection of the plan will show that the distance between E F and K L is the same as that between J M and G H, from which we can infer that the two sides are alike. For the pattern of the side corresponding to H J M G in plan proceed as follows: Draw any line, as $a\ d$, in length equal to H G of plan, or, what is the same, A D of elevation. At right angles to $a\ d$ erect the perpendicular $d\ k$, upon which set off the slant hight of side, as shown by E'' K'' of front elevation. From k, measuring in either direction, set off the distance k M, k J of plan, as shown by $k\ c$, $k\ b$ of pattern. Connect $a\ b$ and $d\ c$, which completes the pattern of the side. The pattern for the front can be set off in the same manner, or by the aid of the T-square as follows: Draw $e\ h$ parallel with E' H' of plan. With the T-square at right angles to $e\ h$ erect the perpendicular $a'\ b'$, in length equal to A B of side elevation, which gives the slant hight of the front. Draw $k\ j$ parallel to $e\ h$, cutting $a'\ b'$ at b'. With the T-square at right angles to E' H', drop lines from the points E' H', cutting $e\ h$, and also lines from K' J', cutting $k\ j$, all as shown. By connecting the points $e'k$ and $j\ h$ the pattern for the front of article is obtained, as shown by $e\ k\ j\ h$. The pattern for the back of article, as shown by $g\ m\ l\ f$ in Fig. 128, is obtained in a similar manner; $f\ g$ and $l\ m$ are of the same length as F' G' and L' M' of plan. On the right angle $f\ d\ c$ is laid off the distance D C of

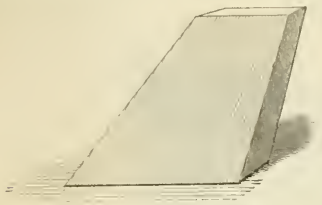


Fig. 125.—View of the Finished Article.

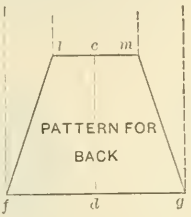


Fig. 128.—Pattern for Back of Article.

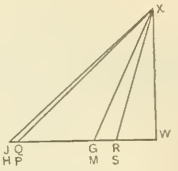
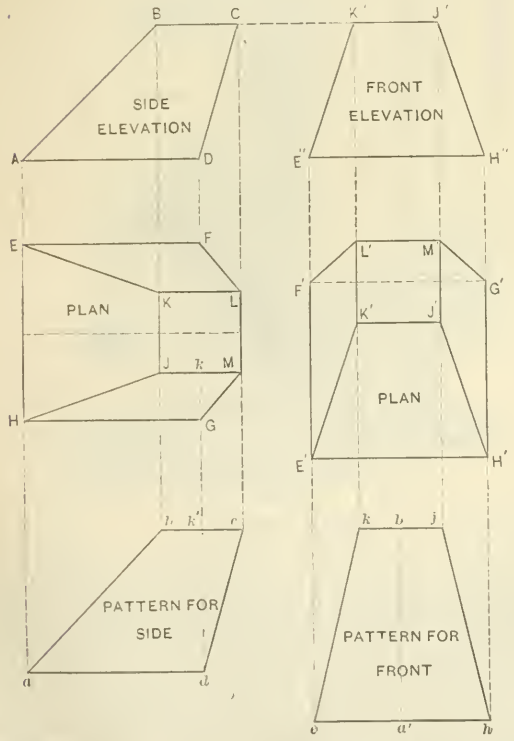


Fig. 129.—Diagram of Triangles Drawn on Solid Lines of Plan.



Figs. 126 and 127.—Plan, Elevation and Patterns for Front and Side.

Fig. 130.—Diagram of Triangles Drawn on Dotted Lines in Plan.

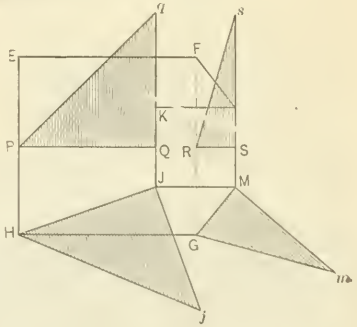


Fig. 131.—Triangles Drawn on Solid Lines in Plan.

PATTERN FOR THE FRUSTUM OF AN OBLIQUE PYRAMID.

side elevation, making *d c* equal to D C. By connecting the points *f l m g* the pattern for the back of article is the result.

To obtain the pattern by triangulation it will be necessary to draw a number of triangles, the bases of which can be obtained from the plan, their hight being equal to the straight hight of the article, and their hypotenuses will give the distances from points in the base to points in the top of the article.

In Fig. 129 is shown a diagram of triangles drawn from the solid lines in plan. Draw the right angle J W X, making W X equal to the straight hight of the article. From W set off the length of line J H of plan, and connect J H with the apex X, which gives the distance from H in plan to J in the top. In a similar manner, set off from W the lengths of lines Q P, G M and R S, and connect the points thus obtained in W J with X. The right angle H' Y Z in Fig. 130 is constructed in a similar manner. Y Z represents the straight hight of the article, and on Y H', measuring from Y, is set off the length of dotted lines in Fig. 132, and the points connected with Z, as shown. If the triangles in Fig. 129 were cut out and placed on their respective base lines in the plan in Fig. 131, their appearance would be as shown. The same can be said of the triangles in Fig. 130, if placed on the dotted lines on plan in Fig. 132. In describing the pattern for the article, we will locate the seam or joint as indicated by R S in plan.

The pattern can be described by the use of the diagrams of triangles in Figs. 129 and 130, in connection with the plan, or by the aid of the diagrams in Figs. 131 and 132. In the present instance we will use the diagrams in Figs. 131 and 132. When describing the pattern shown in Fig. 133, one can commence at the right, at the left, or from the center, as may be desired. We will first describe the pattern for the part of article shown by E K J H of plan. Draw the line E'' H'', in Fig. 133, equal in length to E H of plan. With H'' as center, and H' *k'*, Fig. 132, as radius, describe a small arc (*k''*), which intersect with one struck from E'' of pattern as center, and H *j* of Fig. 131 as radius, thus establishing point *k''* of pattern. With *k''* of pattern as center, and K J of plan as radius, describe another small arc (*j''*), which intersect with one struck from H'' of pattern as center, and H *j* of Fig. 131 as radius, thus establishing point *j''* of pattern.

With H'' of pattern as center, and H G of plan as radius, describe a small arc (G''), which intersect with one struck from *j''* of pattern as center, and G' *j* of Fig. 132 as radius, thus establishing point G'' of pattern. With G'' as center, and G *m* of Fig. 131 as radius, describe a small arc (*m''*), which intersect with one struck from *j''* as center, and J M of plan as radius, which establishes the point *m''* of pattern. Point R' is struck from G'' as center, R G of plan as radius, and with *m'* of pattern as center, and R' *m'* of Fig. 132 as radius. The remaining point *s''* represents the distances M S and R *s* of Fig. 131. The points F'' R'' *s''* *l''* can be obtained as above described.

A model similar to that shown in Fig. 135 can be constructed by forming a duplicate of the pattern into the required shape. For a model showing half of the article, draw A B C D in Fig. 131, which is a duplicate of the side elevation. Below A D draw the half plan of base, H A D G, and above A C the half plan of top, B J M C. At right angles to C D set off C M' and D G', equal in length to C M and D G respectively. In a similar manner, from A B set off B J' and A H', in length equal to B J and A H. Connect M' G' and H' J'. The parts of the pattern are to be formed at right angles on the lines A B, B C, C D, and D A, the result being as shown in Fig. 135. The dotted line J G of model, which represents the hypotenuse of the triangle J' *j'* G' in Fig. 132, can be represented by means of colored thread.

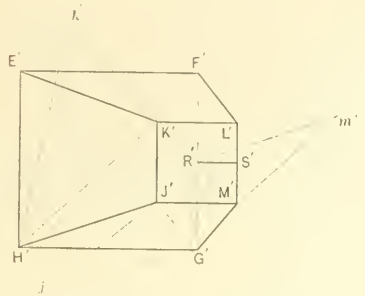


Fig. 132.—Triangles Drawn on Dotted Lines in Plan.

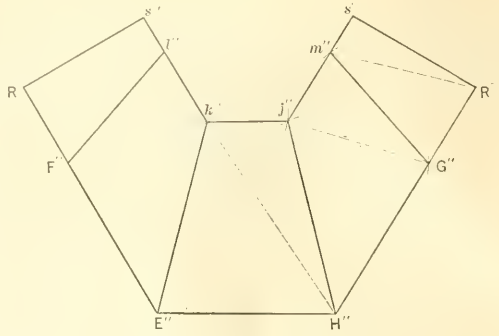


Fig. 133.—The Pattern Shape.

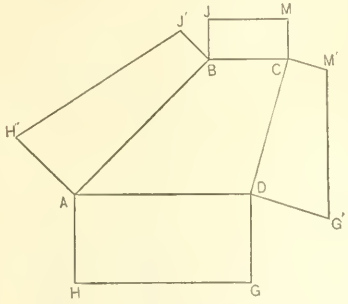


Fig. 134.—Pattern for Model.

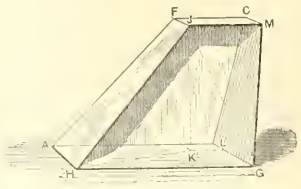


Fig. 135.—Model Derived from Pattern in Previous Figure.

PATTERN FOR THE FRUSTUM OF AN OBLIQUE PYRAMID.

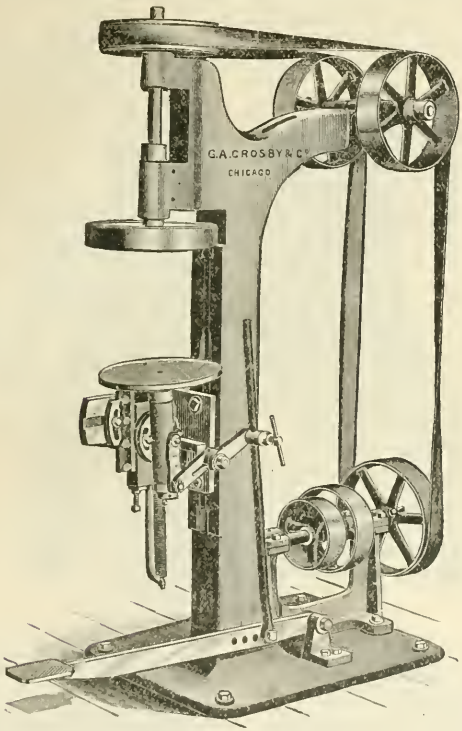
The New York municipal authorities propose to move speedily in carrying out the plans for the construction of a new city hall in the park. A new building in the modern style, comprising a large quantity of iron beams, girders and posts, would naturally endure for centuries, and at first thought the location chosen would seem to be very far down town. But a century hence the City Hall Park will be much more central than now with reference to population on Long Island and other environs geographically within the corporation limits. Between the two great contemplated improvements—the new city hall and rapid transit—the municipal treasury is likely to be well drained.

Chancellor McGill of New Jersey issued a decree for the appointment of a receiver for the Jersey Central Railroad because it ignored the order of the court to withdraw from the coal combine. The decree is held in abeyance pending an inquiry by a master in chancery.

Patent Wiring Machine.

The accompanying illustration represents a novelty in machinery for rolling or wiring the edges of sheet metal packages, which will recommend itself to manufacturers who realize the necessity for some cheap and effectual method of doing this class of work. Heretofore it has been practically impossible to either wire or false-wire conical or tapering vessels, except by the use of wiring dies, which are so costly as to prevent many of the smaller manufacturers going into the production of an extensive line of this class of goods. When wiring dies are used a special die is necessary for each different sized vessel, involving a large outlay of money, while requiring constant attention and frequent repairing.

The machine which G. A. Crosby & Co. of 176 South Clinton street, Chicago, Ill., are now placing on the market possesses many points of advantage for doing this class of work. Among other things, they refer to its cheapness; to the fact that either straight or tapering vessels can be wired or false-wired on the same machine; that it is capable of handling vessels from 24 inches high and 18 inches in diameter down to work no larger than an ordinary varnish can nozzle, and that the work produced is of a superior quality.



Patent Wiring Machine.

Builders of steamships at lake ports must take a costly lesson from experience. There is no longer any doubt that the loss of at least two of the largest steel steamers built by them is due to serious faults in construction which developed weakness amidships. More evidence to this effect is coming to light. The steel steamer "Maritana" of the Minnesota Steamship Company, built and launched at Calumet last summer, was towed into the shipyard of the Globe Iron Works at Cleveland, where experts found that the boat had narrowly escaped breaking in two. Hundreds of rivets were gone and steel plates were separated as much as ¼ inch in many places. The steamer will be repaired at a cost of $75,000.

Micanite.

Eugene Munsell & Co., 218 Water street, New York, sole agents for the Mica Insulator Company of Schenectady, N. Y., are introducing, under the name Micanite, a new electrical insulating material. This is described as made of pure India sheet mica and the least possible amount of cement of the highest resistance. It can be furnished in any desired form or size. They inform us it has passed the experimental stage, been thoroughly tested and is now in actual use by large electrical manufacturers. While it is true mica has long been recognized as a valuable insulator, the difficulty for many uses has been its great cost, no suitable substitute having yet been found to take its place. Now, however, they have succeeded in utilizing what heretofore has been a waste product. In cutting plates for various uses there has always been considerable refuse. The mica scrap is just as valuable for insulation, the difficulty having been to properly prepare it. This has now been accomplished and this material can be supplied in any form required. The compound readily lends itself to manipulation under mechanical processes, such as sawing, shearing, punching and boring. This production was recently described at length in a paper read before the American Institute of Electrical Engineers by Edward P. Thompson, the title of the paper being "Micanite and Its Application to Armature Insulation."

New York now has a boss stevedores' trust.

Barnes' Friction Clutch Pulley.

The accompanying cuts illustrate the principle of the construction of a new friction clutch pulley made by J. H. & D. Lake Company of Hornellsville, N. Y. Fig. 1 is a sectional side view of the Barnes screw lever friction pulley in released position, showing the driving hub keyed to the shaft.

Fig. 2 is a sectional end view of the friction hub encircled by friction ring, the former of which is cast in one solid piece with the pulleys. Projecting lugs on opposite sides of the driving hub of the ring drop into lugs, or lug cavities of the friction ring, and when the clutch is on these lugs take all the driving power.

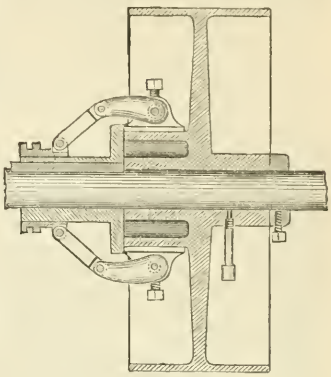


Fig. 1.

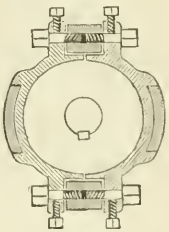


Fig. 2.

Barnes' Friction Clutch.

This is claimed to be an improvement over the old bolt-fastening system, the bolts of which are more liable to be affected by the twisting strain upon the hub from the friction of the clutch. At the extreme top and bottom of Fig. 2 is shown a view of a simple device which obviates the use of more complicated machinery. It is a lever nut on each side of the friction ring, one-half of the nut being cut with a right thread and the other half with a left thread. Sufficient space between opposite sections of the ring is given for contraction of clutch, which is effected by means of right and left thread screw bolts entering the lever nut from opposite sides, secured by set screws. Duplex levers are attached to these nuts at their upper section and to the hub at their lower section. When the shipper sleeve is thrown against the flange by the operating lever, the duplex lever turns the nut sufficiently to produce all necessary friction. The screw bolts are adjustable to any desired pressure, however, in case the clutch should ever become lax. They give the pulley a positive grip and absolute release from the hub by each opposite shift of the operating lever, without the use of springs. These friction clutch pulleys and cut-off couplings are adapted to both heavy and light work.

Steam and Hot-Water Circulation

English Practice in Hot-Water Heating—XIX.*

BRICK SET BOILERS (CONTINUED).

The most customary way to set a saddle boiler, especially of medium and large size, is to provide flues up and down along its exterior as follows: The boiler is placed upon a level with the furnace bars, the hight of this point being fixed by the position of the door, &c., of the furnace fittings that are furnished for the job. The front of the boiler comes up tight against the brick-work front (against which the iron furnace front is fixed), and the joint between the boiler and brick work must be a thoroughly sound and tight one to prevent the draft and flame making a short cut this way into the upper flue (see Fig. 75†). This brick work should be 9 inches thick.

There is frequently a difficulty in getting the iron front and fittings to hold securely against the front brick work, owing to several causes. Firstly, the expansion and contraction of the metal and, again, the opening and shutting of doors, and use of stoking tools, are the chief causes of the work getting loose. This happens especially if the fittings are merely secured with holdfasts in the brick work. The object in referring to this is to explain a method of securing the front which will not only keep the fittings in place under the roughest of usage, but which will tend to keep the front brick work tight against the boiler also, as is so necessary, as just mentioned. This method is to have iron rods or stays extending from the iron furnace front right through along the sides of the boiler and clipping round its furthest end. These can be easily tightened up by having the front ends coming through holes, screwed, and with nuts on them.

From the illustration it will be seen that previous to the boiler being placed in position, its base is built up, and it is arranged that the brick work extension of the fire box at back (for the bars do not extend the whole length of boiler) is exactly level with the top surface of the fire bars. The bars are also exactly level with the dead or dumb plate in front, the front ends of the bars coming just level with the front of the boiler, as shown. Sometimes, when it is desired to place the boiler lower than usual, or to do with a shallower boiler pit, the bars and back brick work are kept level, as just explained, but some 2 to 4 inches below the lower edge of the furnace door, instead of being level with it. This inequality is made up by having the dumb plate sloping, as Fig. 76.

The common use of the dumb plate now is to complete the furnace bottom from the bars to the front; it is a solid and strong plain plate, as bars are not needed here, and brick work would do, only that clear way must be left beneath, the space below being the ash pit. The dumb plate is sometimes used in the manner originally intended—viz., to place a charge of coal upon, that it may dry and volatilize some of its lighter gases, which, passing over hot fuel, are consumed, the charge of fuel being afterward pushed on, a considerable reduction in smoke and waste products being the result. It will be noticed in Fig. 75 that, from extreme front to back, the furnace bottom is quite level. This is how it should be in the usual way, and simplifies the stoking and reduces the chances of rough usage.

* Reprinted from the *London Builder*.

† This and Figs. 77, 78, 79, are from the catalogue of Jenkins & Son, Rotherham.

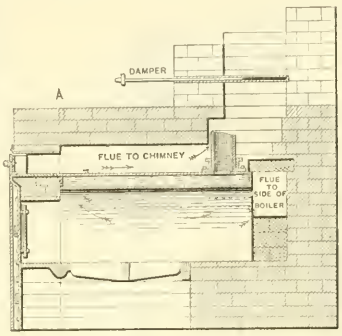


Fig 75.—Section through Boiler Taken on Line E F of Fig. 78.

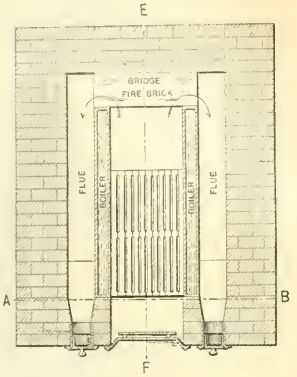


Fig 77.—Section through Boiler on Line C D of Fig. 78

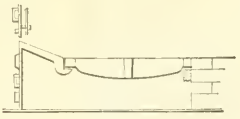


Fig. 76.—Section Showing Sloping Dumb Plate.

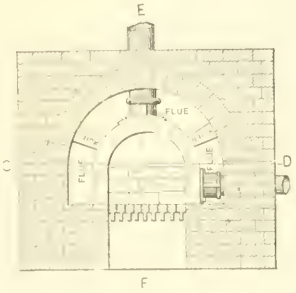


Fig. 78.—Section of Boiler Taken on Line A B of Fig. 75.

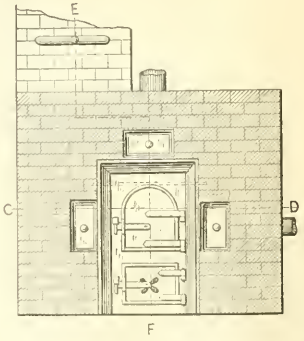


Fig. 79.—Front Elevation of Saddle Boiler in Position.

ENGLISH PRACTICE IN HOT-WATER HEATING.

The furnace bars usually occupy about two thirds the area of the fire box with a plain saddle boiler, but the area varies with the pattern of the boiler, as has been fully explained (Article XV). The rear ends of the bars are sometimes made to rest on the brick work with a light flat bar beneath, or they may be supported on a stronger bar, clear of the brick work, as shown. In any case, their upper surfaces have to be quite level with the brick work in question. The front extremities rest upon the rebated edge of the dumb plate, or in some cases the dumb plate has no rebated edge, and both this plate and the fire bars rest upon a strong bar which extends from side to side. This latter method is not so good as the former, not so neat, and no stronger, for the dumb plate being supported by the brick work at each of its ends, will carry the fire bars well. The fire bars are kept forward, as shown, so that the inner and direct heating surface of the boiler may have the fullest benefit of the heat and heated gases, &c., before passing away at the back into the flues.

The rear end of the boiler does not reach to the back wall by some 5 inches to 8 inches (according to size of boiler);

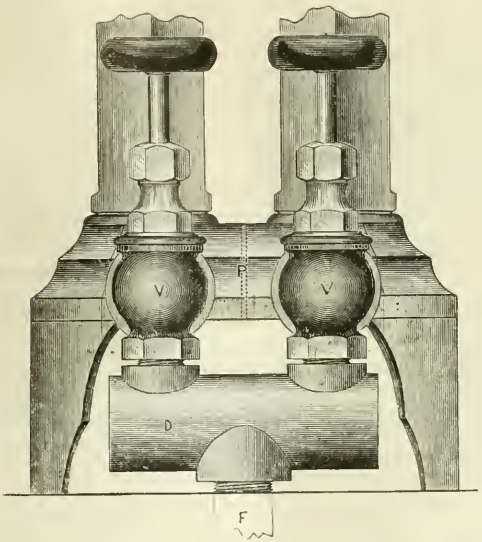
this space forms the passageway for the heated products from the furnace to the flues of the boiler. There is, however, some brick work built in this space with the object of guiding the heated gases in the directions they are intended to go. In this space between the boiler end and the wall at the back is firstly built a fire-brick bridge, as shown in Fig. 75, extending about half way up the back of the boiler; and as marked in Fig. 77, which shows the fixing work in plan, say 6 inches above the level of the fire bars. The object of this "bridge" is, 1, to prevent the fuel working from the fire box into the flues; and, 2, to check the too free escape of the heated gases, &c. As mentioned, this bridge extends as nearly as possible half way up, as shown in Fig. 75, and also in the sectional elevation to be shown directly. With small boiler, a thick fire-brick slab is used for this purpose, but the space at back should be tolerably roomy; no harm will result, as would happen if we made the other flues too wide. The action or direction of the flame at this point is to hug the boiler, to cling to it, we may say. This last illustration shows the two box soot-doors that have to be provided for cleaning the lower parts of the flues; another soot door is provided over the top of the boiler in front.

At a point outside the boiler, a little above where it commences to describe a circle, two mid-feathers have to be provided, one on each side, as Fig. 78; they are marked "brick." The object of these feathers is to divide the flueway round the boiler into three; they extend from the extreme back to within about 5 inches to 7 inches of the front of the boiler, as shown in dotted lines in the first illustration. From the last drawing just shown it will also be seen that their position is a few inches above the brick bridge, or, in other words, there is a clear way for flame and heat to pass over the brick bridge and into the flues each side of the boiler underneath the feathers. This is shown by arrows on both Figs. 75 and 77. After the flames have traversed the length of these flues to the front, they enter the top flue together, there being provision made for this by terminating the feathers some inches short of the front of the boiler, as shown in dotted lines at Fig. 75.

They then pass along the top of the boiler from front to back, and into the chimney at the rear. It is supposed that with a low chimney and low draft the heated products have lost most of their heat after having made this journey.

To make the explanation as clear as possible, we have spoken of the flame and gases finding their way through these flues; of course it is understood they are impelled or carried by the draft induced in the chimney.

This last drawing is in section and elevation across the front ends of the furnace bars, and it will be noticed that the brick work forming the bottom of the flues is also exactly level with the fire bars and the rest of what may be called the base. The side flues are, as a rule, say 4 inches for boilers up to 3 feet 6 inches in length, and 4½ inches up to 5 feet, and 5 inches up to 7 feet. This is large enough, as we must always remember that flame and heated gases and products heat by contact only; that is, they must actually impinge against or touch an object, to heat it effectually.



End View of Bundy Improved Duplex Radiator Base.

It may be as well to explain the customary way of making the arched flue way over the boiler, this method requiring no wood work supports and suiting all sizes alike. After building up the brick work at the sides to the point where the boiler begins to arch over, dry ashes are obtained and laid over the top to a thickness that agrees with the size of the flue required. The brick work is then carried over, resting upon this bed of ashes, and when it is set the ashes are raked out.

The final point to be mentioned is the second bridge, which is carried over, extending from mid-feather to mid-feather each side, and above the other bridge at back. This bridge is seen in the first illustration. It is introduced to prevent the flame taking a short passage up at the back of the boiler into the chimney, which will probably exist just there. Some make this bridge by carrying an iron bar from side to side about 5 inches or 6 inches above the lower bridge and building brick work on this to the required shape and extent. This is not a good plan, for, unless the bar be a piece of small stout girder iron, it will contort or sag down and cause very bad results. It is best to arrange to throw an arch over from feather to feather.

Fig. 79 shows the boiler complete, the boiler itself being out of sight, of course. Boilers can be had with waterway mid-feathers if desired; also the lower bridge at the back can be formed in the boiler with a waterway through it, and when the boiler is arranged to be fed through the top, by a proper feed-hole provided, it can also have a waterway front. The fixing of the saddle boiler has been dwelt upon rather fully, but it is a necessary information and goes far toward making a man competent to fix almost any other boiler.

Bundy Improved Duplex Radiator Base.

The accompanying illustration represents an end view of the Bundy Improved Duplex Radiator Base made by the A. A. Griffing Iron Company, Jersey City, N. J. This attachment is designed with a view to making an ordinary Bundy two-row radiator equivalent to three distinct sizes, by offering means of regulating the heat. The partition P divides the base into separate compartments, regulated and controlled by the valves V. The header D is used for convenience and economy in connecting up, as it saves pipe and fitting and cutting of the floor. To secure the necessary room for the header the high-leg Bundy base has to be used in which the center of tapping for any size of hole is 4½ inches from the floor, and thus allows ample space for cleaning out under the radiator and for free circulation of air. The manufacturers claim that in the point of economy, the Duplex Base saves in fuel alone many times its additional cost in a few weeks, and they also refer to its efficacy in preventing the overheating of apartments. The base, which is adapted to either steam or hot water Bundy radiators, can be used with either one or two pipe systems. With two pipes, two headers and four valves are required to each radiator, while with the one-pipe system, one header and two valves only are needed. By means of the division in the radiator the heat can be regulated so that in very moderate weather the valve supplying the rear row of loops is opened; in fairly cold weather the steam or hot water is turned on the front row of loops, the rear ones remaining idle, while in extremely cold weather both valves are opened and the entire radiator brought into use.

Stopping Leaks in Steam Pipes.

From I. R., *Norwich, N. Y.*—How can a small leak be stopped in steam and hot water pipes without taking out and putting in a new fitting?

Answer.—Our correspondent's query is broad. In order to answer it we will have to assume different interpretations. In the first place, it can be inferred that the leak is in the pipe and not in the fitting. The next inference is that on account of the smallness of the leak it is desired to remove the portion of the pipe in which the leak exists without being compelled to use a new fitting. If the leak is at the weld of the pipe the best thing to do is to remove the "split" piece of pipe and replace it with a sound piece. To do this the piping will have to be removed from the point at which there is a flange union or left and right threaded fitting and by doing so, if all the fittings are sound, they can be used again, thus saving a new fitting. In prac-

tice the time occupied in doing this is a great deal more valuable than one or two new fittings. It is therefore not unusual to break one fitting on the defective part of the pipe and replace it by a new fitting and use a flange union or right and left threaded coupling to finish up the connection.

If the small leak exists between the thread on the pipe and the thread on the fitting, and the pipe has been well screwed into the fitting, if no red lead or paint has been used it will generally "make up" in a few days. Should a small leak between pipe and fitting show no sign of diminishing, it can be stopped by using white lead at the leaking point with some twine wound tightly round the pipe against the threads on the pipe and against the face of the fitting. By this means the leak can be stopped, as the white lead is forced between the threads and into the cavities. When the white lead has become hard the twine winding can be removed, and the appearance of the joint will be like any of those which have been properly screwed together. This remedy is only practical when the leak is small. Another remedy for small leaks is the use of sal-ammoniac, but its use should be rather avoided than advised, and it certainly should not be used where a pipe leaks on account of a flaw in the weld. A pipe with an imperfect weld should not be used. In screwing pipe threads into fittings care should be taken that each thread is clean, and a little oil only should be applied, and the use of red lead and such other cements should be dispensed with.

HEATING NOTES.

From a letter recently received from the J. F. Pease Furnace Company, Syracuse, N. Y., we learn that the sales of their Economy air-combination and hot-water heaters show an increase of some 30 per cent.; also that their Economy steam and air combination heaters are selling in larger numbers than ever before. Their works have been running since summer until 10 o'clock at night, and even now they are running overtime to keep up with their orders. Among recent shipments was one of a steam and air combination heater to Japan for a missionary building. George D. Hoffman, who handles the Economy heaters in Chicago, has also made a contract with the official representative of the Emperor of Japan for heating the administration buildings on the World's Fair grounds with an Economy hot-water heater.

The Exeter Machine Works, 32 Oliver street, Boston, favor us with a handsome calendar, which is bare of advertising matter, excepting that which is covered by the monthly sheets. For ornamentation it has in the center a group of three very attractive-looking children, flanked on either side by four of this concern's well known radiators. Under this display are the words, "seven Exeter babies."

The Raymond & Campbell Mfg. Company, Middletown, Pa., issue a very pretty illustrated circular relating to the Lindemuth Sun steam and hot-water heaters of their manufacture. The circular, bound in dark reddish-brown leatherette, contains a very careful description of the Sun apparatus, with numerous cuts showing general and sectional views of the heaters. Tables of dimensions and prices are also presented, and a little card that accompanies the circular announces that they furnish their customers with a full line of printed matter, also their improved specification or contract agreement, which, they say, is printed with copying ink, and is a convenient article.

The Holland Radiator & Mfg. Company, Chicago, Ill., issue a notice under date of January 15 that they have removed to 89 Lake street. They also mention that A. H. Fitz, formerly Northwestern manager for the American Radiator Company at Minneapolis, has associated himself with the concern, and in the future will manage the financial affairs of the company.

The American Radiator Company, 111 and 113 Lake street, Chicago, have rented part of the commodious building occupied by the Bogue Lead Company, 1810 Blake street, Denver, Col. A full line of sample radiators will be on exhibition and sufficient stock carried for the filling of orders. The new establishment will be in charge of T. Guy Haywood.

The L. H. Prentice Company, steam and hot-water heating and ventilating engineers, 203 and 205 Van Buren street, Chicago, enumerate the following recent contracts in Chicago and vicinity: Power, heating and mechanical ventilating apparatus for the new Chicago club building. Have just completed the heating of Cobb Hall, Divinity Dormitory, University of Chicago, and are now engaged in heating Kent Chemical Hall, Snell Hall and Walker Museum for the same university. Are about to equip Burley & Co.'s new store, 145 and 147 State street, with a power and heating plant. Among other large plants may be mentioned the Victoria Hotel, Chicago Heights; Augustana Hospital, the New Briggs House, Newberry Library, Boyce office building, Washington Park club house, James Ingram Hotel, Mayer estate building, Kuh, Nathan & Fischer building, Barry Bros.' Hotel, D. W. Irwin building, Huck & Young office building and Lexington Hotel; for the Chicago & Northwestern Railroad, power plant, depot, emigrant building and office building in Chicago; also depots at Rockford, Ill.; Fond du Lac, Wis.; De Kalb, Ill., and Council Bluffs, Iowa. Also outside the city the University of Wisconsin, Madison, Wis.; F. S. Hodge building, Duluth, Minn.; the Casino Club, Edgwater, Ill.; Highland Park club house, Highland Park, Ill., and Milwaukee street railway power plant, Milwaukee, Wis. Also a number of prominent dwellings in Chicago, among which may be mentioned those of R. W. Patterson, Jr., H. A. Blair, John Clay, Jr., E. C. Potter, Gen. A. C. McClurg, and Prof. Lawrence Laughlin.

The Hardware Club of New York.

Arrangements are being actively made for the dinner of the Hardware and Metal trades, to be held on Tuesday evening, February 21, as announced in the following official circular, which has been sent out to the members of the club:

FIFTH DINNER
OF THE
HARDWARE AND METAL TRADES.

RECEPTION, 6 TO 7 O'CLOCK; DINNER, 7 O'CLOCK.

The fifth dinner of the Hardware and Metal Trades will be held under the auspices of the Hardware Club of New York, in the Banquet Hall of the Manhattan Athletic Club, Madison avenue and Forty-fifth street, on Tuesday evening, February 21.

Tickets, $5 each (wines a la carte), can be had from A. D. Clinch of Underhill, Clinch & Co., 94 Chambers street.

We are under obligations to the officers of the Manhattan Club for the courtesy of extending to our guests the privilege of inspecting their magnificent building in all its departments during the evening.

The demand for tickets for the dinner of 1892 exceeded the supply, and it is hoped that applications for tickets this year will be sent in early, as the issue will be limited, so as not to exceed the comfortable seating capacity of the hall.

The opportunity of securing tickets is first offered to the members of the Hardware Club, and we shall esteem it a favor if you will kindly advise us by January 25 the number of tickets you desire.

Dinner Committee:

Alfred D. Clinch, *Chairman*,
Peter McCartee.
John L. Varick.
Edward C. Van Glahn.
Eugene Bissell.

It is expected that there will be at the dinner a large representation of the trade from within as well as outside the city who have not as yet formally consummated their membership in the club, but, as announced above, tickets are first offered to the members. It will be well for any who are desirous of being present at the dinner, whether at present members of the club or not, to send in their applications early. The following additional persons have recently joined the club:

David Homer Bates,
The Bradstreet Company,
New York.

Jared Chittenden,
The Bradstreet Company,
New York.

Charles F. Clark,
President The Bradstreet Company,
New York.

Brent Good,
57 Murray street, New York.

O. D. Gray,
The Gast Lithograph and Engraving Co.,
New York.

Chas. S. Houghtaling,
3 Park place, New York.

John Oliver,
The Bradstreet Company,
New York.

Ralph H. Plumb,
Plumb, Burdict & Barnard,
Buffalo, N. Y.

Thomas H. Spaulding,
Jersey City, N. J.

William K. Stansbury,
Eagle File Company,
Middletown, N. Y.

T. M. Cox having acquired the interest of E. and W. W. Dilworth in the Hardware, Stove and Implement firm of E. Dilworth & Co., Vermont, Ill., will with his brother, E. G. Cox, continue the business under the firm name of T. M. Cox & Bro.

THE LETTER BOX.

A Good Suggestion.

From A. R., *Pennsylvania.*—I regret that I do not see any more letters from some of the old-time tinners. Can they not be induced to contribute a letter to the apprentice boys or for their benefit and tell them how to do and how not to do work, and also to impress upon their minds the importance of becoming good, neat and speedy workmen? Let us hear from both the old and the young boys.

Note.—We hope this appeal will not be lost upon the large fraternity of old-time tinners, who could amuse and instruct one another and the younger generation by making free use of our columns. The ways and customs of the old tinners are fast passing out of use, and machinery is doing much to change their trade. But for all that, the recollections of the old-timers would not be the less entertaining. We know that many an old tinner has resolved to write us some story of his early days, and we are sure that some of them have got as far as getting out pen and paper. This time, with the new year, we hope they will go a little further and write the letter and send it to us.

Tinners' Trade Secrets.

From H. J., *Chicago.*—It is indeed jocose, but nevertheless a fact, that there still exists a certain class of tinners, who in my opinion come under the head of fanatics, who still consider that any information they may impart to another of the fraternity is not in keeping with good sense, and only do so under the principle of the man who married the girl to get rid of her. I had a little experience last week which brought back reminiscences as to the closeness of a few of these sheet-metal working cranks one comes in contact with every once in awhile.

Invariably these communicative (?) gentlemen (?), who consider their store of knowledge unbounded, take great umbrage if an artisan who is perhaps less informed asks them as to the manner of procedure of a certain job or the correct method to obtain a certain pattern. Of these I would respectfully inquire whether they are not laboring under an hallucination? I think on mature reflection they will have to admit that they are, also that they palpably see the fallacy of their ways. Not being puffed up with my own egotism and admitting that there were others who were better informed, I asked a supposed friend how a certain culinary article was made, and if he would be kind enough to send me a pattern for the same. Nine months elapsed and I still received no reply, so concluded my request had escaped his vigilence in some unaccountable way, and that his dilinquency was purely inadvertent, as he being a supposed friend, a deacon in a church, &c., I never imagined he would have the discourtesy not to reply at least, as not replying to a letter is equivalent to not answering when spoken to, so I wrote him again inclosing sketches elucidating my requirements, now eight months since. Being somewhat despaired in the intervening period, I continually wrote a friend living in his vicinity, I fearing he had succumbed to the inevitable, to which he invariably replied that my fraternal and personal friend told him laconically that "he had me down on his *agenda* paper," but when my name would be eliminated from said document my friend considered it hard to say. Such pertinacity is indeed worthier a better cause. Alas, will the spirit ever move him?

I cite this one instance, as I have had several like experiences, merely as an example, and to exhibit how a certain class consider all they know (which is indeed stupendous) to be trade secrets, and would never divulge anything to a fellow workingman for reasons best known to themselves. But these self-same people are usually the very class who are adepts at asking questions and seeking information, thus adding to their already overflowing store of knowledge. While I do not believe in a person carrying, metaphorically speaking, all he knows on his shirt sleeve, I think when one of his fellow artisans asks a question and it be one that he is competent to answer, he should (leaving friendship and perhaps indebtedness out of the question), if only for the advancement and betterment of his craft, answer him to the best of his ability.

Duty on Tin Plates.

From S. B., *Kingston, S. C.*— We tinners down here are under the impression that the duty has been taken off from tin plates. If so, when did the law go into effect?

Answer.—Our correspondent and his friends in the part of the country from which he writes are laboring under a decidedly wrong impression, for to the best of our knowledge and belief the duty is what it has been since the passage of the last tariff bill. It is $2\frac{2}{10}$ cents a pound, and there is no law enacted to alter it from that figure. What will happen under the new administration is uncertain, but what has happened up to date has not affected the tariff on tin plates.

Galvanized Sheet Iron.

From S. E. B., *Englewood, Ill.* — Will you please inform me how many years galvanized iron has been made? Also, what is the difference between "Juniata" and "Apollo," other than the trade-mark?

Answer.—The process of coating iron saucepans with zinc is known to have been in use in France as far back as 1786. The first patent for galvanizing iron sheets was, however, taken out in England in 1837, by H. W. Craufurd; and another for zincing of iron, which had been previously tinned, was obtained four years later by E. Morewood—also in England. We believe the pioneer in the manufacture of galvanized sheet iron in this country was the late Delaplaine McDaniel of the McCullough Iron Company. The material was first made at the company's mills in Maryland in 1852. Galvanized sheets are now almost invariably made of steel. Both the brands named above are of that material, and their quality, like that of all B. B. steel sheets, is pretty nearly identical.

Trouble With a Hydraulic Ram.

From C. L., *New Haven, Conn.*—Please advise me in the following case: There is a hydraulic ram which works intermittently now, although in use for several years. That is, the supply of water, fall and delivery have been tested. The ram has a new air chamber and flow valve. The feed and discharge and service pipes are apparently clear from obstacles, and the outside valve when raised by the flow often remains up, but if pressed down to its seat will work for varying lengths of time. The ram has been tried since getting new pieces as above in all ways—that is, with a full head or minimum; all the joints made tight and the valves put in order, or so reported, and being new from the factory they probably are in good order. A late discovery is that the drive pipe is leaky near the ram and possibly in other places. There seems to be no lack of water from it. Under these circumstances should the failure to work follow from a leak in the drive pipe or from a fault in the ram?

Note.—A leak in the drive pipe will, undoubtedly, diminish the effects of the ram, since the action of this apparatus depends upon the momentum of the water when suddenly checked, and if the water can find an escape through a leak in the drive pipe it will not compress the air in the chamber as much as it would otherwise. And it is the compression of air in the air chamber that acts as a spring to push the water up from the discharge of the ram. Whether this leak in the drive pipe will account for the peculiar action of the ram in the case described by our correspondent is, however, another matter, and without inspection of the premises and careful inquiry into all the circumstances, we would hesitate to ascribe it to this cause. From those of our readers who have had experience in ram setting and repairing we would like to hear what their opinion is in this case.

To Find the Circumference of Circle.

From C. E. S., *New Haven, Conn.*—Please give me a simple rule for finding the exact circumference of a vessel from the diameter. I am quite sure that many of your readers do not know how to find the circumference, and I know the information would be useful.

Answer.—The common and most exact rule for finding the circumference of a vessel, knowing its diameter, is to multiply the diameter by 3.1416. For quick work the fraction $\frac{22}{7}$ is used for the multiplier. The circumference of a circle is about $3\frac{1}{7}$

times its diameter, but the relation between the length of the circumference and the length of the diameter is not an even fraction or decimal and can never be told with absolute accuracy. For all practical purposes, however, either of the rules above given is satisfactory.

Problems from the Country.

In a recent issue of *The Metal Worker* we printed a communication from "P. H.," New Madrid, Mo., giving a solution of the apple problem, and he added a note mentioning that he had sent in several communications before, consisting of a solution, a withdrawal and a second solution. The latter was published, but that it was not correct, either through an error of ours or our correspondent, is very amusingly told in the following, which we have just received. The rythmical allusion to the figure 3 is the 3 of the 30 in the second line, which should have read 20:

And still, to my surprise and terror,
I, after all, behold an error;
For there appears the figure three
Just where the figure two should be.
The error does exist. However,
To place it I will not endeavor.
It may be mine; it may be yours—
Readers will think it mine. Of course
If I said thirty, I meant twenty:
But surely now there has been plenty
Of time and stationery spent,
Of postage, too, just for one cent.

From S. W. M., *Ness City, Kan.* — In answer to the problem of "D. C. L.," which appeared in *The Metal Worker* of December 3, I would say he lost the 1 cent by selling more of the inferior kind of apple. My explanation is this: By bunching the apples 3 of 1 kind and 2 of another, or 5 apples for 2 cents, you will pay as many times 2 cents as 5 is contained in 60, which is 12 times, or 24 cents, 12 cents' worth of each kind. Since you get 3 for 1 cent, for 12 cents you get as many apples as 12 times 3, or 36 apples (of the inferior kind), and at 2 for 1 cent, 12 cents will buy 12 times 2, or 24 apples. Hence you will sell 36 apples of the inferior kind and 24 of the better quality.

Material for Gutters.

From J. L. F., *Memphis, Tenn.*—In answer to "W. D. M.," Sunbury, Pa., I would recommend him to try aluminum alloy, which has very little expansion and contraction, lies like lead and I believe is as durable as copper for ordinary purposes.

From H. A. G., *Grand Rapids, Mich.*—Replying to your correspondent, "W. D. M.," of Sunbury, Pa., whose letter appeared in *The Metal Worker*, January 7, I would advise him to get old-style roofing tin 8 feet long and 20 or 28 inches wide, or whatever width will suit best. Clean out the gutter and dry it thoroughly. Lock the tin well and solder well, using rosin, not being afraid to use the solder, but letting it soak in thoroughly. Take care not to bruise the tin, and after it is laid give two coats of paint, and before the last one dries give a coat of sand. Do not use ready mixed or so called iron ore paints, but take boiled oil and red lead. Before using the paint go over the tin with benzine or gasoline with a brush, the same as with a coat of paint. If your correspondent will follow these directions I think he will have no more trouble.

From D. L., *Memphis, Tenn.*—In answer to W. D. M. of Sunbury, Pa., I would say that my experience tells me that XX bright tin is not the best for gutters, as the expansion is greater and the cross seams are liable to break. IX tin is heavy enough and will give satisfaction provided the proper material is selected. Bright tin is best for gutters, but an extra coated plate should be used such as can be procured from any dealer in tin plates. A 6-pound iron should be employed in soldering the seams, not too hot, but hot enough to allow the solder to flow easily and soak into the seam. As much care is required in putting the gutter in as in choosing the proper material. The tin should be painted underneath and heavy building paper placed in the bed of the gutter. Always avoid driving nails in the tin of which the roof is made. Strip on the outside and lock to the strips, then finish by seaming against the face of the eave. Should a tin roof be on the building, edge and cleat the edge and lock the roof on. Cross seams in bright tin when well soldered hold better than in leaded tin. Nailing the eaves or inner side of the gutter offers a resistance to contraction and expansion so that buckling and breaks occur. Painting and laying paper underneath is the best method for preserving the gutter, as in most cases rust takes it from the under side. Attention should also be paid to the length of the gutter, which should not exceed 35 feet from the starting point. Should a building be so constructed as to require a long run it should be divided up and a down pipe placed (in a run of 70 feet two pipes should be placed). At the rise it should be so arranged that a standing seam should be made so as to stand 2 inches in hight. This will prevent breaking of cross seams.

Comparative Radiating Power of Black Sheet Iron and Galvanized Iron.

From F. J. S., *Washington, D. C.*— Please answer in *The Metal Worker* what the difference is, if any, in the radiating qualities of sheet-iron pipe of black and of galvanized iron. All other things being equal, some practical men here say that there is a difference of 10, 25 and even 60 per cent. between the two materials. It is my opinion that the matter can only be decided by scientific test and is not merely a matter of opinion.

Answer.—Certainly facts cannot be mere matter of opinion, and it is facts this correspondent seeks.

In the first place, the books give the radiating power of black sheet iron as 0.092 of a heat unit per hour for 1° of temperature difference between the radiating surface and the surrounding air and objects when the temperatures of the radiating and receiving surfaces are low. For polished zinc the radiating power is given for low temperatures as 0.04906 heat unit for each degree of temperature difference. Comparing these figures, we find the radiating power of polished zinc is 0.04294 heat unit less than that of the black sheet iron, and this difference is found to be very nearly 47 per cent. of the radiating power of the iron.

It might be supposed that galvanized iron, having a surface of zinc, would have the same radiating quality as that of polished zinc, but this would be a rash conclusion, because the surface is far from being polished. In fact it is not nearly as smooth as the surface of some black sheet iron. Any one who has seen galvanized iron has noticed the crystalline appearance of the surface. Below this surface at no great depth the zinc becomes alloyed with the iron.

It is probable that in the discussion referred to in the query the total loss of heat by galvanized iron pipes and black sheet iron pipes, both by contact of air circulating over them and by radiation proper, are included in the term "radiation," this being a common way among practical men of speaking of the passage of heat from a heated interior surface to exterior objects; and it is possible that the different values assigned by the disputants have been named, some for this total transfer of heat and others for the action of radiation pure and simple, which latter is, strictly speaking, independent of transfer of heat by contact of air. Both the loss by contact of air and by radiation proper are increased when the temperature of the surface giving off heat is elevated, as in steam coils, furnace radiators, &c., and if we could be certain that galvanized iron had the same radiating power as ordinary rolled zinc, we might compute very nearly its radiating power at the higher temperatures. Such an assumption would, however, be mere guess work.

Some years ago private experiments were made to determine the conducting power of galvanized iron of several thicknesses, such as are used in heating work, and also the radiating power. The experiments were performed in too rude a manner to be useful for rigid scientific work, but they gave figures that are probably sufficiently reliable for use in the practical work of heating buildings.

The conducting power of galvanized iron does not vary inversely as the thickness, as is the law for sheets, &c., made of a single homogeneous metal. If a sheet of this galvanized iron be cut across and closely examined it will be found to be an alloy of iron and zinc to a considerable depth on both sides, and the probability is that the zinc penetrates in a greater or less degree to the very center of thin plates; that is to say, plates of No. 22 Am. W. G. in thickness or less.

The tests referred to were on several thicknesses of sheets including Nos. 22, 20, 18 and 10 Am. W. G.

The black iron sheets and the galvanized sheets were made into tubes 3 inches outside diameter, and of a length that gave 2 square feet of surface. The work was done as well as available workmen could do it, but undoubtedly there were some small inaccuracies. The tubes were closed by soldering brass caps into the ends, these caps being tapped and threaded in the middle for the connection of ¾-inch inlet and outlet pipes. In testing the pipes some were placed in a vertical position in a room kept at 70° F., and so that all the water could be drained out of the pipes as fast as it condensed from the steam admitted to them. The water was taken out by a trap. The water thus condensed was taken as the measure of the heat transmitted and transferred to the surrounding air and surrounding objects. Steam was taken from a power boiler and reduced by a pressure reducer to 2 pounds per square inch as nearly as could be measured by a mercury gauge. A receptacle for separating and receiving any

water that might otherwise pass with the steam into the tubes was provided and kept well drained. Just before entering the top of the pipes the steam was superheated about 2°, to insure its freedom from any entrained water; the superheater being a coil of pipe immersed in a bath of a saline solution (acetate of soda) by which, when heated by a gas burner, a very even temperature could be maintained and applied to heating the coil. A saturated solution of this salt boils at about 256° F.; but to obtain the desired superheating, a temperature much below its boiling point was entirely sufficient. In this arrangement, therefore, the temperature of the steam admitted to the pipes to be tested was, as nearly as it was possible to regulate it, kept at 218° F., being superheated 2° F. The amounts of water condensed by pipes of each thickness varied very little. The following results are transcribed from a record of these tests:

Amount of Heat Transmitted by Pipes of Black Sheet Iron and of Galvanized Iron, per Square Foot per Hour, for a Difference of 1° F., the Pipes being Heated to 218° F. inside and the Surrounding Outside Temperature being 70° F.

Thicknesses American wire gauge.	Heat units per hour per 1° of difference for black sheet.	Heat units per hour for 1° of difference for galvanized iron.	Percentages in favor of the black sheet.
			Per cent.
No. 22	1.1349	1.0782	5
No. 20	1.2234	1.0887	13 3/100
No. 18	1.1612	1.0673	8 8/100
No. 10	1.1011	1.0593	3 79/100
Averages	1.15665	1.0684	7 49/100

The figures given for each thickness are the mean of four different tests each of one hour's duration. For some reason the No. 20 black sheet iron transmitted more heat than the thinner iron. Its surface, however, may have been in a state to radiate heat more freely than any of the other sheets. This supposition is the more plausible, as the fact is well recognized that a slight difference in smoothness affects radiation proper from metal surfaces very sensibly.

The results given are thought to afford a sufficiently near approximation to the average difference in heat-transferring power of these materials for most practical purposes.

Painting Conductor Pipe.

From G. R. C., *Mansfield., Pa.*—As we have a great deal of conductor spouting to be painted on the inside, I would like to hear, through *The Metal Worker*, the experience of tinners who have to do this kind of work. Our way has been to tie a cloth on the end of a wire and swab out the pipe; but this is a very slow and dirty way of painting it.

A Horse Trade.

From S. W. M., *Ness City, Mo.*—How much will I make in the transaction, if I sell my horse for $90, buy him back for $80, and sell him again for $100.

The Apprentice in the Country.

From J. H., *Bridgewater, Mass.*—Our business has changed very much during the last 10 or 15 years. Formerly we made all the tinware we sold and bought castings and made parlor stoves for the fall trade, and this with the pump trade and tin roofing gave us work enough, with a chance to teach a boy a trade. Now we do the plumbing and sheet-metal work usually done in a country tin shop and iron pipe work as well. We need a boy in the shop but cannot teach one the business in three years, and they are unwilling to serve more than that. *I* can see how a young man can learn to wipe a joint and receive technical instruction in the principles of the plumbing trade, and also learn how to do certain kinds of sheet-metal work by attending a trade school, but how he can get enough practical knowledge of the work necessary to succeed in a country cornice shop I fail to see. The tendency of the times is for each one to learn only one part of a trade and stick to that alone, but that won't work in a country shop. We are expected to do first class plumbing and fitting, and if a man wants a good and workmanlike job of hot-water work or a furnace job, we must do that to his satisfaction or lose a good customer; and if we happen to break the plaster or displace a few bricks, we must make it all right. It seems to us it will be necessary for the country shop to take the boys and teach them country work, and if any of the readers of *The Metal Worker* can tell us how to make things profitable to the boys, as well as ourselves, we would be greatly obliged.

Weekly Prize Competitions.

$25.00.

FOR MORE than six months Weekly Prize Competitions ($10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of $12.50, a second prize of $7.50 and a third prize of $5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. These competitions are open to every one, and it is hoped that there will be a general response from business men. Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers to the different questions will be favorably regarded as meeting the purpose for which these competitions are announced. We shall have the privilege of publishing any or all of the contributions received.

Weekly Prize Competition No. 2.

SUBJECT:

How to Keep the Store Neat and Clean.

This competition, which relates to a matter of no little practical importance in the conduct of business, is intended to call out an explanation of desirable methods, and touches upon such points as the following:

The advantages of keeping the store neat and clean;

Difficulties in doing this;

How to sweep and dust, with suggestions in regard to sprinkling, disposition of sweepings, &c.;

Clearing counters and ledge of accumulated stock;

How to avoid the accumulation of odd goods where they do not belong;

The care of show windows;

Methods of receiving and unpacking goods;

Care of goods awaiting arrival of invoice;

The disposition of goods to be called for.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

Replies are to be received not later than February 11, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Weekly Prize Competition No. 2.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 1. Closing February 4.
How to Avoid the Accumulation of Dead Stock.

No. 2. Closing February 11.
How to Keep the Store Neat and Clean.

Another subject will be announced in our next issue.

Our readers are also reminded of the following Prize Competitions, announced on another page, in each of which four prizes, of $50, $25, $15 and $10, are awarded:

No. 6. Closing February 18.
How Retailers Can Best Advertise and Extend Their Business.

No. 7. Closing February 18.
Travelers' Yarns.

No. 8. Closing February 18.
How to Treat Clerks.

No. 9. Closing February 18.
Shop System of Keeping Track of Jobs.

No. 10. Closing February 18.
Business Maxims—At Least 10.

No. 11. Closing February 18.
How Small Retailers May Keep a Record of Prices.

PLUMBING AND GAS FITTING.

Testing Plumbing.

From D. M., *Watertown, N. Y.*—Will you kindly give us the method usually employed in testing old plumbing work to ascertain its condition and safety from sewer gas? There are some school building in this city in a suspicious condition and the Board of Health are thinking of ordering a thorough examination.

Answer.—The test usually employed to ascertain the condition of old plumbing work in this country is the peppermint test, although in some places, under certain circumstances, what is known as the smoke test is applied. This latter test, which consists of forcing heavily charged smoke through the pipes, requires an appliance specially adapted for the purpose, known as an "asphyxiator," but it is not generally available and the method consequently is not much in vogue, the peppermint test being accepted as the one most desirable and consequently most generally adopted. To secure the best results in its application it is necessary that the vertical soil and waste pipes should be open at or extend above the roof. In many localities these pipes do not extend above the highest fixture, but whether the plumbing system in use in Watertown has to contend with this serious drawback or not we are not informed. Supposing that the roof opening exists, in order to make the test it is necessary that two persons be engaged in the work—one to do the "roof act" and the other to exercise his olefactory nerves within the building.

The method is as follows: The man on the roof supplies himself with a pail of hot water, a bottle of oil of peppermint and some cloths to cover the mouth of the pipe. The scuttle or other openings to the roof and all the doors and windows opening to the outer air are to be closed so as to prevent any of the odor from the roof wafting into the building and vitiating the test, and the traps to all of the fixtures are to be left undisturbed during the application. The roof operator first pours some hot water into the soil or waste pipe opening, next he empties about 2 ounces of oil of peppermint into the pipe, next he pours in the remainder of the hot water, and then closes the mouth of the pipes with the cloths so as to prevent the escape of any of the pungent odor. The man inside is meanwhile awaiting developments, and when the peppermint begins to make itself felt, if the plumbing is in bad order, he will readily detect it and be able to locate the exact spot where the defect exists, by the odor emitted, as he goes from room to room. If there should be an open joint or a defective pipe through the house there will be no difficulty in finding it out, and the proper remedy can then be readily applied. It should be borne in mind that the peppermint odor may be present, although there may be no defect in the joints or the pipes, and if so it may be set down either to the fact that the traps have syphoned out for want of trap ventilation, or that the pipes are run with so little judgment as to create what is known in the sanitary world as "by-passes." If syphonage is proven to be the cause no time should be lost in venting the traps, and the same promptness is necessary where a defective arrangement of the pipes leads to the same result. It is well to add that if the soil and waste pipe do not open to the roof the peppermint for testing should be poured in at the highest fixture on the line of pipe, the door of the room in which such fixture is located to be kept closed during the operation.

Plumbing Regulations.

The preparations which are being made throughout the State to carry into practice the provisions of the act passed last year by the Legislature at Albany and signed by the Governor known as Chap. 620 of the Laws of 1892, in relation to the regulation of plumbing and the licensing of plumbers in the different cities, has developed a spirit of inquiry into the merits of the materials to be used and how to use them which is encouraging to the advocates of sanitary progress and good plumbing.

The questions cover a wide range in relation to plumbing work and its requirements. As is usual in such cases, there is in many instances a considerable amount of triviality, but in the main the desire to obtain serviceable information is readily discernible.

The soil, waste and cellar drain pipe system appear to be the thought which is uppermost in the heads of those who will be prime movers in the contemplated reform. The material to be used and the method of testing to be observed claim first attention, and we give a few brief points which should be sufficient for all practical purposes.

The plumbing code should provide the following in every case: The vertical lines of pipe—soil, waste and vent—should all extend above the roof and be open at top. What is known as extra heavy cast iron should be used invariably, and the pipes when set up should be tested either by means of air or water pressure—the former the most reliable, while the latter is the most satisfactory in many respects.

In no case should earthen pipe be used inside the walls of the building. It may be set outside for drainage purposes, and the connection with the iron cellar drain pipe be made with good Portland cement. The running trap and fresh air inlet should not be omitted in any case.

Rain water leaders should in no instance be used as soil pipes. If within the building they should be of cast iron with the joints well calked with oakum and lead. The cellar drain should be laid so as to secure a good descent of not less than ¼ inch to the foot.

These answers cover the extent of inquiries made and should suffice for all of our readers interested in the subject.

Why the Water Back Exploded.

From J. P. S., *Burlington, N. J.*—Inclosed you will please find clipping from a Philadelphia paper referring to a range explosion which took place here a few days ago. As the cause assigned does not seem to me to be a legitimate one, I would ask *The Metal Worker* to throw some light on what could have led to the accident, and how it could happen that the boiler became empty and red hot with the consequences as stated. How can such happenings be avoided?

Answer.—The account furnished by our correspondent states that "the explosion was due to water freezing in the supply pipe, causing the boiler to empty and to become red hot; and that when the water was released and rushed into the boiler the explosion ensued."

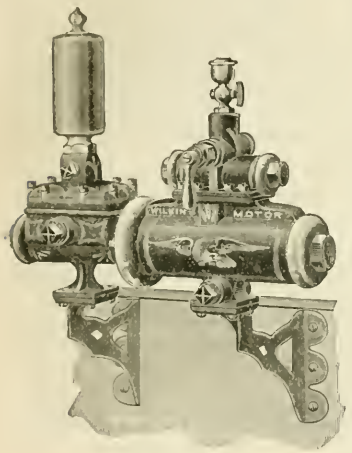
This is not correct. In the first place, the word "boiler" is erroneously substituted for "range water back," as understood in the trade; and in the second place, neither water back nor boiler could be emptied by the stoppage of the supply pipe. The cause of the bursting was the increased pressure to which the imprisoned water in the range water back became subject while waiting for the necessary pressure to force it into the boiler. It is to be supposed that the fire was allowed to run down and that the cold air during the night circulating through the kitchen and passing through the grate bars converted the water in the water back and in the supply pipe into ice. The first effect of the fire in the morning was to reduce the ice in the water back to water, which gradually became heated until it reached 212° F. Up to this (the boiling point) there was no actual danger, but when no circulation was possible because of the frozen supply pipe the longer the hot water was exposed to the heat the greater was the pressure in the water back, and it was only a question of time how long it would stand it. The collapse came when the pressure exceeded the resisting power of the water back. If the coupling of the hot-water circulating pipe with range had been unscrewed so as to permit the steam to escape and only a small fire kindled until the supply pipe had been thawed out and the circulation restored the accident would in all probability have been avoided.

As a preventive of range explosions nothing is so effective as a proper circulation. It is to the stoppage of circulation by frost that the Burlington accident may be attributed, and as other causes of stoppage are at times likely to occur, it is important that any tendency in that direc-

tion should have prompt attention. As conducive to that end it is considered advisable by practical men that in connecting the boiler and the water back the hot water or upper pipe should be somewhat larger than the cold water or lower pipe. By that means there is a better circulation secured than when, as in the majority of instances, both are of the same size.

The Wilkins Motor Pump.

The Columbus Closet Company, Columbus, Ohio, manufacture the Wilkins Motor Pump or Hydraulic Water Lifter, a general view of which is shown in the accompanying illustration. The motor is designed to pump rain water from a cistern into a tank in the upper part of a house for the purpose of supplying baths, wash stands, &c., with soft water. The pump is operated by means of hydraulic pressure, or, in other words, by water taken from the city main and using it instead of steam power. The motor is made in three sizes. Nor 1 is intended for pressures up to 40



The Wilkins Motor Pump.

pounds to the square inch and will pump 1 gallon while it wastes 1½ gallons and raises the water 2 feet for every pound of pressure on the driving cylinder when not below 40 pounds. Where the pressure is below this and not under 20 pounds to the square inch the No. 2 motor is used, which pumps 1 gallon while it wastes 2 gallons, and with 20 pounds of pressure will raise 1½ feet for every pound pressure on the driving cylinder. The No. 3 motor is used for pressures from 10 to 20 pounds and pumps 1 gallon while it wastes 3 gallons, and with 10 pounds pressure it will raise water 20 feet, with 15 pounds pressure 40 feet, and with 40 pounds pressure will, it is said, raise water to a hight of 250 feet. The motors are constructed entirely of bronze metal with no working parts exposed. In case of repair they can be easily taken apart, having right and left-hand connections. The manufacturers point out that there are no stuffing boxes to leak and no delicate piston rods or eccentrics or cross heads to get out of order.

HENRY BEUTELSPACHER, Bridgeport, Conn., has patented an improved soldering iron possessing several novel and interesting features. It is so made that the copper bit can be turned and held at any angle, making the iron convenient for use in many kinds of work. The means for setting and holding the bit are very simple. At the bottom of the bit is a notched disk pivoted in the split end of the handle rod and which permits the bit to swing at right angles to either side. To hold it in position there is a collar slipping loosely on the rod, which is arranged to catch the notches of the disk referred to and fastens with a bayonet joint, thus securely holding the bit in position.

Power of Examining and Supervising Boards of Plumbing.

From W. H. P., *Utica, N. Y.*—I would be glad to ask the advice of *The Metal Worker* relative to the proper interpretation of the law under which the Examining and Supervising Board of Plumbers and Plumbing in this city was created. In the matter of examination of candidates for the position of inspector, which will come up early in January, if six or eight candidates apply for the office and each pay the examination fee of $5 and then suppose each candidate to be above the average and that the Board of Health appoint one of the number, the others want to know if their individual $5 is coming back to them. I should be glad to have your opinion.

Answer.—From the synopsis of the act of 1892 before us it seems plain that the fee of $5 is not returnable to the unsuccessful candidates. They take the chance and enter the competitive list, paying their entrance fee to make them eligible for such chance. The section of the act applicable to their case clearly requires the board "to charge and collect from each person applying for examination the sum of $5 for each examination made by such board." There is no provision for the return of this fee in case the applicant is unsuccessful, and as the bill further provides that "all money so collected shall be paid over to the chamberlain or treasurer of such city," it appears to us that the question is settled and the board has no authority to make any return of the fees.

Dry Closets in New York.

From L. M. I., *Newburg, N. Y.*—Will *The Metal Worker* inform me if the State or local Board of Health allows the dry closet system to be placed in buildings in New York City?

Answer.—The State Board of Health has no jurisdiction within the limits of New York City and cannot authorize the use of any system of dry closet therein. The New York Board of Health exercises almost absolute power in the direction of sanitary matters within the city and county, and in the exercise of that power prescribes the class of plumbing and plumbing fixtures to be set up and which is that used in connection with water service. Every building in New York City facing on a sewered street must have water closets and all the facilities for the proper flushing thereof. There is a species of dry closet in use in some of the Central Park Buildings where there is no elaborate sewerage system, but whether it is of the Moule or the Smead-Willa pattern, or some makeshift, the work of the park carpenter, we are unable to state. The earth closet, however, is not in use in dwellings in New York City.

TRAPS AND VENTS.

WE ARE INDEBTED to John C. Kupferle, Second and Mound streets, St. Louis, Mo., for his No. 16 illustrated and descriptive catalogue and price list of brass and iron specialties. The catalogue contains the principal plumbing and waterworks specialties manufactured by the firm, as well as a line of such other goods as are used by the plumbing trade. Since issuing his last catalogue he has added lavatory, tank and sink brackets. He desires to call particular attention to the fact that his manufacturing capacity has been greatly increased, and he mentions that he will be able to serve his customers as promptly in the future as in the past. The volume, of convenient size, is bound in purple cloth boards, and contains 70 pages illustrating and describing a large variety of goods. The first portion is devoted to hydrants, street washers and fire hydrants of many different varieties and styles. Accompanying the illustrations are brief descriptions together with price-lists of the various sizes. Next comes an account of water closets, lawn sprinklers, valves, hopper cocks, seat legs, air vents, pipe hangers, boiler stands and such goods. A number of pages are given up to brackets for various purposes. Cesspools of different designs are noted. A variety of miscellaneous articles such as pump fixtures occupy the next few pages. At the close of the catalogue are repair lists. The publication is neatly gotten up and will be of value to all handling these classes of goods.

THE ST. JOSEPH PUMP COMPANY, St. Joseph, Mo., send us a pretty calendar directing attention to the Perfection water elevator and purifying pump of their manufacture. This apparatus, together with three infantile operators, occupies the upper part of the card. The picture is a process cut, and we presume is a living likeness of some of the most junior members of the company.

THE PITTSBURGH GAS & ELECTIC FIXTURE MFG. COMPANY of Pittsburgh were granted a charter last week, with a capital stock of $10,000. John M. Thompson, E. W. Mudge, David T. McKee and Robert B. Ivory are the directors.

SMITH & WEBSTER, manufacturers of fine plumbing goods, 193 Lake street, Chicago, furnish the plumbing material for the Bristol Building, Ashland, Wis. This is to be the finest building in the State north of Milwaukee, and will cost $100,000. P. J. Dullanty of Ashland does the plumbing work.

THE BOARD OF EDUCATION of Eau Claire, Wis., have adopted the Torrent Washout Range system of closets for the Eau Claire school buildings. The Torrent Washout Range is manufactured by the well-known manufacturers of plumbing goods, Smith & Webster, 193 Lake street, Chicago.

PERCY FALKINBURG, Atlantic Highlands, N. J., who is one of the Town Council, has at present some 75 plumbing contracts on hand, which is an evidence of the active state of business in that town. We understand that there are some 100 houses going up during the winter and spring, while the town is going to spend about $100,000 for water works and sewers, bids for which will be opened February 8.

WE HAVE RECEIVED from M. R. Wilson, Rome, N. Y., a neat little catalogue relating to his extensive line of manufactures, which includes copper-lined bathtubs of every description, copper range boilers, sinks and copper balls of all kinds, water-closet tanks and seats, pipe boards, bathtub casings, flush pipes, stand pipes, valves, ball cocks and a varied assortment of brass work. These goods in various styles and sizes are illustrated in the pam-

phlet before us, which is a little volume of 50 odd pages, bound in manila paper. In addition to the illustrations are tables of prices and brief descriptions of the articles are given when necessary. At the end is an index of articles. In the introductory note Mr. Wilson calls attention to his lately increased facilities which enable him to supply promptly all kinds of plumbers' copper cabinet ware and brass work.

SYDNOR & SHEPARD, Richmond, Va., are, we understand, meeting with a large demand for Rife's hydraulic engine or ram, which they manufacture. Referring to the capacity of this motor, they say that with 12 feet of fall and a good supply of water a large-size ram will deliver about $\frac{1}{20}$ of the water supplied it to a point not exceeding 120 feet vertical distance and to a horizontal distance of 1000 feet or more. At 50 feet elevation twice as much water will be discharged as at 100 feet, if the amount of water is the same. A special feature of the Rife ram to which the manufacturers allude is that pure spring water can be delivered at the house while the power is furnished by any creek or polluted stream. The double-acting engines or rams made by this company are the same as the single. With the double-acting attachments connected, the corresponding numbers or sizes are adapted to the same conditions of location except the power of creek or river water is utilized when the spring is insufficient.

ON ACCOUNT of the proportions that their commercial printing has attained, the Clayton & Lambert Mfg. Company, Ypsilanti, Mich., have found it necessary to establish a job printing office of their own, where they now do all their own work. They will soon issue a complete catalogue of their gasoline specialties, and each one of their large jobbers will receive for distribution quantities of these catalogues with his own advertisement on the front cover and a brief business sketch within. We understand that these catalogues will not be too large or heavy to inclose with business letters without extra postage and the Clayton & Lambert Mfg. Company hope soon to have them in the hands of every plumber, painter and electrician in the country. On February 1, Bert Lambert will start on his semi annual trip through the Middle and Eastern States in the interest of his firm.

S. DAVISON, who is agent for New York City and New York State for the goods manufactured by the Steel Bath Mfg. Company of Detroit, has established an office at 56 Beekman street, New York City. We understand that the introduction of the steel-clad bathtub has met with great success in this market.

JAMES B. CLOW & SON, Lake and Franklin streets, Chicago, report that considerable work yet remains to be done under their contract at the World's Fair. For this contract about 3000 water closets, 1500 lavatories and 1500 urinals are required. There are yet 1000 water closets, 500 lavatories and 500 urinals to be placed in position, which is to be done by April 1. While all of the plumbing work is to be first class in every respect, that in the Art Building is intended to be particularly fine. The toilet rooms are to be finished with the finest marble, tile floors, frescoed ceilings, &c. The Beckman embossed closets are to be used. The firm have a nicely furnished office in the Service Building on the grounds, which is now in use and will be during the World's Fair. The extensive advertising space in the closets, of which the firm has exclusive control, is being taken rapidly.

The Pacific Mail Company have issued an announcement at San Francisco that a permanent cut in rates of 50 per cent. will be made on all freight per steamer of the 18th inst. to Central American ports. This cut is brought about by the competition of the new Spanish-American line.

House Warming.—I.

There are few subjects relating to domestic economy of more vital importance than that of maintaining the temperature of our dwellings at the point requisite for health and comfort, and yet it will hardly be questioned that there is no branch of what may be termed "domestic engineering" in which the application of correct principles of known physical laws is more utterly ignored. The formulation of those laws and the demonstration of the correctness of the now universally accepted theories are due to the untiring and exhaustive researches of some of the most eminent scientists—men whose intellectual caliber was such that they were able to deduce and demonstrate facts from data so meager and apparently so irrelevant as to place them far beyond the comprehension of the average intellect and to gain the unbounded admiration of those who, while unable to successfully emulate, could still appreciate, the results of their labors.

And yet to many so-called "practical" men the word "science" is like a red rag to a bull. They do things according to accepted practice—not because they know it to be right, but that it is the way they were taught. On the other hand, we have a class of practical men who, while doing things as they have learned them from teaching or observation, are in sharp contrast with the former type, by reason of giving some thought to "why." Such men are the progressive ones and they are willing and anxious to learn, not only from their own observation and reasoning, but from that of others as well—and it is to them alone that all practical improvements in "applied science" are due.

APPLICATION OF SCIENTIFIC DISCOVERIES.

Every practical man, whether he be workman or superintendent—the latter being usually a development of the foreman—can decide for himself to which of these classes he belongs; if to the first, he will do well to change his allegiance as promptly as may be. With a few notable exceptions, the men by whom these scientific principles were evolved have limited their efforts to the demonstration, rather than extending them to the application of their discoveries; and upon the practical men the latter labor devolved—with what result may be seen in the wonderful progress of this era in all branches of engineering.

The reason for the limited advance in improvement of methods and facilities in connection with matters purely domestic may be found in the fact that, while in the aggregate they constitute a field of vast magnitude, the individual units composing this aggregate are on so small a scale as to be more or less neglected. To the rank and file of householders the lack of economy and efficiency of domestic appliances is not realized, as, from want of a technical understanding of the subject they compare what they have, not with what might be, but with what is, and their standard of comparison, therefore, is erroneous, from the fact that the logical result must be slow progress or none at all. Also, the possible saving in expense of each item, even though representing a large percentage, is comparatively small, if merely considered as an abstract matter of dollars and cents. Ten ones, however, make ten; and an aggregation of many small economies may make quite a large one. Therefore, as the cost of housekeeping is made up of sundry small "ones," the resultant ten, if reduced by a large percentage, would be very appreciable.

SAVING IN MONEY AND HEALTH.

But, even if we ignore this phase of the matter and consider merely the question of comparative efficiency, the importance of the subject suffers no diminution, as the comfort, health and, in fact, the very lives of the family are more or less dependent on all features bearing directly or indirectly on the sanitary condition of the dwelling. The proper heating and ventilating, no less than correct plumbing, may be considered as important factors in sanitation, and to the first we propose to direct a few inquiries with a view of comparing the results of ordinary practice with the theoretical and also the practical possibilities, as deduced from ordinary practice on a scale sufficiently large to be dignified by the term "engineering." The subject is one of many ramifications, on account of the many different systems of heating, and also that, from the interdependence of the two, the matter of ventilation must be considered jointly with that of heating.

In order to make the specific comparisons necessary in this connection, the use of numerous calculations will be unavoidable. The latter will, however, be kept strictly within the practical limit, and based upon simple and familiar formulæ, in which only the ordinary arithmetical rules are necessary. In such cases as a complete analysis of the details would render the work too voluminous the simple formulæ or quantities will be given, together with the name of the authority to whom they are attributed. On the subject of fuels, American data only will be used, except in relation to such as present the same characteristics in all localities. In regard to general principles and physical phenomena, being of a purely abstract nature, they are entirely independent of local influences. Before proceeding with the classification of heads referring to the several systems of heating, it will be well to briefly consider the subject in a general way and also, incidentally, call attention to its effect or dependence on the matter of ventilation.

(To be continued.)

On the Road.

At Cooley's, Springfield, Mass., one evening last week were noticed the following well-known men in the trade:

J. Sidney Smith of St. Louis Stamping Company, Boston, who would easily pass for the rector of a fashionable church.

E. B. Doolittle of Richardson & Boynton Company, New York, one of the greatest hustlers in the business.

E. B. Freeman of Steel Edge Stamping & Retinning Company, Boston, who is great at whist and thinks the Intelligent oil can a wonder.

J. S. Crapon of Dean Mfg. Company, Taunton, Mass., who is up in the latest styles of tinware.

And Edward C. Hazen of Kirkham & Hazen, Springfield, a live merchant and an enthusiast on football.

Genial Ben Mallory was missed, but his spirit hovered over the company and several of his latest yarns were sprung on the innocent *Metal Worker* man.

Authority has been given for the erection of a new pumping station near Washington Bridge for the supply of water to the upper part of New York, west side. The tower will be 175 feet high. Three large pumping engines will be set up, having a capacity of 20,000,000 gallons a day, and the tower of 4,000,000 gallons—total daily capacity 24,000,000 gallons. The entire estimated cost is $500,000.

TIN PLATES.

TIN PLATE.—V.

Sorting and Boxing.

Little need be said on this subject. The faults incident to the quality or the treatment of the steel from which the plates are made are readily identified in practice and can hardly be put into words. The plates—whether they have only two, or as much as four pounds of tin per box—should be free of streaks incurred in the black-plate rolling, or subsequently due to scruff in the tinning pot; there should be no bubbles, scratches or buckling, and no patches of half-coated surface. The various defective plates are sorted into their classes of "wasters," which should not under any circumstances exceed 7 per cent. of the whole. The value of ICW may be taken as 50 cents less than the value of IC per box.

The plates are boxed in elm boxes at 8 or 9 cents each with the aid of an ordinary screw clamp. Better methods will occur to all Americans. The boxes are then branded, and, for the information of those to whom the terms "Common No. 1," "Cross No. 1," "Common Doubles," "Two Cross Doubles," "Small Doubles," &c., are unfamiliar, the following list of dimensions and weights is given:

Brand mark.	Number of sheets in a box.	Sizes. Inches.	Weight. Cs. qrs. lb.
IC	112	20 x 28	2 2 0
IX	112	20 x 28	2 2 2
C	112	14 x 20	1 0 0
X	112	14 x 20	1 1 0
XX	112	14 x 20	1 1 21
XXX	112	14 x 20	1 2 14
XXXX	112	14 x 20	1 3 7
IC	225	183/4 x 10	1 0 21
2C	225	133/4 x 93/4	3 17
3C	225	123/4 x 91/2	3 7
IIC	225	133/4 x 10	1 0 7
IIx	225	133/4 x 10	1 1 0
1x	225	133/4 x 10	1 1 21
2x	225	133/4 x 93/4	1 0 14
3x	225	123/4 x 91/2	1 0 21
1xx	225	133/4 x 10	1 1 14
1xxx	225	133/4 x 10	1 2 7
1xxxx	225	133/4 x 10	1 3 21
D C	100	163/4 x 123/4	3 14
Dx	100	163/4 x 123/4	1 0 7
Dxx	100	163/4 x 123/4	1 1 0
Dxxx	100	163/4 x 123/4	1 2 21
Dxxxx	100	163/4 x 123/4	1 3 0
S D C	200	15 x 11	1 2 21
S Dx	200	15 x 11	1 2 14
S Dxx	200	15 x 11	1 3 7
S Dxxx	200	15 x 11	2 0 0
S Dxxxx	200	15 x 11	2 1 11
Wasted or WC and X mixed	225	133/4 x 10	1 0 0
T T	450	133/4 x 10	1 0 7
X T T	450	133/4 x 10	1 0 14

Cost of Plant.—The cost of the plant we have been considering will be as follows:

Four tin mills and two engines, so arranged that two more mills can be coupled at a future date	$20,028
Eight pairs cold rolls and engine	13,598
Two pickling machines, with cradles	1,728
Eight tinning sets, 28 x 20 and 20 x 14 (including royalties on patent) shutting and engines	8,500
Total	$50,754

The total weight of material in the above, exclusive of engines and tin sets, is 353 tons 14 hundred weight. Boilers, heating furnaces, loose plant, cost of erection, buildings, &c., are not included in this estimate.

Analysis and Tests.—A streak mark in a tin plate, if cut out in strips and treated for silica will often prove whether the default is due to the presence of sand or ganister in the tin bar maker's ingot, or to scale or faulty rolls in the black-plate mill. Continuous mechanical tests of the annealed black plate and of the finished plate are of course of vital importance.

The quantity of tin on a tin plate may be estimated in the following way: 5 grams of tin-plate chips are weighed into an 80 c. cm. bulb flask provided with a cork, into which passes a tube and Bunsen valve, add 53 c. cm. of 5 E hydrochloric acid and dissolve. The object of dissolving out of contact with the air is to prevent precipitation of a large amount of sulphur by subsequent treatment with SH_2 if the iron were present as protochloride. Pour the solution into a 300 c. cm. beaker, dilute to 250 c. cm., add 13 c. cm. of 10 E hydrochloric acid, saturate with SH_2, allow it to stand in a warm place for half an hour, filter off the Sn S and wash with SH_2 water. Dissolve the Sn S off the paper with 12 c. cm. of hot 2 E Na_2 S in which 0.1 gram of sulphur is previously dissolved by frequent percolation, and repeat with 12 c. cm. more. The solutions are now mixed and diluted to 100 c. cm., neutralized with 10 E Hcl, and after settling the stannic sulphide is filtered off and treated to separate any arsenic that may be present; the tin is determined as oxide.

Present Condition of the Trade in Great Britain.—Surprising as it may seem, there are still a large number of manufacturers and traders in Wales who will not believe that tin plates can be and are made in the United States, and even the better informed do not grasp that the output there is already at the rate of 100,000,000 pounds per annum or 16 times the make of the first quarter of the year. On the other hand, it is not a fact that the Welsh trade is so severely hit as some of our American friends suppose. For the first nine months of the following years the quantity of tin plates exported to the United States was:

	Tons.
1890, January 1 to September 30	227,114
1891, January 1 to September 30	284,316
1892, January 1 to September 30	214,527

From January 1 to September 30, 1892, the United States, as against this, produced 10,981 tons of finished plates. The exports of this country are not, therefore, seriously suffering as yet, though threatened by the enormous increase of the trade so successfully established in the United States.

All the smaller and some important works in this country have been stopped for many months, and we believe there are at the present moment a total of 112 mills idle, while many others are working in only a desultory fashion. This great depression must be attributed chiefly to over production, the many mills that were run up during the year preceding July, 1891, having been the climax of a power of production that was already excessive. And we now recognize that the manufacture, at least of commons and ternes, for export to the United States has passed from this country forever, or is about to do so, tariff or no tariff. It is not generally expected that any large change in this tariff will be made in the face of a powerful established trade, or that the big steel makers, having found a new outlet for their produce, will let it slip from their hands.

At least three English syndicates who have been awaiting the result of the election for some months have now definitely abandoned any idea of erecting plants in the States. A manufacturer who visited several sites, in preparation of a scheme by which he proposed to export and coat his own black plate in that country, makes the following interesting but rather exaggerated estimate of the cost of doing so—interesting, because the cost of imported as compared with home-manufactured black plate will be apparent to the reader.

Cost of Coating Imported Black Plate, Ternes Reduced to 14 x 20.

	Per ton.	Per box.
Black plate, 1 ton, f.o.b.	$40.34	
Duty, 2,240 pounds at 1.85/100 cents	36.96	
Freight	1.92	
Delivery charges to works	2.10	
	$81.32 =	$3.87
	Per box.	
Lead, 2½ pounds; tin, 1 pound; 3½ pounds at 12 cents	$0.420	
Coal (at $2.88)	.032	
Vitriol, 2½ pounds at 1½ cents	.037	
Palm oil, 1 pound at 6 cents	.060	
Flux, 2 pounds at 2 cents	.040	
Box	.190	
Stores	.075	
	$0.754	
Credit: Dross, metal and copperas	.011 =	.74
Labor (American Association):		
Pickling	$0.05	
Tinman	.12	
Boy	.04	
Cleaning and dusting	.02	
Assorting	.06	
Carrying, extra labor, &c.	.05	
Boxing	.02	
Day wages.—Foreman $5.00		
Smith and striker 3.75		
Mechanic 2.25		
Engineers and firemen 8.50 =	.15	.51
Commission to agent, 1¼ per cent. on $5.40		.08
Rent, rates and taxes		.03
Interest on outlay		.04
General charges and management expenses		.07
Total		$5.34

It is well known that labor is one of the most difficult questions in the South Wales trade. The following resolutions were passed by the Tin Platers' Executive on November 26 last, and may be taken as illustrative of the policy the workmen pursue and of their general ignorance of affairs in America and elsewhere:

1. This executive, viewing the unpatriotic conduct of Messrs. Morewood & Co. in assisting Americans to deprive Wales of its staple trade, and observing that black plates are exported to be coated in America with a view of misleading the American public that they are producers of tin plate, and that in this way South Wales works and Cwmbwrla millmen are used as instruments to the injury of their own tinhousemen, calls upon the Cwmbwrla and South Wales millmen to protest against being

made instruments for such purpose, and are prepared to approve of their action if they present their employers with a general notice.

2. That the executive ask the branches to prepare themselves with a view of taking action to prevent the exportation of black plate.

In conclusion, whatever other difficulties may occur in the progress of the industry in the United States it is to be hoped that the Workman's Association will not hamper and limit the productive power of first rate mills of efficient and costly tinning machines, or of any of the numerous inventions by which the employer effects economies and extends his operations. In Wales, however much the employer may be pressed by his shippers, however desirous of floating his standing charges in a larger output, however low his profit or heavy his loss, the Union permits only 36 boxes. The most rapid and efficient tinning pot is on the same footing as the oldest—36 boxes. As much as anything else, it is this difficulty that has induced certain Welsh manufacturers to take advantage of the provisions of the McKinley act, and to leave the staple industry of Wales babbling astonishment at the want of patriotism and long suffering displayed. But whatever number of manufacturers transfer their capital, it matters little. The day was bound to come when America could manufacture its own iron, or rails or tin plates. That day has most certainly come, and again it matters little whether the tin plates are manufactured by an American or by a Welshman provided they be made in Ohio or Pennsylvania. There will still be room for gallant little Wales elsewhere.

The Blower System of Heating and Ventilation.

BY WALTER B. SNOW.

The blower or hot blast system of heating and ventilation is substantially a product of the last decade. Ten years ago the system and its advantages were but little known. True, there was a limited number of hospitals, theatres and halls in which fans had been introduced for mechanical ventilation, but as a rule only as adjuncts to an already established system of heating and frequently almost independent of it, as in cases of vacuum ventilation.

Practically, however, no marked advance had been made toward the introduction of a system by which heated air was forced under pressure through ducts and distributed as a heating medium throughout a building.

The public was uninformed and public opinion was therefore not settled as to the advantages of the method; perhaps to a great degree due to the fact that no one concern was advocating the system as a system and manufacturing for general sale fans and heaters in combination and properly designed for this work.

FIRST USE OF THE HOT BLAST.

Such marketable combinations were in fact first employed for the purpose of drying lumber, wool, cotton and like materials. Their success in this line led, naturally, to their introduction for heating purposes alone.

To say the public is fully alive to the necessity of proper ventilation, and the laws of some States, vigorously enforced by State inspectors, require either a stated air supply per person in certain classes of buildings or else in a confessedly indefinite manner require that the air in these buildings shall not be allowed to become so impure as to be injurious to health.

Thus the State of Massachusetts in the acts of 1887, chapter 173 and acts of 1888, chapter 149, relating to the ventilation of factories, workshops, public buildings and schoolhouses, provides that they "shall be ventilated in such a proper manner that the air shall not become so exhausted as to become injurious to the health of the persons" present or employed therein. Just what degree of purity is to be maintained under this law is an open question, as demonstrated by the experiences of the State inspectors in their enforcement of the law.

In the passage of the new building laws of the City of Boston a laudable attempt to clear this matter of its indefiniteness has seemingly proved abortive by what appears to be an omission in the text. Chapter 419, section 105, of Massachusetts, acts of 1892, reads: "Every hall, auditorium or room of every building hereafter erected for or converted to use as a schoolhouse, factory, theater or place of public assembly or entertainment shall have in continuous operation while occupied a system of ventilation so contrived as to provide 50 cubic feet per minute of outer air for each light other than an electric light for each occupant." Apparently, the last clause should read, for each light other than an electric light and for each occupant.

Accepting this as the intended reading, it is certain that under all conditions of weather this volume can only be supplied by mechanical means. The fan blower is universally accepted as the most economical mechanical agent. The ease with which 50 cubic feet per occupant can be satisfactorily and comfortably supplied must necessarily vary with the room space per occupant. It is not a question of possible fan capacity, but of comfortable distribution of the air after it enters the room.

AIR SPACE AND VENTILATION.

In an ordinary factory with its usual number of occupants, there is generally about 300 cubic feet of space and upward per occupant. Under such conditions there is no great difficulty in distributing 50 cubic feet per minute per occupant; that is, supplying a volume capable of changing the entire volume of the room every six minutes.

In a crowded hall, however, with from 75 to 100 cubic feet of space per occupant, a supply of 50 cubic feet per minute per head must cause a change of the air every one and a half to two minutes, a practical impossibility, without creating objectionable drafts.

The fault lies not with the air supply required, but with the exceedingly small room space per occupant. The law can only be made practicable by coupling with it regulations as to the amount of space to be allowed each occupant of the room or building.

The writer's attention has just been directed to a case where a committee had been chosen for the purpose of improving the ventilation of a certain hall capable of seating 3000 persons. The present provisions for air supply consist of two floor registers (there is reasonable opening at the ceiling for the escape of vitiated air, which should be admitted pure and fresh at some other point). The air connection to one of these floor registers was found to be 4 x 24 inches, the other was not measured, but was presumably of the same size. To go from one extreme to the other, the chairman of this committee persists that he now wants to supply by means of a fan 60 cubic feet of air per minute to each occupant.

The volume of the air space in the hall is, however, so meagre that this air supply will be equivalent to changing the entire volume of the hall every two minutes. At such a velocity as would be permissible, if it were possible to satisfactorily admit this volume under these conditions, there would be required about 1000 square feet of free air inlet directly to the room against 1 square foot at present in the register connections.

At the present time accepted systems in new school houses, in and about Boston, prior to the passage of the last building laws, provide 30 cubic feet of air per minute per occupant, and as each occupant is generously provided with 250 cubic feet of room space a change of air takes place every eight and one-third minutes—a result readily accomplished by the blower system. Effective mill heating, with properly proportioned apparatus, is accomplished with the blower system by changing the air about once in 15 minutes.

ADVANTAGES OF BLOWERS.

As a heating system alone the blower system has certainly a logical reason for its existence. All systems of direct radiation depend to a large degree upon a circulation of heated air for their efficient action. This is noticeably true in the case of mill heating by overhead direct steam pipes, where the currents are set up by the passage of air past the pipes to the outer walls, thence downward by their cooling action and across the floor to rise again and be reheated by another passage across the pipes. A circulation of air is a necessity in an efficient heating system.

In the blower system this circulation is made positive; the air is discharged into the rooms under such velocity as to cause it to flow to the desired points. All of the air is conveniently and economically heated by a single heater in connection with the fan.

The permissible velocity of air in ducts and through outlets to rooms is largely dependent upon the character of the building. In a factory—particularly one with a smooth ceiling offering no obstruction to its flow—the air may be made to do effective heating at a distance of 200 feet or more from the outlet, with velocity through the same of 2500 to 3000 feet per minute.

In a schoolhouse, on the other hand, register velocities are usually below 500 feet per minute, and in the case of halls or theaters, with air supply through the floor, even this velocity must be greatly reduced—due to the fact that a velocity of over 19 feet per second is perceptible to the sense of feeling.

The blower system is applied solely as a plenum system — that is, supplying air under pressure and maintaining a pressure within the heated building. Its action as a ventilating system is thereby rendered practically independent of atmospheric conditions and positive action is secured at all times.

(To be concluded.)

More ocean vessels are to be built for the lakes. Captain Gilbert, the manager of Harrison H. Wheeler's shipyard at Bay City, Mich., is in Pittsburgh, to purchase steel beams and other structural work to be used in the construction of three large steel steamships to be turned out of the Wheeler yards during the coming year. These three steamers will be of the freight-carrying class, and will approach the ocean steamers. The three new ships will be 400 feet in length. They will have a beam of 42½ feet and 27 feet depth of hold. The average tonnage of the largest lake vessels at present is 3000 tons; these new steel vessels will have a carrying capacity of 3800 tons each. They are expected to maintain an average speed of 14 miles per hour.

Nearly five-sixths of all the corporations formed in Mexico for the prosecution of various enterprises requiring an investment of capital are American. Only three years ago Englishmen had the lead. Last year the capital represented by new companies was over $90,000,000.

STOVE TRADE NOTES.

A Test of Heating Apparatus.

The past few winters have been so unusually mild in the Northwest that the various forms of heating apparatus have not for some time been severely tested. Last week, however, there was a visitation of rude Boreas with considerable of his old time vigor, and it is not too much to say that he caught hosts of people illy prepared for his reception. Numerous have been the complaints from those who fondly supposed that, because they were very comfortable with the temperature at 20° above, they were ready to endure zero to 20° below. Stove men were suddenly called upon to supply more stoves for heating exposed rooms; furnacemen were obliged to unwillingly listen to complaints from customers who had never been known to complain before, and who insisted that hitherto approved forms of construction were out of gear somewhere or they would not fail to deliver the usual volume of heated air; the serenity of users of hot water was disturbed by the suddenly discovered fact that hot-water heaters consumed coal quite rapidly in extremely cold weather, and a manufacturer of steam heating apparatus was covered with confusion when he found the steam pipes in his own office frozen one bitter morning. If we were not deterred by compassion for an unfortunate fellow creature we would like to present a picture of one office of a prominent stove manufacturer recently visited, which was found heated by a gas stove, an oil stove and a furnace supposed to be somewhere below, but which gave no sign of its proximity through the capacious register in the floor. The mild suggestion that a coal stove and a steam or hot-water boiler would aid in raising the temperature of the room evolved a considerable degree of heat immediately, demonstrating quite conclusively that, after all, internal physical conditions have much to do in exciting warmth in the individual, without special regard to mere mechanical appliances for heat development.

Changed Conditions in the Stove Trade.—III.

By Stovemaker.

Next to the furniture-store element of disturbance to the even tenor of the stove business comes the matter of repairs, the piracy of which is of earlier origin than 1882, but the growth and development belonging to the period of great change under discussion. The traffic in repairs by the so-called pirates has eaten like a cancer into the vitals of the trade of the wholesalers until it has almost destroyed that particular branch or department. It was ignored entirely at first as of little account; in fact, there were for a long time but one or two such concerns in the city, and the manufacturers felt it would be uncharitable to attempt to deprive them of a living from the traffic when it affected any one of them so little.

After a while, more and more frequently, the dealers called at the regular houses for light castings and odd plates, after purchasing from the pirates, for the same stove, grates and other heavy castings which they had with them, and the manufacturers, more from chagrin than from the loss of trade really experienced, consulted legal counsel to find out how to proceed to close them out. Their chagrin was not lessened to find that, however it might be criticised on high moral grounds, the business of the pirates was legal, and before they could be held amenable the manufacturers would have to patent the design of every part of their stoves, or else by legislative enactment declare the piracy of repair patterns unlawful.

Both of these remedies were entirely too expensive to think of, and agitation of the matter was dropped. It is a mooted question after all whether the trade in pirated repairs, which is not prohibited by law, is not also perfectly honorable and fair. Less odium attaches to it nowadays than in former years, and the repair dealers themselves show less consciousness of the fact that their trade was frowned upon by manufacturers and some stove dealers. Of course there are many persons who would avoid any business that had to be conducted to a certain extent on the sly, as this has been. For instance, when some orders have made it necessary to purchase odd pieces of the manufacturers or when they have had to get pieces for new stoves introduced by the manufacturers to "file up." At such times they have been obliged to resort to sly means to get what they wanted, knowing the manufacturers would refuse them if they ordered in person or on their own name, but such practices are not very unlike the methods adopted by manufacturers to get a competitor's stove which they desire to imitate, or hardly less questionable than the subterfuges employed to get inside information of a rival's business or points regarding his constructions.

Relations of the Pirate to the Trade.

The pirates have always been looked upon as bitter enemies of the stove wholesalers and regarded with unconcealed contempt. The enterprise displayed by the repair men was not calculated to mollify this feeling in the slightest and it kept increasing in proportion as the repair men's business increased and the wholesalers' declined. Their close contact and relations with the stove dealers put them in possession of information about new goods introduced for which repairs should be made, and kept them abreast of the times and with complete stocks for the accommodation of all.

The main reason why they were patronized in preference to the stove makers was, of course, the lower price at which they sold repairs. The better class of retailers for a long time refrained from trading with them on account of the better fit of original repairs, but were gradually driven to do so and get the benefit of the reduced price to hold their own trade against the competition of smaller concerns, basement traders and second-hand men, who did and were able to undersell them. But other agents were also instrumental in helping the growth of the repair business among the pirates—namely, the expressman, city and suburban, who, receiving orders from several customers for a variety of repairs from several of the different wholesalers and jobbers, found it very convenient and advantageous to make all their purchases in one store instead of visiting all the makers or regular agents, and any manufacturer who from a lack of system of keeping repair accounts was unable to realize the falling off in his repair trade needed only to look in the express wagons as they backed up to his door for stoves to be convinced, for there he would see the evidence in packages of repairs for his own stoves just from the repair shop. It may be remarked that sometimes an unprincipled expressman would buy repairs at the repair shops at the reduced price and charge the dealers for whom he bought the manufacturer's price, keeping the difference himself, the deception being discovered when, on account of some mistake in size, the dealer brought back the grate or bricks to the stove manufacturer, only to be informed that they never came from his place.

It seems incredible that the manufacturers were so blind to their own interests as to let this trade, an important item, be taken from them when for several years it was within their power to suppress the traffic by reducing the price of repairs so low that the pirates would be unable to make any money. Putting the price at cost for two years would have forced them all out of business, and the loss to the manufacturers would have been a bagatelle compared with all the losses of the years since, to say nothing of the future. They have been forced to make reductions from time to time anyhow during the past ten years, to hold fast to some lingering trade and stem the tide as much as possible, but the opportunity for crushing the competition and reclaiming the business has gone by. Instead of weaklings at first, they have powerful rivals to fight, men strengthened in purse by the accumulations of profits for ten years, and more securely intrenched behind a business whose scope has been vastly enlarged since its birth.

The craze for the artistic decoration of stoves has benefited them, and so has the demand (so liberally met) for dustless stove polishes and plastic cements; and the trade in tile, nickel and bronze ornaments, stove paste, polishes, to say nothing of the other sundries, such as finishing rings, chimney caps, drip pans, &c., &c., yields a comfortable income to some regardless of stove brick and castings.

All this trade might have dropped into the laps of the stove men if they had nipped the competition in the bud.

Stock Orders for Repairs.

In 1882, when the stove salesman booked a winter stock order for stoves from the retail dealer, he likewise received a stock order for repairs, consisting of grates, bricks, rests, fire pots, &c., by the dozens, for all the stoves, new and old, of his firm's manufacture. They were delivered with the stoves; they amounted to as much as 10 or 12 stoves and yielded a profit twice as large. In place of every hundred such orders in 1882 they get one now—the repair men get the rest. They do get a complimentary order now and then for an oven front or check slide for old stoves, for which a pattern has to be hunted up and the piece cast, and on which the profit very seldom is "in it." At any rate, the main trade from the stove dealers consists of orders for pieces that the pirates

do not keep, oven and fire doors, oven tops and bottoms, ends, backs and bottoms of ranges and the light parts of heating stoves, pieces so seldom called for compared to heavy castings that it does not pay them to make patterns for or cast them. Even this trade the manufacturers are prevented from making any money on, as any advance in price of such pieces would drive the pirates to making them at once. The only other trade left to the manufacturers is from such people out of town, more or less remote from a city, who write to the stove makers, not knowing of the existence of the other shops, the number of whom, however, grows less and less as the repair men reach them by circulars and price books and persistent advertising.

(To be continued.)

The Modern Stove.

A writer in one of the Albany papers gives play to his imagination regarding the stove of to-day in the following effusion:

The modern stove is most fearfully and wonderfully made. It is the sum and consummation of American inventive genius. From a simple type it has been evoluted and developed into a wonderful piece of mechanism with dampers, drafts and check drafts, flues and return flues, cold and hot air chambers, and contrivances and contraptions innumerable and unnamable, all of which seem useful and easy enough to manage, when the dealer is expatiating upon the merits of the stove and you are undecided whether you will purchase a "Vesuvius," with a nun-draped goddess rising from its crater, or a "Popocatapetl," surmounted by a silver statue as chastely draped as Ada Rehan's counterfeit presentment in Montana silver.

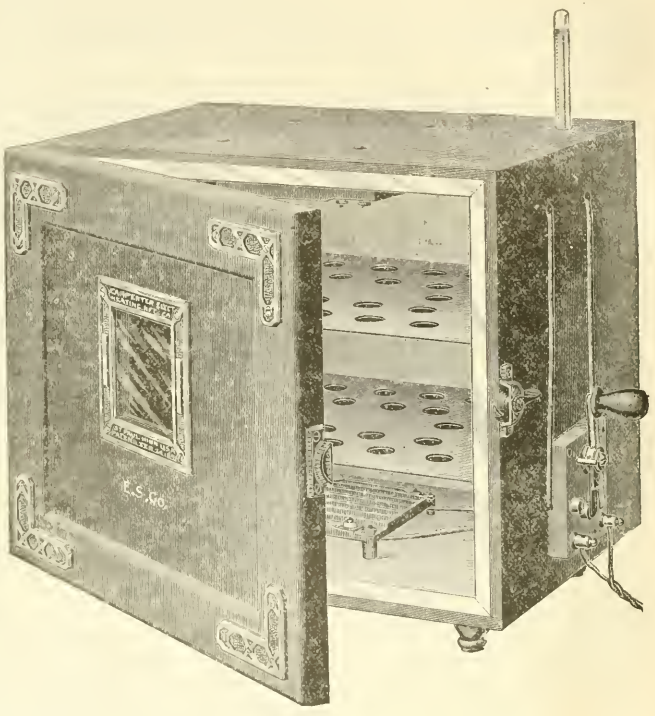
No matter which stove you buy, you are certain to wish in less than a week that you had chosen the other. You find the multiplicity of direct, back action and double back action drafts simply bewildering. You open and shut them, experiment with them in all sorts of ways and you find that when you adjust them so that the fire burns you get no heat, and when you adjust them so that you think you will get some heat the fire goes out more quickly than the enthusiasm of a defeated party after an election. You go back to the outlaw from whom you purchased the machine; he explains the mysteries of its mechanism to you again, and back you go to wrestle with it again, but you find yourself more hopelessly baffled by its intricacies than before. You have to own, after weeks of physical and mental efforts, that you are beaten. You know that you can keep a tavern better than its landlord; you know that you can run a paper better than its editor, and you have a sneaking notion that you can write a better sermon than your pastor; but you can't run that goddess crowned nickel-plated imp of blackness. You wonder whether you had better engage an engineer to take charge of the pesky thing, but while you are debating whether you can afford this the stove is apt to manifest some new and unsuspected peculiarity, and you conclude that the engineer has not yet been born who can master its waywardness, and you surrender to it, are the slave of its freaks and moods, its eccentricities and waywardnesses, until the thing burns itself out, or you purchase deliverance by investing the savings of years in a furnace or steam heating apparatus.

"I know whereof I speak" when I pay this tribute to the supremacy of matter, as embodied in the modern stove, over mind.

There is one of them in the *Argus* office, a gorgeous nickel-plated, tile decorated affair, with a bronze statue dancing a hornpipe on its crest, that is a terror, a nuisance and a calamity all in one. To see that stove in summer you would think it was perfect, that it could not only heat a room in winter, but devote some of its surplus energy to setting type or writing editorials. You would have a very different opinion of it, however, if it alternately roasted and froze you on a cold and windy day.

The responsibilities attending the care of that stove are too great to be entrusted to the devil, so the past devil has been appointed to fill its always empty maw with coal, manipulate its drafts and counter drafts, oils its bearings, pack its boxings and coax and pet it in the hope of getting 1 per cent. of the heat out of the coal which it consumes. Our past devil is "no slouch," but he is no match for that stove. It's the bane of his existence and makes him long for the happy days when he was only a devil and used to go to the other offices on fool's errands, for a yard of editorial, italic quoins and left-handed mallets. It's the simple truth that this boy has had to build fires in that stove no less than six times in one day. He thinks he has everything fixed all right and goes off as happy as a boy can be with such a terrible responsibility resting upon him, but in less than an hour the stove will have taken a new kink, direct drafts will be acting as check drafts, or check drafts will reverse action and become direct drafts and send a whole cylinder full of coal blazing up the chimney in a few minutes. Then again the stove will set up in business as a gas retort and send enough poisonous vapors out into the room to kill any man who hadn't become used to inhaling coal gas. It's a wonderful stove and it's aging our past devil very rapidly.

It's a curious fact that, although every one who has made the acquaintance of that stove recognizes it as a wonderful piece of mechanism, every man about the office thinks he knows more about manipulating its machinery than any one else. I used to think that I knew something about it myself, but it knocked the conceit all out of me long ago. The political editor, the city editor, the horse editor, the man who did the snake stories when snakes were in season and who now writes up "Hymeneals," "Notes of Sunday Services" and other light and airy trifles, and the occasional, who brings in a "personal" now and then, each and all cherish the delusion that they know how to run that stove. Of course they don't, but it's worth being roasted and frozen and choked with gas to see them assisting, directing and counseling with the engineer as to the proper method of adjusting the apparatus. And it gives me increased respect for their nerve to note the cool assurance with which they shuffle off responsibility for their failures on the boy, charging to his stupidity, carelessness or cussedness their inability to achieve the impossible and regulate a stove which cannot be regulated.



Cooking and Heating by Electricity.—Fig. 1.—View of Baking Oven with Door Partially Open.

John F. Donohoe of Paola, Kan., has recently patented a radiator intended for use in connection with an oil, vapor or gas stove. The radiator is referred to as being simple, durable and inexpensive, and as so constructed as to prevent all possibility of the outer air becoming mixed with and contaminated by the odors or other offensive products of combustion of the fuel. The device is said to be attractive in appearance and capable of application to a great variety of heaters and burners.

Cooking and Heating by Electricity.

For some little time past no little attention has been given to the question of the application of electricity for heating and cooking purposes, and as a result a number of devices have been forthcoming. Electricians have known for many years that heat could be obtained from this source, but the problem was how to safely and economically adapt it to the purpose. A satisfactory solution of the problem is believed to have been found in what is known as the Carpenter Process, controlled by the Carpenter Electric Heating Mfg. Company of St. Paul, Minn. This concern has brought out a number of appliances for heating and cooking purposes, some of which are illustrated in the accompanying engravings. Among the more important of these may be mentioned the baking oven Fig. 1, which is 18 inches long, 14 inches high and 12 inches deep, made of well seasoned white pine. It is lined with asbestos felt, which is covered with bright tin plate, allowing no radiation of heat into the room. There are two resistance plates on the bottom and one on the top of the oven connected with a switch on the outside so that two temperatures may be obtained and so that the operator may have heat at the top or the bottom of the oven, or at both places, as may be desired. Two foot iron shelves are provided, while in the top is a small glass window so that baking operations may be watched from the outside. The manufacturers state that each resistance plate consumes about 5 ampères on 110 volts, and that it requires only from 12 to 15 minutes at the maximum temperature to heat the oven to 250° F. Then the current can be turned off and the baking continued. The manufacturers state that after hours of baking and roasting the oven can be carried about from place to place without danger of burning the hands; that the oven door never needs to be opened, and that no basting is required. The construction of the baking oven is such that when the switch is placed on the right-hand post the bottom plates become heated, when on both posts the top and bottom plates become heated, and when on the left-hand post the top plate alone is heated.

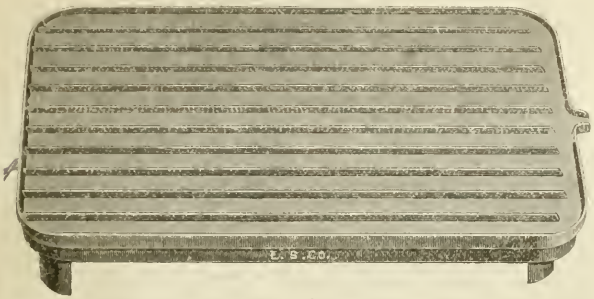


Fig. 2.—General View of Broiler and Toaster.

Another appliance which the company are making is a broiler and toaster illustrated in Fig. 2 of the engravings. Three sizes are made, measuring, respectively, 7 x 11 inches, 10 x 16 inches and 15 x 30 inches. The sizes for general use are the first and second, these being made with ridges on the surface, as indicated in the cut. The small size consumes about 7 ampères on 110 volts, and from a cold iron, after turning on the switch, will become sufficiently heated in from three to four minutes, so that broiling can be completed in less than five minutes. The broilers are constructed with a little slant, so that they may drain to one point at the middle of the lower end. The largest size of the broiler is intended for restaurant and hotel use. Pancake griddles are made in sections for general use, each section measuring about 6½ inches in diameter. The size intended for restaurants and hotels measures 12 x 18 inches and has a smooth polished surface. These are so constructed that any number can be placed side by side, thus obtaining as much surface as may be required.

Fig. 3.—House and Office Radiator.

In Fig. 3 of the illustrations is shown a general view of a house and office radiator made 18 inches long, 13 inches wide and 12 inches high. It is constructed with three separate heating plates, placed upright and incased in a nickel-plated frame provided with an improved spring switch, so that one, two, three or all of the plates may be turned on at the same time by pulling out the knobs at the end of the radiator. They will remain in this position until pushed in, when the plates will be disconnected, thus giving perfect control over the temperature. The company also make this radiator for use on a 500 volt circuit, constructed with four upright heating plates and connected in series with an improved spring switch which will break very quickly.

In the skillets, tea kettles, coffee pots and numerous other convenient cooking utensils which the company manufacture, there is said to be only one-eighth of an inch of metal between the food which is being cooked and the heated wire. This is accomplished by completely covering the bottom underneath the utensil with a zigzag wire and imbedding it in enamel of such quality as will expand and contract with the varying temperature of the wire without cracking. Cooking may be done, it is stated, on any ordinary table in any room in the house. The company are also making electric pressing irons of all kinds, which are kept at a uniform heat while in operation. The manufacturers make the broad claims of economy, durability, speed and cleanliness, and state that the apparatus can be used on any electric light wire which may be in the house. A factory has been started at St. Paul, Minn., for the manufacture of these electric heating and cooking devices and the company are now giving employment to over 60 men and turning out 27 different articles.

ODD PLATES.

Wm. E. Devlin, representing the Excelsior Mfg. Company, St. Louis, Mo., in Alabama, Georgia and Florida, resigned from this company on January 1. The employees of the establishment presented him with a diamond scarf pin and a pair of diamond cuff buttons. Robert E. Ryan, store salesman, made the presentation speech, which was very favorably commented upon, and in which he referred to the fact that Mr. Devlin had been connected with the company for over 20 years. The occasion was a very pleasant one to all concerned.

Henry Gleason, 106 Beekman street, New York, is sending out a neat vest-pocket memorandum book, 4¼ x 2¾ inches, bound in red leather, with his compliments, calling attention to stove urns and figures, made by the New Jersey Lamp & Bronze Works, and stove tiles in over 800 original designs made by the Trent Tile Company, for both of which concerns he is agent.

The Safety Oil Stove Company of Boston, Mass., are the assignees of a patent lately granted to Charles K. Stinson, Chelsea, Mass., for an oil stove. The peculiar feature of this stove is a wick-raising device located within the tank and having a depending flange cast solid with the top of the tank against which the wick bears. The chimneys are flattened, having edgewise openings, closed by a movable door with transparent panes, so that the light from within may be transmitted to the room in which the stove is used.

J. Van Wormer & Co. of Albany, N. Y., are distributing a four-page folder, the covers of which are lithographed in colors, relating to their Astral B range made in four sizes. It has triplex, duplex or flat grate, as the trade may desire, improved water front, patent oven-door opener, cut off damper and other

features of convenience and utility. The ornamentation is neat and effective, nickel being judiciously employed. The folder shows a view of the stove and gives directions for operating it.

Eugene Munsell & Co., 218 Water street, New York, have recently issued an export edition of their illustrated catalogue, containing in all 142 pages, 8¼ x 5½ inches in size and finely printed. In the front has been incorporated a description of their Manhattan line of stoves, ranges and furnaces, printed in both the Spanish and Portuguese languages, which will be of much practical use in the West Indies, Mexico, Central and South America, as also the numerous other sections of the globe where these languages are spoken. Reference is made to the illustrations of the different articles on the various pages of the main catalogue, and there is also given a price-list of the numerous goods dealt in by this house. The four features—viz., Spanish and Portuguese description, price list and main book are all bound in one cover. Among the goods described in this work are double oven ranges, ranges for flats and general use, cook, parlor, cylinder, globe, cannon, laundry and gas stoves, furnaces, fire-place heaters, mica, hollow ware and sundries.

George Baker, a well-known stove man of Albany, died at his residence, 70 South Pearl street, at 2 o'clock on the afternoon of Tuesday, January 3. Mr. Baker was identified with the stove business in Albany for nearly 40 years. He was born in Charlton, Saratoga County, N. Y., 63 years ago. In 1854 he went to Albany and worked in the stove store of his brother James. Five years later he opened a store of his own on Washington avenue, where he remained for two years, then going to the corner of Norton and Green streets, and after a short period removing to the present location of his business, 16 Green street.

William J. H. Gluck of Baltimore, Md., is distributing a variety of advertising matter relating to some of his leading specialties, among which is the Gluck non-explosive oil stove No. 2, referred to as being "as safe as a lamp and as effective as a large cook stove." Only one size is made, this having 4-inch wicks. The list also includes slips showing the May Queen, the Gluck elbow and the Naylor patent ice cream disher.

J. H. Cort, dealer in cooking and heating stoves, ranges, hot-air furnaces, &c., has issued an illustrated catalogue of 119 pages, 7½ x 5 inches, well printed on fine heavy paper. There is a large variety of ranges, with single or double oven, cooking stoves, caboose ranges, parlor and cylinder stoves, furnaces, laundry and cast-iron heating stoves. There are stoves for export, suited for all sections of the globe. Distributed through the book at intervals are blank pages for memoranda, which will be found convenient when making notes for future refereuce. The Stamford brick-set range with low closet is alluded to by this house as having met with much favor since its introduction last fall. Since January 1, 1893, and hereafter, this house will be known as J. H. Cort & Son, Warren L. Cort having been admitted as a partner.

A unique advertising novelty in the shape of a *fac-simile* of a United States mail bag, except that the edges or sides are not fastened, reaches us from the Barstow Stove Company of Providence, R. I. Upon one side of the bag is written the address of the person to whom sent, while upon the other side is the inscription, "Let No Man Delay the United States Mail." This inscription is printed in two lines between which is a panel carrying a 1-cent stamp. Upon unfastening the bag we find some advertising matter relative to the company's goods. The statement is made that "there has been no day during the past year when the United States mail has not transported to us orders for Bay State ranges, stoves and furnaces. As the new year opens we desire to thank our many patrons for their favors of the past season, not forgetting to thank 'Uncle Sam' for his prompt delivery of them. At the same time we beg to request that we be not forgotten in the new year just opening."

Simonds Mfg. Company, 50 Cliff street, New York, are just introducing Culver's T portable elliptic furnace, with patent jointless indirect radiator. This furnace is similar in construction to one which heretofore they have only supplied in brick set form. Owing to the necessity of its being properly set to give satisfactory results they have only sold the brick-set style to nearby trade, where it could be put up by their own workmen. They have now succeeded in adapting it to the portable form, and offer it for sale anywhere. They describe its features as follows—viz.: Owing to its peculiar shape it contains more radiating surface than many furnaces, and is made exclusively of the best cast iron, having but few joints. Its sections are put together with dry sand only, making it proof against breaking by contraction or expansion. It has a large air chamber which prevents the air from becoming overheated, thus preserving the castings. There is a large ash pit and triangular grate, and when desired it can be supplied with a draw-center grate. The pot is sectional, but it can be furnished with a solid one if so ordered. The sheet-iron casing is double, by which the cellar is kept comparatively cool. There are two well fitted trench plates to prevent the escape of air before it is heated. It is supplied with a patent damper, of direct or indirect pattern, operated at pleasure. The furnace has a clean out and water door, and is said to be gas and dust tight. Cold air may be admitted in the rear, sides or bottom. A clinker door is provided through which to remove clinkers and examine the fire. It is made in three sizes.

The Scranton Stove Works of Scranton, Pa., report a very gratifying volume of business for the year 1892, and state that in extent it was the largest in their history. Their foundry was idle only seven days including Christmas and New Year's.

Eugene Munsell & Co. of 218 Water street, New York, have issued an illustrated four-page circular of the Peerless Manhattan range made with or without horizontal boiler, and either brick-set or portable form. It shows, also, the Manhattan range with gas attachment, which is furnished with either portable or brick-set ranges.

The Art Stove Company of Detroit, Mich., have added to their already extensive line a new and attractive six-hole range which will be pushed during the season of 1893. The construction embodies many features which cannot fail to interest the wide-awake dealer and should establish for the stove a hearty reception. We understand the company have also perfected and introduced to the trade two new oil heaters, which are confidently expected to bring large returns.

The Central Oilgas Stove Company are distributing a New Year's greeting and with it an invitation to the trade to keep an eye out for an annual catalogue containing 100 pages, devoted to a description and illustrations of their full and complete lines of oil, gas and vaporizing stoves, together with their furnishings, which the company expect to mail about February 1. In a little folder which the company have issued are presented a number of facts relating to their goods which cannot fail to interest the trade. There is also presented a view of the company's oilgas lamp stove, which is 15 inches high and 10 inches wide at the base. The top grate is 10 inches square and has two drop shelves 4 inches wide, thus making the top of the stove with shelves extended 18 inches in width. One of the features of construction to which the manufacturers refer is their improved full-size vapor burner. The stove weighs 18 pounds and three are packed in a crate. The circular states that this stove is sent on application to any responsible dealer on ten days' trial and approval.

Broomell, Schmidt & Company, Limited, York, Pa., inform us that they are having a very excellent trade in their Heatancook range, which apparatus, they say, has gone through the severe test of the present season with excellent results.

We are indebted to the Fuller & Warren Company, Troy, N. Y., for a 16 page pamphlet which is being distributed to the trade. Its pages relate to the company's leading ranges, which are fitted with their triple series of interchangeable grates. The illustrations show the F. & W. Company P. P. Stewart range, the F. & W. Company Germania range, the F. & W. Company Diamond range and the F. & W. Company 16 hole range, all provided with the patent oval fire box, oscillating draw center triangular or dockash grates, as may be preferred. Sectional views are presented showing the company's new dockash grate, with patent oval fire box, as arranged in this series of constructions; also their triangular grate and the methods of removing them from the stove. The pamphlet is neatly printed in two colors, and will prove an interestingad dition to the stove literature of the dealer.

The Michigan Stove Company favor us with a sample of a new indoor sign which they are now furnishing to their patrons. It is the trade-mark of the company ingeniously pressed on a thin wooden board, which is inclosed in a neat frame. The whole is varnished in natural wood color, forming a unique and attractive sign to be displayed in a store.

The Somerset Stove Foundry Company of Somerset, Mass., closed their works on Saturday, January 10, in order to make repairs and take account of stock. We understand that operations were resumed during the past week.

The issue of the Atlanta *Herald* for January 10 contains an item to the effect that the plant of the Georgia Stove & Range Company of that city was sold on the day named to C. W. Hunnicutt for $24,304.86.

The Fuller-Warren Company of Milwaukee, Wis., made a very brief stop for the holidays and started up on January 2 again in all departments. Preparations are being pressed with vigor for the coming season. The policy of this company is to carry as little stock as possible from one year to another, but to be able to place fresh goods on the market each season. Last year their stock was so well cleaned up that even the sample room was invaded for sizes and styles in particularly strong demand. The company's new works were laid out on a very liberal scale and were expected to fully meet the requirements of their trade for at least a few years, but the end of the very first year finds the capacity taxed and some departments cramped for room. The furnaces manufactured here have been in heavy demand the past season and formed an important item in the company's trade. All the work is done for the Fuller & Warren Heating & Ventilating Company, whose system is steadily growing in favor for schoolhouses and public institutions requiring effecient and power-

ful heating apparatus. Col. Walter P. Warren, of Troy, N. Y., president of the company, visited Milwaukee last week and spent several days in going over the results of the year's business and conferring with Vice President and General Manager H. A. Viets relative to the coming campaign.

THE BAIN MFG. COMPANY of Charlestown, Ill., send us a number of sheets illtrating some of their leading specialties, among which may be mentioned the Prize Monarch, a medium-priced four-hole range intended for burning wood and furnished with the modern improvements; the Active Monarch, a four-hole construction having large draw hearth, swing feed, heavy cut linings, patent oven door opener, &c.; the Social Monarch, for wood only, made in a variety of sizes; the Regal Monarch, made for burning soft coal or wood; the Active Oak, a medium-priced heater for coal or wood, made in several sizes, and the Monarch Oak, adapted for hard or soft coal or wood. The company are producing a fine line of stoves and are pushing their trade in all directions. They will be represented during the ensuing year by J. E. Schroyer, who will travel in Indiana, George W. Rosebraugh, who will cover Illinois, and A. F. Alvey, who will look after their interests in Ohio and Pennsylvania.

AT THE ANNUAL MEETING of the Kernan Furnace Company held in Utica, Monday, January 9, the following officers were elected: President, Francis Kernan; vice-president, W. J. Owens; secretary, W. H. Landers; treasurer, Joseph F. Kernan.

SAM. UTTER and his son, John, have returned to New York after an absence of two weeks. During their absence Mr. Utter visited his agencies in the principal cities of the West, where he found everything satisfactory.

AN OIL BURNER having great radiating power forms the basis of a patent lately granted to E. M. Spalding and George E. Willsie of Fremont, Neb. The reservoir has a central flanged opening, within which is an outer wick tube having a flanged collar. There is also an inside stationary wick tube having its upper end crimped and provided with a series of inwardly extending circumferential grooves which are connected by ducts or flues. Within the inner wick tube is a button having a fluted neck, while upon the outer wick tube is an adjustable perforated collar and a cylindrical sleeve. Inverted T-shaped hot air pipes lead from without through the combustion chamber to the upper heating chamber.

THE THACHER FURNACE COMPANY, 33 Peck Slip, New York, report that last year's demand for their furnaces and ranges was far ahead of any previous year and that this year has begun with very flattering prospects. The company have made important additions to their works to meet the increasing demand for their goods.

RUMOR HAS IT that W. H. Mackellar, superintendent of the Mackellar Foundry Facing and Supply Company, Quincy, Ill., has severed his connection with that concern. We are personally informed by Mr. Mackellar that he is still connected with the company as in the past, and has no intention of making any change. We take pleasure in referring to this, as the success of the company in question is to a certain extent due to the efforts of Mr. Mackellar.

"THIS IS ONE OF OUR DRUMMERS," is the title of a circular which reaches us from the Empire Stove Works of Troy, N. Y. The title is printed in large red letters, below which in black is the following:

Do not chuck him in your waste basket! He is a modest solicitor, making no boiler shop whisperings; taking little of your valuable time, and no expense to you. He is always on the road, never sleeps, and gets there every time. He will attend to his own business, and not misrepresent other people and their goods. He will simply say that he is the only drummer we employ, and his expenses being only 2 cents a trip (Uncle Sam's Line,) we were enabled to sell our goods at such low prices in 1892 on account of our small expenses, that our trade was very much increased. We will transact business on the same line this year, for we are confident that our customers know a good thing when they see it. Do not forget us and we will remember you.

THE GOBEILLE PATTERN COMPANY of Cleveland, Ohio, have issued an official-looking document, under date of January 14, in which they make a bold offer for the purpose of proving their position as to the amount of business done during the year just brought to a close. The plan which they have hit upon is a challenge to any three pattern shops to contest, on conditions which are set forth in detail, the statement that in the year 1892 the Gobeille Pattern Company "did more business in the manufacture of wooden patterns for castings, as shown in hours on the pay roll, than any three other public pattern shops in the United States combined." The idea is to have each party to the transaction within 30 days from date sign a contract and deposit $1000 with the National Bank of Commerce of Cleveland. Three men shall be selected, who will examine the necessary books of account and decide the question at issue. A feature of the contest is that $1000 of the amount shall be divided equally among three charitable institutions in Cleveland.

AS A HOLIDAY REMINDER G. C. Dunklee & Co., stove dealers, 111-113 Blackstone street, Boston, sent out a handsome card in colors, one side of which shows a group of children, while the reverse is occupied by a seasonable bit of verse.

WE ARE INDEBTED to the Magee Furnace Company, Boston, Mass., for an attractive calendar for the year 1893. It consists of four pieces of cardboard, each measuring 5¼ x 6¾ inches, held together at the top by a red silken cord, forming a loop for hanging it upon the wall. Each card is embellished with a panel picture, there being one for each of the four seasons. The first card contains a calendar for January, February and March, the second one for April, May and June, the third covers July, August and September, while the last covers the remaining three months of the year. The picture upon the first card is entitled "Good Morning," that upon the second "A Song Without Words," the third is embellished with "A Vermont Hillside," while the last represents an interior, where a New England family is "Preparing for Thanksgiving." The back of each card carries advertising matter relative to the specialties of the company, reference being made to the Royal Standard square stove, the Magee Boston heater and the double-oven Kitchener brick-set range.

THE ROCK ISLAND STOVE COMPANY, Rock Island, Ill., issue a greeting to their friends in the trade, in which the statement is made that they have closed the most prosperous year of their experience. They have sold more Riverside stoves than ever before and have been able to fill their orders more promptly. They state that they are expecting great things from 1893 and have prepared for them. With the greeting is a card from A. D. Sperry addressed to his friends in the trade, and the opening paragraph of which reads as follows: "It has been said that 'a man must keep his mouth open a long time before a roast pigeon will fly in.' I believe that, but hope you won't have to wait so long for me to call on you with the old reliable Riversides. If you have them for your leading stoves it is a much better thing than a roast pigeon anyway, for the bird might not be properly cooked unless his folks used a Riverside, while our famous line is always just right."

George W. Percy.

The stove and hardware trade of the country, especially of the Eastern section, will regret to learn of the death of George W. Percy, which occurred at his home, 845 River street, Troy, N. Y., on the afternoon of Wednesday, January 11. He was one of the oldest residents of the city, and for some time past had been in feeble health. Recently he contracted a cold which developed into pneumonia, and, complicated with heart trouble, caused his death. He was born November 7, 1820, at Hoosick, where he spent his early life. While still a young man he removed to Troy, where he has since resided. After several business ventures he formed a copartnership with John E. Gately, and built up a large and constantly growing business in the manufacture of the stove trimmings which are to-day so well known to the trade under the name of Alaska. Owing to ill health, he retired from active business about a year ago. Previous to his association with Mr. Gately he for many years was connected with the hardware house of Taylor & Ackley, and for more than 20 years was confidential clerk for H. & W. Ingram.

Traveling Salesmen for 1893.

The Peninsular Stove Company of Detroit, Mich., have a staff of traveling salesmen for the new year which will cover a wide territory. Those representing the home office include E. P. Washburne, who will travel in New York and the Eastern States; F. R. Lawrence, in Eastern Ohio and Pennsylvania; Ernest Neuhoff, in Western Ohio; E. W. Frazer, in Indiana; R. W. Balleutine, in Nothern Michigan; J. B. Rue, in Southern Michigan; A. H. Lovejoy, in Kentucky, Tennessee and the South, while F. T. Dwyer will look after the trade in Detroit and suburbs.

The staff representing the Chicago branch of the Peninsular Stove Company includes J. A. McLaughlin, who will cover the northern portion of the city; E. C. Hanrahan, the southern portion of Chicago; W. T. Whiffen, the northern portion of Illinois; William Willing, who will travel in Southern Illinois; T. T. Crandell, in Wisconsin; W. L. Nesbitt, in Minnesota; William Bishof, Jr., in Northern Iowa and Northern Nebraska; Carl Raben, in Southern Iowa and Southern Nebraska; George A. Loy, in Kansas, and F. W. Isherwood in Washington, Oregon and the Northwest.

The Bucks Stove & Range Company of St. Louis, Mo., will be represented by the following salesmen, who will travel in the territory named: H. Maffray, in Illinois; C. H. Hodges, in Minnesota; G. D. Boller, in Northern Iowa; P. A. Pamplin, in Southern Iowa; F. A. Spielman, in North Missouri; F. G. Blackwell, in South Missouri; A. H. Gauff, in Kansas; E. F. Sprague, in Nebraska; W. E. Davlin, in Arkansas, Alabama, Mississippi, Georgia and Tennessee; Joe Hayes, in Northern Texas; D. W. Shanks, in Southern Texas, and Frank Selinger, in city of St. Louis.

E. Bement & Sons of Lansing, Mich., will have on the road during the year 1893 George P. Dailey, Charles T. Williams and D. H. Chisholm, who will cover the State of Michigan; C. A. Gooddale, who will travel in Ohio; J. C. Freme, in Indiana; J. G. Reilly, in Illinois; W. H. Newbrough, in Wisconsin; Linus G. Mollitor, in Minnesota; J. A. Hosmer, in Eastern and Central Iowa; O. Landes, in

(*Continued on page 69.*)

PRIZE COMPETITIONS.

WE HEREBY ANNOUNCE a series of six prize competitions relating to trade matters in which our readers are interested. Four prizes of $50, $25, $15 and $10 will be awarded in each competition.

The competitions are open to all and a general participation on the part of the trade is invited.

We shall have the privilege of publishing any or all of the contributions received.

The committee of award in assigning prizes will take into account the merit of the different contributions and their suitability for publication.

PRIZE COMPETITION No. 6.

How Retailers Can Best Advertise and Extend Their Business.

The object of this competition is to obtain practical suggestions as to the methods which the retail dealer in Hardware, Stoves, Tinware, &c., can advantageously adopt in building up his business, and is intended to cover such points as the following:

Advertising in the local papers, with suggestions as to how such advertising should be done and to what extent;
The manner in which circulars and other printed matter may be used;
A description of any special or unusual methods of attracting and holding trade; and
General suggestions in regard to ways in which the business can be extended.

An account of any methods which have been found useful in building up trade will be suitable under this competition.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 6.

PRIZE COMPETITION No. 7.

Travelers' Yarns.

The traveling salesman is proverbially happy in the stories which he narrates, and this competition is for the purpose of calling out a collection of good yarns for publication. While the attention of travelers is specially invited to this competition, it is open to all. Stories relating more or less closely to trade or business matters will be preferred.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams 96–102 Reade street, New York, and marked Prize Competition No. 7.

PRIZE COMPETITION No. 8.

How to Treat Clerks.

Under this competition, beside a general discussion of the subject, such questions as the following may be considered:

The extent to which clerks should be given an opportunity of obtaining a knowledge of the business, and of price-lists, prices, &c.;
Whether it is desirable to have formal rules for the regulation of employees and for the management of the store. If so, a set of rules should be submitted;
To what extent clerks should be held responsible for their mistakes;
Suggestions as to how clerks should be treated in order to secure their most intelligent and efficient work;
Mistakes made in the treatment of clerks.

This competition opens an important subject and it is hoped that it will be discussed fully by merchants and by their clerks from their different points of view.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 8.

PRIZE COMPETITION No. 9.

Shop System of Keeping Track of Jobs.

This competition is intended to call out information in regard to methods of keeping account of the cost of labor and material on tin-shop work, repairing and new work, inside and outside. In connection with the general subject such points as the following may be touched upon:

Whether blanks or forms are used in connection with such work. (If so, samples should be submitted);
What record is kept of orders, costs of jobs, charges, &c.;
How time occupied in going to and from the job is covered;
Suggestions in regard to the profitable conduct of the shop.

To illustrate the system it is desirable that a specific job (as for example, repairing down spouting and eave trough, or other job of repairing in which new material is used) be referred to and the method of keeping track of the costs in such job fully explained.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 9.

PRIZE COMPETITION No. 10.

Business Maxims—At Least 10.

Those entering this competition will send at least ten maxims relating to the conduct of business, presenting in a brief and pithy manner practical suggestions which may advantageously be followed.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 10.

PRIZE COMPETITION No. 11.

How Small Retailers May Keep a Record of Prices.

The object of this competition is to call out information or suggestions in regard to the best methods to be adopted in keeping a record of prices, showing cost or selling prices, or both cost and selling prices, of Hardware, Stoves, Tinware, &c., in a small retail store employing not more than four persons in the selling and bookkeeping departments, including the proprietors. Those entering the competition are expected to give a concise and clear explanation of their system, and if a price book is used, to submit as illustrating the system at least three specimen pages. If a price book is referred to it may be of any design or arrangement best adapted to the purpose, and may be original with the contributor or may be one of the different price books on the market. Fictitious names should be used instead of the real names of jobbers and manufacturers.

The committee in awarding prizes will take into account the merit of the different systems described, the character of the descriptions given, and the general utility and interest of the contribution.

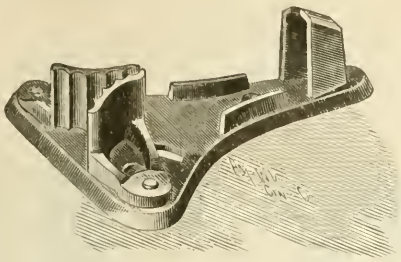
First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business, February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 11.

Universal Clamp or Double Eccentric Lath Holder.

The accompanying illustration displays the Universal clamp or double eccentric lath holder, manufactured by the Honeybrook Novelty Works, Lancaster, Pa. In using the holder one end of the lath is thrust through the jaws into the socket. The socket of the holder is so constructed that it will readily adapt itself to any thickness or width of lath, no matter how hard or smooth the lath may be or what amount of force may be required, the lath cannot be pulled from its position. The makers claim that it will enable the tobacco farmer to do his work at a less expense, and prevent the breaking and tearing of choice tobacco; that it is simple in construction; that the effective manner in which it holds the lath and the easy manner of adjusting it to the table or bench commends it to the farmer.

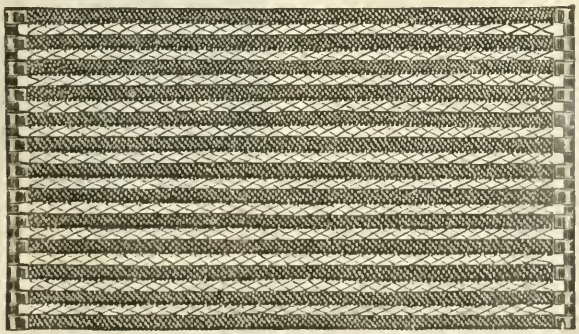


Universal Clamp or Double Eccentric Lath Holder.

New Midgley Wire Matting.

The accompanying illustration shows the new Midgley wire matting, manufactured by the Trenton Iron Company, Trenton, N. J. The mats are made of galvanized steel wire, the edges being finished with rubber strips, securely attached by interlocking metal strips. The manufacturers claim that they are the only wire and rubber mats so constructed that they can be rolled up or that will conform themselves to stairs and remain in shape with no fastening other than being tacked to the floor; also, they are the only wire mats into which may be woven ornamental letters as a sign. They can also be provided with rubber shoe cleaners, on which the edges of shoes may be thoroughly cleaned, thus avoiding the carrying of dirt or mud indoors. The manufacturers also recommend them for railroad passenger cars, Pullman cars and street railway cars; for this purpose it is desirable for them to be in two pieces for each car, so that they can be easily handled. In this form it is perfectly easy and safe to roll them up, throw them on the platform or ground, turn water on them and wash them and put them back in the cars. Mats can be lettered, when so desired, with brass or nickel letters.

The standard sizes are 16 x 24, 18 x 30 22 x 36, 26 x 48, 30 x 48, 36 x 48, 36 x 60, 36 x 72. Irregular shapes, special sizes and extra heavy mats made to order. These goods are also made in brass wire.



New Midgley Wire Matting.

The latest novelty in the labor world is a scheme to boycott the passenger whaleback, built at West Superior for the World's Fair, because the vessel is built of steel plates from the West Superior Iron & Steel Company, which is a non-union shop.

Stanley's Improved Plane Irons.

What is referred to by the makers as a substantial improvement in the production of plane irons has recently been introduced by the Stanley Rule & Level Company of New Britain, Conn. The construction of the plane iron is said to be such as to render it unnecessary to detach the cap iron at any time, for the reason that the connecting screw will slide back to the extreme end of the slot in the plane iron without danger of falling out. The screw may then be tightened by means of the thumb and finger, the screw head being properly milled for the purpose. The cap iron will then serve as a convenient rest or handle in whetting or sharpening the cutting edge of the plane iron. In the accompanying illustrations the construction of these plane irons is so clearly indicated as to call for very little description. Fig. 1 represents a plane iron with the cap screw fastened just back of the circular opening in the slot and in position for using the iron. Fig. 2 shows the cap screw moved to the rear end of the slot and in position for sharpening the iron without the necessity of removing the cap.

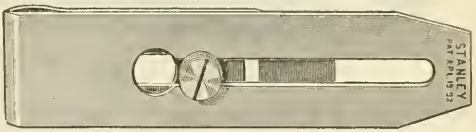


Fig. 1.—Showing Cap Screw in position for using the Iron.

Fig. 2.—Cap Screw in position for Sharpening the Iron without the necessity of removing the Cap.

The manufacturers state that by placing the circular enlargement of the slot nearest the cutting edge the plane iron can be safely tempered up to or beyond the lower edge of the circle, thus insuring equal expansion and contraction of the metal. The owner can also use up his cutter closer than heretofore without the liability of its being broken or cracked at this point.

National Post-Hole Digger.

The accompanying cut of post-hole digger represents the latest efforts of Gibbs Mfg. Company, Canton, Ohio, in this line. The blades and shanks are dropped out of single pieces of steel, properly tempered, thus doing away with malleable-iron

National Post Hole Digger.

shanks and rivets. A feature of the tool is the resting of the handles on the shoulders, bringing the thrust on the blades instead of on the bolts, which, it is claimed, prevents the handles from splitting. The point is made that the handles are separate and easily grasped, and the material and finish are guaranteed the best.

The Lawrence Coasting Guard.

The accompanying illustrations of a coasting guard illustrate the improved

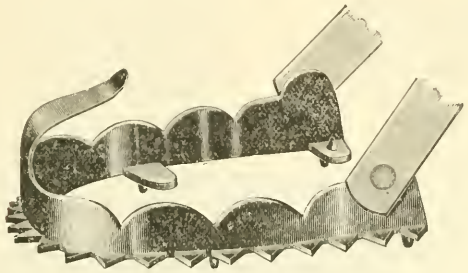


Fig. 1.—The Lawrence Coasting Guard.

form in which it is offered by the Copeland Hardware Mfg. Company, Worcester, Mass. Fig. 1 shows the device, which is intended to protect the boots and shoes when coasting. It also serves as a brake and steerer when running into danger, as a sled can be readily stopped by pressing the toe into the snow or ice. It is easily

Fig. 2.—The Manner of Attaching the Coasting Guard.

adjusted to the foot, Fig. 2, being made of malleable iron it can be spread or closed to fit a broad or narrow shoe or boot. The point is made that it gives the coaster perfect control over the sled.

Always Cool Sad-Iron Holder.

J. L. Keaner & Co., Chicago, Ill., are manufacturing the above article, which is

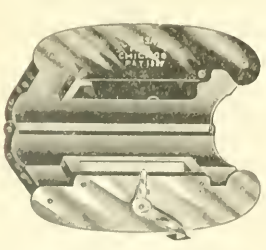


Fig. 1.—Always Cool Sad-Iron Holder.

illustrated herewith. This holder will fit any regular sad iron or polishing irons of any make, excepting Mrs. Potts' irons. The holder is lined with asbestos which prevents the conduct of heat. All radiation of heat from the iron upward against the hand is prevented by an extra heavy nickel-plated brass shield, which fits closely. In operating the holder, the right hand is placed over the top, with thumb at catch. The catch is then pressed, opening the holder. In adjusting the holder it is placed over the iron so as to fit the iron handle. Both parts of the holder are then pressed together, and it is ready for use. The rapidity with which this is accomplished is alluded to by the manufacturers, together with the safety, con-

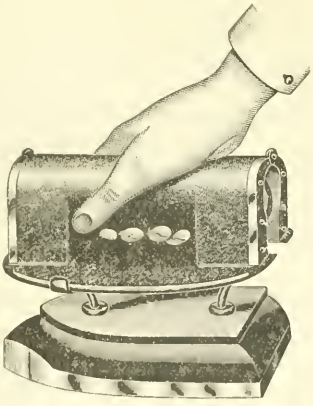
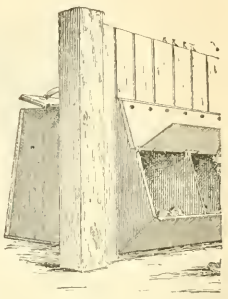


Fig. 2.—Holder in Use.

venience, simplicity, durability and cheapness of the holder.

Combined Garbage and Ash Box.

T. E. Copelin, 35 and 37 North State street, Chicago, is introducing the combined garbage and ash box, as illustrated herewith. It is made of heavy galvanized steel, and will be found very convenient where stationary receptacles are used. The box does not absorb moisture, and thus become a menace to health, as is liable to be the case when wood is used. Being set in, and fastened to the fence, it is out of the way of passing teams, and not liable to be moved from its position or stolen. An opening of suitable size having been made in the fence, the box is secured in position by means of flanges, which are riveted to the box and fastened to the fence by means of screws or bolts. On the alley side a close-fitting hinged cover is provided, which can be opened by the garbage collector when the contents of the box are to be removed. Under this cover are a number of holes, thus securing ventilation. The hinged cover on yard side is convenient to raise when any refuse is to be placed in the box, which is divided into two parts by a partition, thus securing separate compartments for garbage and

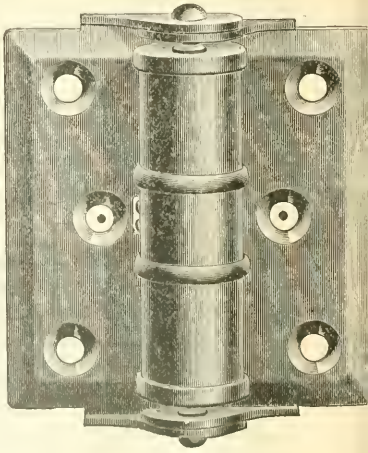


Combined Garbage and Ash Box.

ashes. The usual size of box made is 40 inches long, 25 inches high and 26 inches wide.

New Idea Spring Hinge.

The New Idea steel spring hinge is being offered by the Stover Mfg. Company, Freeport, Ill., makers of the cast hinge bearing the same name. It is referred to as being a well balanced and neat design, and as a covered steel spring hinge embracing lasting with correct working qualities. It is made in one size only, 3 x 3 inches for screen doors, and ordinarily finished in japan, but on special order will be furnished in electro, nickel and copper,



New Idea Steel Spring Hinge.

Berlin bronzed, bronze plate, oxidized copper and brass, packed for the best trade.

Austin Corbin proposes to build an elevated railroad on Atlantic avenue, Brooklyn, so that the surface roads may be used exclusively for freight.

The last rail of the Great Northern Railway has been laid, completing the route from St. Paul to Seattle and forming another transcontinental railway.

TRADE REPORT.

The Iron Market.

The Pig Iron market continues quiet and without special change since our last report. From some of the Western Pig Iron markets come reports which indicate growing activity, accompanied, however, by intimations that it has been secured through concessions to buyers. The local Chicago furnaces have set the pace in that market, and have placed very considerable quantities of Iron, the concessions, however, being in relatively small amounts. The Southern furnaces are reluctantly meeting the competition, but are not notably lowering prices where their influence is dominant. There has been a more active trade in Cincinnati, and Detroit, too, notes a livelier movement.

In Eastern markets sellers are more stubborn, and Philadelphia, notably, records a firmer feeling.

New York quotations are as follows: Northern brands at $14.75 @ $15.25 for No. 1; $14 @ $14.50 for No. 2; tidewater. Southern Iron, same delivery, $14 75 @ $15 for No. 1; $13.75 @ $14 for No. 2 and No. 1 Soft; $13.25 @ $13.50 for No. 2 Soft.

At Philadelphia the late severe weather has retarded business, more especially in outside operations, but as a matter of fact work is accumulating which later will result in much activity. There is much inquiry for quotations and considerable trade could be effected provided sellers would concede to buyers pretty much their own terms. Offers are at figures which sellers will not meet, resulting in transactions of only moderate proportions, but such business as has been done has been effected at about the same figures as have ruled during the past two or three weeks. The encouraging feature in the situation is the certainty of a large demand later on, which is looked on as likely to stiffen prices. In the meantime manufacturers assert that they cannot get out whole at the low prices frequently quoted, necessitating more money for their goods or a cessation of their business. Without doubt something is meant by these statements under prevailing conditions. Cost of production has been minimized until an end has been reached, and the future seems to indicate better prices or decreased output. The latter alternative is not likely to develop except perhaps where worn-out or unfavorably located plants are involved, as material will be needed in a few weeks' time. However, the ensuing three or four weeks is what those interested wish to provide for. The future has much of encouragement, but a plain statement of facts will not allow us to say that figures are any better than they were a week ago, but there is more resistance to anything that contemplates any further concessions. Quotations are about as follows for Philadelphia deliveries:

American Scotch, No. 1X.....	$17.00	@ $17.25
American Scotch, No. 2X.....	16.00	@ 16.25

The conditions governing the Pig Iron trade at Pittsburgh continue unchanged. Since the beginning of the current year inquiries are somewhat better, but actual business is confined to important lots. It is a fact that prices on all kinds of raw material are considerably lower than ever before, but despite this condition buyers manifest supreme indifference and continue to supply their immediate wants only, believing that when necessary to go into the market again they can supply their wants on as good or better terms than before. For some time past this hand-to-mouth policy has proved a wise and profitable one; but will it continue so? While there are no indications just now of a betterment in prices in the immediate future, it has happened before and may occur again that the long looked for turn will come unannounced. It is conceded to be a good business maxim to buy when a price about represents the cost of production. Prices may be fairly quoted as follows:

No. 1 Foundry	14.00 @	14.10. cash.
No. 2 Foundry	12.00 @	13.10. "
Charcoal Foundry No. 1....	19.00 @	20.00. "
Charcoal Foundry No. 2 ..	18.50 @	19.00. "

Reports from Chicago indicate that the market is in a more active condition, so far as Pig Iron is concerned, some values having receded somewhat, the general tone being decidedly bearish. The past week witnessed the closing of quite a number of good sized contracts for Local Coke Iron, for delivery during the first half of the year. Competition among sellers was so keen that prices were reduced to a lower level than had been touched during the previous three months. The peculiarity of the present condition of affairs is that cuts now made are only of 10¢ @ 15¢ ₱ ton, instead of 50¢ @ $1, as was formerly the case in times of depression such as this. If all the transactions were known it is believed that the aggregate would show a very heavy volume of business for the week. The activity anticipated for January has thus materialized, but by no means in a shape satisfactory to furnace companies. Our quotations are revised to meet the changed condition of the market. Low as prices now are, there are still some large buyers who look for a lower range and are withholding contracts until sellers come closer to their views. The heavy consumption of Iron is indicated by the excellent demand for small lots for quick delivery. The sales of Lake Superior Charcoal have been rather heavier than usual, but by no means compare with the movement in Coke Iron. The exceedingly cold weather of the past week has interfered to a considerable extent with shipments of Iron from furnaces at a distance from this territory, and complaints are numerous from consumers with contracts for season delivery, on which they are depending for a regular supply. Quotations are as follows, cash, f.o.b. Chicago:

Local Coke Foundry, No. 1.....	13.50 @	14.00
Local Coke Foundry, No. 2.....	13.25 @	13.75
Local Coke Foundry, No. 3.....	13.25 @	13.75
Local Scotch...	14.00 @	15.00

Sheets.— General trade is light on Black Sheets, although concerns rolling sheets for tinning purposes are securing considerable trade, and much improvement in the demand is expected in a very short time, as several large buyers are understood to be about ready to place their season contracts. Occasionally parties may be found ready to enter a large order on terms offered, but those who are determined to maintain their reputation for quality have refused orders at concessions. A fair demand is reported for Galvanized Sheets.

Billets and Rods.—Inquiries are more numerous, but with few actual sales made. Some fairly large deals are in negotiation with a prospect of being closed shortly. Buyers appear to be indifferent and not inclined to make offers as a rule unless at prices likely to be declined by makers.

Merchant Bars.— A fair amount of business has been placed since the opening of the new year, a number of mills that were running on half-time being now in full operation. The cold weather in some sections has interfered somewhat owing to inability to procure Coal, a number of concerns being compelled to suspend operations for a time on this account.

Steel Rails.—Prices remain unchanged at the leading centers. There is much inquiry but comparatively little being done, although reports are current that a number of Eastern railroads have placed orders for large lots, while contracts for some roads running into New York are said to be pending.

Structural Iron and Steel.— Some mills are already full of work, and there is little doubt that they all will be as soon as it becomes possible to resume building operations. Meanwhile prices are a little irregular and on desirable orders in some sections a shade lower than general quotations. Eastern mills seem eager to get some "backbone" orders, so that close prices are likely to prevail for a while.

Financial.

The ice blockade at all the principal Atlantic ports, cubes of ice 6 feet thick in Minnesota and the Ohio River frozen from Louisville to its source are among the phenomena that mark a winter of extraordinary severity and betoken a late reopening of navigation, but as yet the effect on trade is scarcely observable. East-bound shipments from Chicago dropped 11,000 tons from about 80,000 tons the previous week and one-third compared with the corresponding week last year, but railway financiers are confident that eventually they will profit largely from the obstruction of rival water routes. Interest in the repeal of the silver law has in no degree subsided, but a sense of relief arises from a conviction that methods will be devised to avert serious embarrassment from the compulsory purchases of silver until remedial legislation can be adopted. The absence of orders for gold shipments, easy money as the result of receipts from the interior, and finally reports from Washington that the Interstate Commerce law would be amended to legalize pooling, also contributed to a better feeling. The withdrawal of New Jersey Central from the coal combination has no immediate effect upon the price of the product, especially while a coal famine is threatened in various directions, but the future remains somewhat obscured. The position of the Lehigh Valley occasions a lively discussion among the stockholders. The Reading people do not believe that the New Jersey authorities will throw Jersey Central into a receiver's hands.

Money is decidedly easier, the banks unexpectedly showing, in their weekly statements, the enormous gain of $6,668,000 in surplus, which makes the sum held in excess of legal requirements $15,610,450, the largest amount since August last. The ease of time money is making a better market for commercial paper, but rates have not declined to a perceptible extent. The best buyers are country banks. Foreign exchange closed at $4.87 @ $4.89. The circulation of the United States, per capita, according to the latest Treasury statement, is $24.32. The present circulation is $1,610,683,874, against a circulation on January 1, 1892, of $1,588,781,720.

The grain markets have been firm and prices advanced, but the export trade continued moderate. Several large orders for future shipment were reported. Exports of wheat thus far this season are 114,300,000 bushels, a decrease of 22,500,000 compared with the same time last year, while the falling off in corn is still more noticeable. Flour was quite active. Hog products again advanced. In cotton there was more animation, but values drooped. Spot cotton declined about $\frac{5}{16}$ cent. Sugars are firm and coffee quiet.

Coal.

Severe weather curtails both production at the mines and shipments to consumers, so that a condition approaching a coal famine threatens many localities. The change of circumstances is so sudden as to have baffled all calculations. Especially is the restricted production enforced for many months past an unexpected source of embarrassment. Happily there are large accumulations at Plainfield, N. J., and other interior points that will be available as soon as transportation is no longer obstructed. Meanwhile consumers will suffer in many instances where the "hand-to mouth" plan has been in vogue, and in some instances manufacturers are compelled to suspend operations for lack of fuel, even in Pennsylvania, comparatively near to the sources of supply. Combine prices nominally prevail, except as to Pea and Buckwheat, which have long been at a premium. In respect to other sizes it is but natural that some dealers where not bound by contracts take advantage of their opportunities. Locally there are several large consumers who are content to obtain fuel regardless of cost. Chestnut Coal is almost out of market. The Reading collieries are again worked to their full capacity.

Chicago Report.

Scrap.—There is no demand for Old Iron or Steel and the following buying prices are nominal only:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12.50	....
Machinery Cast	10.00	....
Malleable Cast	8.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.50	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single		....
Sheets and Rings	11.50	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	7.00	....
Horseshoes	14.00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9⅛¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3⅜¢
Tea Lead	....	3 ¢
Zinc	....	3 ¢
Rubber	....	2¼¢

Coal.—Dealers report a heavy business in consequence of the continued cold spell, the worst for many years. Soft Coal is very scarce, driving consumers to the use of Anthracite. Dealers are mercifully restraining themselves from advancing prices.

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

CONDITION OF THE

Hardware Trade.

A very satisfactory result of the cold weather which has so generally prevailed is the depletion of the stocks of nearly all winter goods, both in the hands of dealers and manufacturers, thus clearing out some lines which have been, to a greater or less extent, carried over for several seasons. There are also indications of an early movement in general business, and orders are beginning to come in from the smaller trade and from the jobbers in still larger volume. A marked feature of the situation is the confidence which very generally prevails that the season's business will be large. In the matter of prices there is little new to report, the market as a whole not being characterized by an especially strong tone, and yet there have been a good many slight advances, more in the way of the withdrawals of extras than the announcement of new quotations. There is an evident tendency on the part of manufacturers toward a consolidation of their interests, and in more than one important line negotiations are going on to this end, in addition to which there are many rumors current in regard to similar movements in other branches. It will be noted from the reports given below that there is a general confident tone and the expectation of an early and large business.

From Chicago advices are to the effect that the Shelf Hardware trade is opening up very well as traveling salesmen get to work again, but it is not yet in full swing. The resumption of business this year is much slower than last January, and on this account some merchants are inclined to complain, while others on the contrary are exceedingly hopeful and predict a heavy spring trade. The extremely cold weather of the past ten days, which is worse than anything experienced in the Northwest for five years, has interfered with immediate business, and is, therefore, largely responsible for the dullness of which complaints are heard in some directions. Houses making a special drive on Cutlery report a remarkably good trade for the season. Baby Carriages and other summer goods are also beginning thus early to be inquired for. The Heavy Hardware jobbers state that the new year with them has opened up even better than last year. Consumers of Iron and Steel are buying more freely and in larger quantities, showing that their trade is excellent. Prospects are regarded as very bright for the wagon and carriage trade.

Cut Nails.—The Cut-Nail market has developed no specially new features since our last report, the demand continuing fair but not heavy. Prices are quite regularly maintained. There is a good deal of inquiry on the part of prospective buyers, and indications point to an excellent demand in the near future. Small lots from store in New York are held at $1.75 to $1 80, and carload lots on dock at $1.60 to $1.75, according to average.

Advices from Chicago.—The Lakeside factory is again in operation after a shor stoppage for repairs. A fair inquiry is reported, but only moderate buying. Prices are still quoted at about $1.60 on 30 cent average for factory shipments, Chicago delivery. Small lots from stock sell at $1.65 to $1.70, according to average.

Wire Nails.—A good many Wire Nails have been sold during the past week, many of the larger buyers taking advantage of the low prices now prevailing. The quotation for carload lots at mill is $1.40, and for less than carload lots at mill 10 cents additional is charged. The fact that it is understood that the manufacturers have been conferring with a view to taking action to secure higher prices has not thus far had much effect on the market, but it is obviously the part of wisdom for buyers to watch the market closely.

Advices from Chicago.—An important meeting has been in progress in this city since last Wednesday, under the auspices of the Columbia Wire Company. It is stated that all the manufacturers of Plain Wire, Barb Wire, and Wire Nails have been in attendance, and that arrangements are being made which will terminate the severe competition which has so long raged in these trades. The arrangement has not yet been perfected in all its details, but much confidence is displayed by those interested that it will be pushed to successful conclusion and they assert that prices are now at bottom and will be advanced considerably before the close of the month. A money forfeit will probably be the basis on which the agreement to maintain prices will operate. Transactions in Wire Nails the past week have been only such as were forced by manufacturers. Sales were made in moderate lots from factory at $1.55 to $1.60, Chicago, but lower prices were made on special lots carrying high averages. Jobbers are selling from $1.60 to $1.70 according to quantity.

Barb Wire.—The principal feature of interest in connection with the market for Wire or Wire products is the fact that the producers of raw material, as well as of the finished goods, are conferring with reference to action to improve the condition of things in these lines. Nothing has as yet been accomplished, but some far-reaching measures are in contemplation, and it remains to be seen whether or not they can be carried into effect. At the present time the Barb Wire market is in a somewhat unsatisfactory condition. Prices are rather weak, and yet manufacturers, while evidently desirous of securing orders, are indisposed to make more than slight concessions Quotations depend somewhat upon location. Small lots from store in New York are still quoted at $3.10 for Four-Point Galvanized, carload lots being held at $3.

Advices from Chicago.—This branch of trade is expected to be speedily affected by the movement among Wire manufacturers reported under the head of Wire Nails. Thus far prices are unchanged and range from $2.15 to $2.25 on carload lots of Painted and $2.55 to $2.70 on Galvanized. Jobbers are not maintaining the full difference between their quotations and those of manufacturers, but sell small lots at $2.25, Painted, and $2.70, Galvanized, with 5 cents off for mixed carloads.

Axes.—Standard Axe and Tool Works, Ridgeway, Pa., issue a price-list showing the line of axes they are putting on the market. It represents a number of axes and also carpenters' adze, bark spuds, mining picks and machine knives. Their prices of axes are represented by the following quotations :

Axes, Standard brand, per dozen	$7 00
Axes, Black Eagle brand, per dozen	8 50
Double Bit Axes, Standard brand, per dozen	8 50
Double Bit Axes, Black Eagle brand, per dozen	13 00

Spooled Wire.—The following are revised quotations made by Malin & Company, Cleveland, Ohio, on their Spooled Wire :

	Discount. per cent.
Annealed and Tinned Wires	65
Brass and Copper Wires	55

Tire Bolts.—The market for common Tire Bolts is not in quite as satisfactory a condition as usual, owing in part to the fact that some parties making other Bolts have entered the field, the result being an increase in competition on this line. Some lower prices have thus, in some cases, been developed.

Carriage Bolts.—There is a good deal of irregularity in the market on Carriage Bolts, the competition being active among manufacturers, many of whom quote freely without regard to the nominal prices adopted by the association.

Machine Bolts.—This line is also very much demoralized, and prices are considerably lower than those which have recently been ruling.

Wrought Iron Goods.—There has been within a short time a still further decline in the prices of Wrought Iron goods. The market is yet without strength and somewhat irregular.

Bright Wire Goods.—There seems to be more or less unevenness in the market, and quotations are made in exceptional cases, which indicate a reduction in the price of the goods.

Galvanized Conductor Pipe.—The manufacturers who agreed upon an advance in the list price of 1 cent per foot, on 2 and 3 inch galvanized corrugated conductor, as proposed at the convention of Eave Trough and Conductor Pipe Manufacturers, held at Canton, Ohio, December 14, 1892, have returned to the old list. The list prices on these sizes are now 12 cents for 2-inch and 15 cents for 3-inch as before.

Gasoline Specialties. — Clayton & Lambert Mfg. Company, Ypsilanti, Mich., are selling their Gasoline Specialties at the following prices, f. o. b. Ypsilanti:

No. 1 Fire Pot	$ 6.00
No. 2 Fire Pot	12.00
No. 3 Fire Pot	16.00
No. 1 Paint Burner	4 00
No. 1 Electric Torch	4.00
No. 2 Brazing Forge	10.00
No. 3 Brazing Forge	15.00
No. 1 Tailors' Fire	15 00
No. 2 Tailors' Fire	25.00
No. 1 Sad Iron Heater	30.00
No. 1 Burner and Swivel	2.00
No. 1 Burner, only	1.50
No. 1 Swivel, only	.50
No. 1 Bulb	.30
No. 1 Air Valve	.25
No. 1 Filler	.25
No. 1 Filter Plug, only	.15
No. 1 Needle Point	.25
Iron Top for No. 1 Fire Pot	2.00
Base for same, complete	4.00

Glass.—The severe cold weather has had a depressing effect upon building interests, consequently the demand for Glass both from factory and from jobbers is reduced. The price which buyers have paid for Glass in car lots since the factories started up is stated as being 85 per cent. discount for Single, and 85 and 5 per cent. discount for Double. Recently they have been able to purchase at these prices shaded from 2½ to 5 per cent. Those now in the market with orders are trying to contract Glass for 85 and 5 per cent. discount, all around, including Single and Double Strength. The future prices of Glass depend largely upon whether the National Glass Company prove to be a success or not. The company, we are advised, now have a charter and are awaiting the action of some of the directors of the individual companies through the States before completing permanent arrangements. This company are, we understand, a proposed combination of the manufacturers and jobbers, and their object is to make carload buyers pay a fixed price for Glass. The arrangements of the American Plate Glass manufacturers have been completed, and D. E. Wheeler has been appointed general agent for all the manufacturers, with headquarters Room 614, Times Building, Pittsburgh, Pa. This arrangement was to take effect January 14. There is no change in the condition of trade or in the price of imported Window Glass, the demand being all that could be expected at this season of the year. Quoted prices on Glass are as follows: American Window Glass, 1000-box lots or more, 80 and 15 per cent. discount; carloads, 80 and 10 per cent. discount; less than carloads, 80 and 5 per cent. discount. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 2½ per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Trade Notes.

The Clifton Springs, N. Y., Mfg. Company have elected: Directors, J. E. A. Brooks, Herbert C. Evered, Rush Spalsbury; president, Rush Spalsbury; secretary and treasurer, H. C. Evered. Mr. Brooks will continue as superintendent and the works will soon be in operation.

The Eddy Valve Company of Waterford, N. Y., have secured the contract for furnishing the Hydrants needed to extend the water system of Syracuse, N. Y. Their bid was: Valves, $21,185; Hydrants, $21,000; extras, $1,450.

Haight & Clark, Iron founders, of Albany, N. Y., issue a circular calling attention to their facilities for making all kinds of Iron Castings, as well as Brass, Bronze and Aluminum Bronze Castings, from patterns furnished them or from patterns made by them, if desired. They

also do drilling, lathe work and finishing, and Nickel, Brass and Bronze plating and japanning.

THE TROY, N. Y., VALVE COMPANY have been incorporated. They will manufacture and sell Valves, Hydrants and other articles pertaining to them. The capital stock is $30,000. The following are directors: Esek Bussey, 60 shares; Chas. A. McLeod, 60 shares; William Ross, 75 shares; Adam Ross, 2d, Robert Ross, J. C. Ross, each 25 shares; Esek Bussey, Jr., Sayre McLeod, each 15 shares. The concern is incorporated for 50 years, and the principal office will oe at Troy. The trustees are: Esek Bussey, Charles A. McLeod, William Ross, Adam Ross and Esek Bussey, Jr.

BRADLEY FERTILIZER COMPANY, 92 State street, Boston, are directing attention to the new Griffin Mill for pulverizing quartz, carbon, foundry facings, plumbago, cements, &c. Cuts of the Mills and a brief notice of their advantages are presented in an advertisement elsewhere.

THE FIRM of S. A. Wilde Mfg. Company, Taunton, Mass., manufacturers of Tinware, was dissolved on the 5th inst. by mutual consent. Samuel A. Wilde has retired from the firm and Randall Dean will continue the business under the name of the Dean Mfg. Company. Mr. Dean assumes the assets and liabilities of the old concern.

IRONCLAD STOVE POLISH COMPANY, Middletown, Conn., are now putting up their goods in a handsome black box, which makes a very attractive package.

THE CLAYTON & LAMBERT MFG. COMPANY, Ypsilanti, Mich., issue little circulars directing attention to several of their specialties, among which are their No. 1 Fire Pot for tinners and plumbers, No. 4 Brazing Fire and their No. 1 Paint Burner or Plumbers' Torch. They likewise issue on a card a prize-list of gasoline specialties, including Plumbers' and Tinners' Tools.

IN THIS ISSUE will be found the advertisement of the McKinley Tin Plate Company, Wilkinsburg, Pa., manufacturers of Roofing Plates. The goods of this concern have been in the market for some time, and have met with a hearty reception from the trade. Since their commencement their business has constantly increased, and their product is now being sold about as fast as made. It will be observed that the firm make three brands of Roofing Plates.

THE TROY VALVE COMPANY, capitalized at $30,000, have been incorporated at Albany, N. Y. The company will manufacture Valves and Hydrants and articles pertaining to them. The principal office will be located at Troy.

WE HAVE RECEIVED from Held & Gruenhagen, 924 and 926 Raymond avenue, St. Anthony Park, Minn., a four page circular of their Detachable Radiating Drums, illustrations of which were presented in these columns some time since. The circular presents various views of the device, together with descriptive letterpress and price lists.

JOS. A. BOGARDUS, 167 Chambers street, New York, presents an attractive 1893 calendar, on which attention is called to Hardware, Agricultural Implements and House-Furnishing Goods, of which he is wholesale dealer and jobber. The larger portion of the card, to which the date sheets are attached, is devoted to a colored winter landscape.

ELSEWHERE IN THIS ISSUE will be found the half page advertisement of McClure & Co., 62 Second avenue, Pittsburgh, Pa., importers of Tin Plate and dealers in Metals, Sheet Iron, Wire, Copper, Tinners' Tools and Machines. This firm is composed of Thomas G. McClure, for a number of years with John Dunlap & Co., Tin Plate dealers of Pittsburgh, and J. J. O'Connor, who for some years was connected with Gummey, Spering & Co. of Philadelphia, but who for the past two years has represented N. & G. Taylor Company of Philadelphia in Pittsburgh. The new firm will carry full stocks of the above lines of gooda.

WE PRESUME in the nature of things, there must be some limit to the expense and elaboration of New Year calendars that are sent out by manufacturing firms and others to their friends and customers. If there be a limit of this sort, however, to these New Year souvenirs, we think it has been about reached by Ginna & Co. of New York, who favor their friends with a beautiful example of artistic decoration. It is a sheet of 14 x 20 tin, framed in white and gold, carrying at the lower corner a pack of 36 shield-shaped calendar sheets, telling the days of the months for the ensuing three years. A feature of the publication, if we may so call it, is the decoration of the sheet, which shows a group of poppies and small birds. The coloring is exquisitely done and the design is thoroughly artistic.

THE MANAGERS and traveling salesmen in the employ of the Kieckhefer Brothers Company of Milwaukee, Wis., enjoyed a banquet given in their honor by the company at the Schlitz Hotel in that city on the evening of the 11th inst. All present agreed that they had a very pleasant time and expressed the common sentiment that the only cause of regret as to annual banquets was that they occurred but once a year.

THE UNIVERSAL SAD IRON COMPANY of Milwaukee, Wis., state that their Irons are steadily growing in favor. The introduction of a new article to the Hardware trade is necessarily of slow growth, but in localities in which these Irons have obtained a footing in the trade they have proved great favorites with housekeepers, dressmakers and tailors. Nos. 7 and 22 are proving the most popular of the sizes made, they being the largest for families and the largest for tailors, respectively. The Universal is a charcoal Sad Iron, ingeniously arranged to retain fire with a minimum consumption of fuel when the Iron is not in use.

UNDER DATE January 9, the Lalance & Grosjean Mfg. Co., New York, and St. Louis Stamping Company, St. Louis, issue a circular in which they advise the trade that they have acquired all patents relating to the manufacture of the ware known as Onyx, including the process of making and the trade-mark Onyx as applied to such goods. In our last issue in referring to this matter we omitted mention of the St. Louis Stamping Company, who, conjointly with the Lalance & Grosjean Mfg. Company, own the patents and trademark in question and unite in the announcement to the trade.

Price-Lists, Circulars, &c.

THE CONSOLIDATED FRUIT JAR COMPANY, New Brunswick, N. J., and 49 Warren street, New York. Sheet Metal Goods. They have just issued an illustrated catalogue and price list of 100 pages, 8 x 10 inches, handsomely printed on fine plate paper, containing a portion of their products. They announce that a large proportion of their production is proprietary goods, a specialty being the manufacture of such articles, and call attention to the fact that they will at all times be pleased to furnish estimates thereon. Among the articles noticed in the catalogue is a large assortment of Oilers and Spouts, Fruit Jar Trimmings, Can Screws of almost every description, Sprinkler Heads, Ferrules, Lubricating Cups, Torch and Collapsible Tubes, Electric Light Fixtures, Tin Boxes, Rosettes and Ornaments, principally sheet metal goods. Attention is called to their extensive experience in making Glass Molds for use in their own business, which has resulted in opening their shop for orders from the trade generally. They refer to their facilities in this line as unsurpassed.

HILL DRYER COMPANY, Worcester, Mass.: Clothes Dryers and specialties in Wooden Ware. The line of goods manufactured by this company includes the Champion Clothes Dryer for yard, Balcony Clothes Dryer for back balcony, Folding Ironing Tables, Folding Wash Benches, Folding Pantry Steps, Clothes Horses, Step Ladders, Pastry, Meat, Bread, Shirt and Sleeve Boards, Camp Stools, Pillow Sham Holders, &c.

THE CENTRAL STAMPING COMPANY, New York: Sheet Metal Ware. A handsome catalogue gives illustrations of articles selected from their large catalogue, the coloring and decorations being copied from regular goods and represent the extensive lines of House-Furnishing Sheet Metal Ware which they manufacture. Illustrations in color are given of Royal Copper Tea Kettles, Royal Copper Tea Kettles, nickeled; Crumb Pans and Brushes, Children's Fancy Trays, Tea Trays and Coal Vases.

RIDGWAY REFRIGERATOR MFG. COMPANY, Philadelphia, Pa.: Cold Storage Buildings, Ice Houses and Domestic Refrigerators. Their catalogue illustrates, with prices, a line of Ridgway and also of Keystone Refrigerators, each made in domestic and sideboard styles. The manufacturers state that the various kinds of provisions, fruits, butter, milk, &c., can be kept in the same compartment without one becoming tainted with the flavor of the other.

GURNEY REFRIGERATOR COMPANY, Fond du Lac, Wis.: Gurney Refrigerators. Illustrated circulars give interior and exterior views of these goods, also of the Removable Galvanized Ice Compartment. The points of excellence possessed by these goods are strongly brought out in verse, under the heading "Mary Brown's Neighbor," accompanied by an illustration. For this Refrigerator the managers claim cleanliness, free circulation, economy in the use of ice, condensation and dry air, low average temperature, freedom from condensation on the inner walls, freedom from damage by the use of ice picks, proper location of drip pipe and long life.

A bell weighing 600 pounds and designed as a gift from the Seventh Regiment, N. G., S. N. Y., to the United States Cruiser "New York," is being manufactured at the bell foundry of Clinton H. Menceley, Troy, N. Y. The bell will be 31 inches in diameter at the mouth and cost $2000. An unusually large amount of silver will enter into its composition, which will be silver, copper and tin from American mines—the first large bell of American metals ever produced in this country. The bell will be magnificently engraved with elaborate designs, a coat of arms and scenes appropriate to the service to which it will be put. An inscription will be placed on the rim, and the whole will be polished like a mirror.

A trans-Pacific cable is to be built at once. A contract has already been entered into between the colony of Queensland, Australia, and La Société des Telegraphes Sousmarine for a cable from Brisbane, the capital, to New Caledonia, Fiji, Samoa and the Sandwich Islands. The idea of the promoters is to extend it to America. The company have the option of making the terminus at San Francisco or Vancouver. The estimated cost is $10,000,000.

Stove Trade Notes.

(*Continued from page* 61.)

Western Iowa and Nebraska; Oscar S. Case, in Missouri and Kansas; E. B. Eberley, in Kentucky, Tennessee and the Southern States; P. M. Thomas, in Pennsylvania, Virginia, West Virginia and Maryland, and R. J. Minkley, in New York.

Thomas White Stove Company of Quincy, Ill., have enjoyed a prosperous business during the year just brought to a close and look forward to an increased trade for 1893. Some of their leading specialties have met with a very gratifying reception, prominent among the number being White's oak and a soft coal heater with solid air-tight base. Also the New Princess, a neat Todd stove. A number of new patterns in coal and wood cooks have been added to the company's assortment, and the variety now offered the trade is said to be very full. During 1893 the company's interests will be represented on the road by George W. White, Henry Wilson, M. Kirtley and J. H. McAfee.

The salesmen who will represent the interests of the Brand Stove Company, Milwaukee and Chicago, during the year 1893 include D. W. Lansing, who will cover Minnesota and Dakota; D. O. Danielson, Iowa and Nebraska; H. S. Crane in Wisconsin; W. V. Gillespie in Michigan and Illinois; A. V. Smith in Indiana and Northern Illinois, E. W. Kasten, who will look after the trade in Milwaukee, and D. Van Evera; who will represent the company in Chicago.

Robert Robinson & Son of 105 Lake street, Chicago, have a force of traveling salesmen for 1893 consisting of W. H. Bliss, who will travel in Northern Indiana, Illinois and Eastern Iowa; Thomas Hoffman, who will cover Western Iowa and Nebraska; T. A. Lewis, Southern Iowa and Northern Missouri; E. H. Voorhees, Kansas and Western Missouri and L. F. Hyne and J. A. Newton, in the city of Chicago and suburbs. The furnace department will be represented by M. R. Story and H. S. Heep.

Bussey McLeod Stove Company of Troy, N. Y., will be represented during the ensuing year by W. P. Welch, who will travel in Vermont and Northern New York; Charles M. Velsey in Eastern New Jersey, Connecticut and Massachusetts; A. C. Chatfield in Central New York and Ohio and J. Q. Palmer in Western New York.

The Abram Cox Stove Company employ the following traveling salesmen, who will cover different territory according to the requirements of the business: Charles Lehman, Jr., E. E Barto, D. C. Armbrust, E. C. Barker and Frank Eckfield.

Russell Wheeler & Son of Utica, N. Y., have made arrangements for the following territory to be covered by the traveling salesmen named: Eastern and Central New York by Henry L. Stroebel of Utica, N. Y.; New England and the Southern States by S. B. Fitch of Boston; Northern and Western New York by Frank McCarty of Oswego; Southern New York and Pennsylvania by W. J. Kennedy of Binghamton; Ohio, Indiana and Michigan by H. A. Simmons of Detroit, and Iowa, Illinois and Minnesota by George C. Powers of Des Moines, Iowa. In a short time the firm expect to add a number of traveling salesmen to represent their hot-water department.

The Reading Stove Works of Reading, Pa., employ a good staff of traveling salesmen, who for 1893 will cover the territory named. J. W. Sheeler will travel in Eastern Pennsylvania, portions of Maryland, Virginia and West Virginia; H. J. Fueller will canvass Central and Western Pennsylvania, Eastern Ohio and portions of West Virginia and Kentucky; Charles H. Shick will solicit orders from dealers in Western Ohio, Eastern Indiana and portions of Kentucky; T. D. Dreher will cover Northern New Jersey, New York City and Northeastern Pennsylvania; S. S. Sands will, as usual, visit his friends in the trade in Central and Western New York; C. H. Andrews will be Eastern representative of the company, with headquarters at Boston, for all trade in the New England States. C. A. Rusco has been placed in charge of the company's Western branch at 15, 17 and 19 West Lake street, Chicago, and will look after the business in the West. The trade in the South will be attended by William Thomson, with his efficient assistants, A. J. Thomson and C. Osmand. The company are adding to their already large assortment a number of new and desirable patterns, combining some original features, which they feel will be acceptable to the trade.

The B. C. Bibb Stove Company, Baltimore, Md., employ William Hayden Jones to look after their interests in South Carolina, Georgia and Florida, and M. S. Watkins to solicit orders in Baltimore City and vicinity. Salesmen for North Carolina, Virginia and a part of Maryland have not yet been appointed.

The Howard Furnace Company have not as yet completed their list of salesmen for the new year, but so far as arrangements have been made the staff consists of R. S. Van Keuren, who will cover the territory east of Syracuse to the Hudson River, Western Massachusetts, Central and Southern Pennsylvania, and as far south as Washington. Edward Foord of Syracuse, N. Y., will cover Northern New York, west of Syracuse, Northern Pennsylvania and Eastern Ohio. F. M. Tyler of Grand Rapids, Mich., will travel in the State named, as well as cover the northern portions of Ohio, Indiana and Illinois and the southern portion of Wisconsin and western portion of Iowa. The New York branch of the company is in charge of W. B Wilkinson of 254 Water street, with traveling salesmen covering Western Connecticut, Southern New York, New Jersey and Long Island. The Boston branch, at 61 and 63 Blackstone street, will be in charge of Thomas P. Healey, with salesmen covering the New England States east of the Connecticut River.

The Anshutz-Bradberry Company of Pittsburgh, Pa., have engaged L. M. Armor to look after their interests in Ohio, Iowa and Illinois and W. C. Latchew in Pennsylvania, Maryland and West Virginia.

The Carton Furnace Company of Utica, N. Y., have the following list of salesmen who will travel in their interests during 1893 in the territory named: J. B. Jones, secretary of the company, will have general charge of the Western trade and will look after the Western agents. M. Bradley will cover the New England States, Pennsylvania and New Jersey; W. G. Barrows, New York State; Lewis Fuess, Ohio, Indiana, Illinois, Iowa, Wisconsin and Michigan; James Ryan, Central New York; John H. Carton, Missouri, Kansas and Nebraska; Henry A. Benoist, the Southern States, and John F. Dwyer will have charge of the Pacific Slope trade.

J. Van Wormer & Co. of Albany, N. Y., will be represented on the road during the ensuing year by David A. Andrus, who will cover the States of New York, Ohio and Indiana; H. C. Whitten of Boston will look after the company's interests in a portion of the New England States, while T. H. Reed of Worcester will take care of Connecticut, New Jersey and portions of Pennsylvania; G. W. Cahoon of St. Paul will represent the company in the Northwest. We also understand that the company will supply the jobbing trade through the Great Western Stove Company of Leavenworth, Kan., A. L. Lindemann & Hoverson Company of Milwaukee, Wis., and Charles E. Clark of Chicago.

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CHICAGO, JANUARY 19, 1893.

Tin—

Straits pigs..... ....21½@22¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland and Melyn Grade	IC, 10 x 14	@ $7.00
	IC, 12 x 12	@ 7.00
	IC, 14 x 20	@ 7.00
	IC, 20 x 28	@ 14.00
	IX, 10 x 14	@ 9.00
	IX, 12 x 12	@ 9.00
	IX, 14 x 20	@ 9.00
	IX, 20 x 28	@ 18.00
	DC, 12½ x 17	@ 6.75
	DX, 12½ x 17	@ 8.75
Allaway Grade,	IC, 10 x 14	@ 6.50
"	IC, 12 x 12	@ 6.50
"	IC, 14 x 20	@ 6.50
"	IC, 20 x 28	@ 13.00
"	IX, 14 x 20	@ 8.00
"	IX, 20 x 28	@ 16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14, 14x20	@$6.00
IC, 14x20, 90 ℔	@ 5.75
IC, 14x20, 100 ℔	@ 5.85
10 x 20	@ 9.00
20 x 28	@12.00
IX, 10x14, 14 x 20	@ 7.50
BV Grade.—IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—	
IC, 14 x 20	@ $5.62½
20 x 28	@ 11.25
IX, 20 x 28	@ 14.25
Worcester Brand and equal.—	
IC, 14 x 20..	6.12½@ .....
IC, 20 x 28..12.25	@ .....
IX, 14 x 20..	7.62½@ .....
20 x 28..15.25	@ .....

American Tin Plates

Charcoal Plates.—Bright.

Irondale, A, A.—IC, 14 x 20	$7.00
" " IC, 20 x 28	8.75
" " IXX, 14 x 20	10.50
" " IC, 20 x 28	14.00
" " IX, 20 x 28	17.50
" " IXX, 20 x 28	21.00
Florence.—	
IC, 10 x 14, 12 x 12, 14 x 20	$7.00
IX, 10 x 14, 12 x 12, 14 x 20	9.00
Palma.—	
IC, 10 x 14, 12 x 12, 14 x 20	$7.50
IX, 10 x 14, 12 x 12, 14 x 20	9.50

Each extra ices $2.00 and 20 x 28 double these prices.

Brilliant, IC, 14 x 20	$9.25
Royal, extra, IC, 14 x 20	7.25
Merlon, IC, 14 x 20	6.75
Almond, IC, 14 x 20	6.50

Coke Plates.—Bright.

Etwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (No. 205), 20 x 28	@$11.50
Crescent, IC, 20 x 28	@ 12.00
" IX, 20 x 28	@ 15.00
Hickory, IC, 20 x 28	@ 13.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20 x 28	@$14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.50
" IX, 20 x 28	@ 18.50
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@$21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	@$25.60
Irondale A:	
IC, 14 x 20	$6.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Kensington:	
IC, 14 x 20	6.62½
IX, 14 x 20	8.12½
IC, 20 x 28	13.25
IX, 20 x 28	16.25
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)	19.00
Taylor's Rooting, IC, 14 x 20 (Stamped and Resquared)	8.25
Taylor's Rooting, IC, 20 x 28 (Stamped and Resquared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
Globe, IC, 14 x 20	5.75
" IC, 20 x 28	11.50

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$14.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	10.50	17.50
		Per box of 56 sheets.
X, 14 x 56	29.50	16.50
XX, 14 x 56	32.50	18.20
X, 11 x 60	31.50	17.65
XX, 14 x 60	35.50	20.90

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 16..	℔ ₵ 2 7-10¢	3 3-10¢
17 to 20	℔ ₵ 2 8-10¢	3 4-10¢
21 to 24	℔ ₵ 2 9-10¢	3½¢
25 and 26	℔ ₵ 3¢	3 6-10¢
27	℔ ₵ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers	13¢ net
Patent Planished	℔ ₵ A, 10½¢; B, 9½¢
Craig Polished Sheet Steel	℔ ₵ dis. 5%
	℔ ₵ 8½¢

Galvanized.

List on following page.
Juniata, or first quality ..... dis. 70%

Copper—

Ingot.

Lake ..... 13¢ @ 13½¢
Casting Grands ..... 12¢ @ 12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.

Copper, Bronze and Gilding Tube, 3¢ ℔ additional.

Brazed Brass Tubing.

(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 ℔.

Above 5-16 inch to 3 inch inclu	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ½ inch	60¢
Plain, 3-16 inch	$1.00
Plain, ¼ inch	$1.50
Fancy Tubing, Brass, to No. 20 inel	43¢ ℔
Bronze Tubing, 3¢ ℔ more than Brass	

33 and 5%

Roll and Sheet Brass.

List on following pages. 35 @ 40%.

Spelter—

Western Spelter ..... 5¢

Zinc—

600 ℔ casks ..... 6¼¢
Less than Casks, ℔ ..... 7¢

Lead—

Soft Pig Lead ..... 4¢
Bar ..... 4½¢@5¢
Pipe ..... 5½¢, dis. 10¢
Block Tin Pipe ..... 25¢
Sheet ..... 6¢, dis. 10%

Solder—

½@½ ..... 13¢
Extra Wiping ..... 12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson ..... 13¢@14¢
Hallett's ..... 12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain	55&5@55&10%
1¼ and under, Galv	45&5@45&10%
1½ and over, Plain	65&5@65&10%
1½ and over, Galv	55&5@55&10%
Boiler Tubes, list Oct. 24, 1892	65%
Casing, list Nov. 16, 1892	52½%
Inserted Joints Casing, list Nov. 16, 1892	47½%
Steel Boiler Tubes	27½%
Cold Drawn Seamless Steel Tubing	50%

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive ..... dis 70&2½%
Other sizes ..... dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted	55¢
Austin's Corrugated	60¢
Gordon & Gilbert's Corrugated	55%
Ritchie's (Galv. Iron only) Cor'd	55%
Ritchie's Spiral Lock Seam, Galv'd	50%
Austin's Spiral Ribbed Pipe	55%
Plain Adjustable Elbows	55%
James A. Miller Bros. (Galv'd Iron only) Corrugated	55%

Steel Roofing—

Perfection	$3.75 square
Climax	$3.50 square

Metallic Shingles—

Cushman's ..... $1.25 square

Drain Pipe—

Discount from list 50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	℔ ₵, 2 ¢
" " Brown	℔ ₵, 1½¢
" " Purple	℔ ₵, 2½¢
" " Ground in oil, B. Red	℔ ₵, 6½¢
" " Ground in oil, Red	℔ ₵, 6½¢
" " Ground in oil, Brown	℔ ₵, 5½¢
" " Ground in oil, Purple	℔ ₵, 6 ¢
Linseed Oil, Boiled, in bbls	51¢
Linseed Oil, Raw, in bbls	48¢
Mineral Paints	2@4¢
Orange Mineral	10½¢
Pure White Lead in Oil	6¾@7¼¢
Dry White Lead in bbls	6¼@6¾¢
Red Lead, American	7@7½¢
Red Venetian, English, dry	$1.65@$1.70
Red Venetian in oil; asst'd cans, 85¢; kegs	7½¢
Sipe's Japan Oil, in bbls, ℔ gal	34¢
Spirits Turpentine, in bbls., ℔ gal	.38½¢
Asphaltum, Trinidad Refined, ℔ ton	$45
Coal Tar, Felt, 1 Ply, ℔ 100 ℔	$1.05
Coal Tar, Felt, 2 Ply, ℔ roll 108 sq. feet	$1.50
Coal Tar, Felt, 3 Ply, ℔ roll of 108 sq. feet	$2.00
Roofing-Pitch, ℔ bbl. of 300 ℔	$3.25

NEW YORK, JANUARY 20, 1893.

Aluminum—

Guaranteed over 98¼% pure ..... ℔ ₵ .75
Guaranteed 94@98¾% pure ..... ℔ ₵ .65
Lots under 100 ℔ 5¢ ℔ ₵ additional.

Antimony—

Cookson ..... ℔ ₵, 12½¢
Hallett's ..... ℔ ₵, 10½@11¢

Brass—

Planished—

List on following page ..... net

Roll and Sheet—

List on following page ..... 35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889

	Per ℔
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	.80@.35
Plain, to No. 20, above 3 inch	45
Plain, 5-16 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu	43

35&40%

Copper and Bronze Tubing—

3¢ ℔ ₵ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c.

Over ¼ to 3¾ inches inclusive ..... 17¢ ℔ ₵
Over 3¾ to 5 inches inclusive ..... 18¢ ℔ ₵

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive ..... 18¢ ℔ ₵
Over 3½ to 5 inches inclusive ..... 19¢ ℔ ₵

Conductors—

Corrugated. *Round or Square—*

Lists on following page
Galvanized 60%
Galvanized, Locked Joints 50%
Tin 60%

Spiral Riveted—

List on following page
Galvanized 50%

See also *Elbows and Shoes, Eave-Trough Mitres, Strainers, Conductor*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.

List on following page ..... 10@20%

Ingot.

Lake ..... 13¢
Ansonia Grade Arizona ..... 12¾¢
Ansonia Grade Casting ..... 11¾¢

Planished.

List on following page ..... net

Sheet and Bolt.

List on following page ..... 30@35%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

Soldering Coppers ..... ℔ ₵, 19@21¢
Covert's Adjustable, list Jan. 1, 1893 ..... 50&2%

Eave Troughs—

List on following page
Lap or Slip Joint, Galvanized 40%
Lap or Slip Joint, Terne 50%

Eave-Trough Mitres—

List on following page
Lap or Slip Joint ..... list, net

Elbows—

List on following page.

Plain Adjustable—

Tin 70%
Galvanized 70%

Crimped Tubing.

Re-Tinned or Galvanized 35%

Elbows and Shoes—

List on following page

Flat Crimp.

Tin 35%
Galvanized 35%

Corrugated.

Flat Crimp.

Galvanized 60%

Round or Square.

Tin 60%
Galvanized 60%

Iron, Sheet—

Black.

	Common American.	R. G. Cleaned American.	American.
Nos. 10 to 16	℔ ₵, 2¾¢	3¾¢	
Nos. 17 to 20	℔ ₵, 3 ¢	3¾¢	
Nos. 21 to 24	℔ ₵, 3¼¢	3¾¢	
Nos. 25 and 26	℔ ₵ 3¾¢	3¾¢	
No. 27	℔ ₵, 3¾¢	3¾¢	
No. 28	℔ ₵, 3¾¢	4¢	
American B. B.	℔ ₵, 4¢		4½¢

Russia, Planished, &c.

Genuine Russia, according to assortment ..... ℔ ₵, 12@13¢
Patent Planished ..... ℔ ₵, A, 10¢; B, 9¢, 5%
Craig Polished Sheet ..... ℔ ₵, 8¾¢

Galvanized.

	B. B.
Nos. 10 to 16	℔ ₵, 4 2-10¢
Nos. 17 to 22	℔ ₵, 4½¢
Nos. 23 to 24	℔ ₵, 4¾¢
Nos. 25 to 26	℔ ₵, 5¢
No. 27	℔ ₵, 5¼¢
No. 28	℔ ₵, 5½¢
Nos. 29 and 30	℔ ₵, 6½¢

Lead—

American Pig ..... 4¼¢
Bar ..... 4¾¢

New York Prices.

Pipe ..... 6¼¢, 20%
Tin Lined Pipe ..... 15¢, 20%
Block Tin Pipe ..... 37½¢, 20%
Sheet ..... 7¢, 20%
Old Lead in exchange, 3¾¢ ℔ ₵.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ ₵, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ₵, .05½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Boot Mats, Galvanized	30%
Window Guards, Paneled	15%
Tree Guards, Paneled	15%

Mitres, Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.—

Dry Yellow Ochre	1½@3
Dry Venetian Red	1½@3
Linseed Oil, Boiled, in bbls	48¢
Linseed Oil, Raw, in bbls	51¢
Brown Metallic Paint	1½@3
Red Lead, American	7½¢
Pure White Lead in Oil	7½¢
Red Venetian, English dry	$1.65@$1.70
Red " in oil, ass'd cans, 11¢; kegs, 8¢	
Spirits Turpentine, in bbl	40¢
Asphaltum, Trinidad Refined, ℔ ton.	$30.00@$35.00
Asphaltum, Rock, ℔ ton	$14.00
Coal Tar Felt, 1 Ply, ℔	2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl	$2.24
Plumbago, E. I., Po., ℔	4@6¢
Plumbago, American, ℔	6@10¢
Plumbago, Gunpowder Glazing, ℔	10¢
Plumbago, Shot Polish, ℔	10¢

Pipe, Drain—

List on following page 50%

Pipe and Fittings, Cast Iron, Soil—

List on following page.

Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 Inches, inclusive	60&60&10%
Other sizes	55&55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 Inches	60&60&10%
Other sizes	55@55&10%

Pipe, Spiral—

List on following page.

Galvanized	60%
Tin	60%

Pipe, Wrought Iron—

List on following page.

1¼ and under, Plain	55&'65&10%
1¼ and under, Galv	45&55@15&10%
1½ and over, Plain	65&55@65&10%
1½ and over, Galv	55&55@55&10%
Boiler Tubes, list Oct. 24, 1892	65%
Casing, list Nov. 16, 1892	52½%
Inserted Joints Casing, list Nov. 16, 1892	47½%
Steel Roller Tubes	27½%
Cold Drawn Seamless Steel Tubing	50%

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, January 28, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....220 South Fourth Street
BOSTON.....146 Franklin Street
PITTSBURGH.....Room 500, Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....S. E. cor. Fourth and Main Streets
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....219 Superior Street

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Fuel Consumption.

One of the questions usually put to the steam or hot water heating engineer when he is endeavoring to secure a contract is, "how much coal will it take in cold weather to heat my house with your apparatus?" The answer can seldom be evaded, although in many instances an evasion would be very much of a relief to the would-be seller of a heating plant. He knows or is confident that his apparatus will devour no more fuel than other heating apparatuses with which he has to compete; he knows, perhaps, also, that these same competitors are really and truly economical of fuel, yet he also knows that if the man whom he hopes to persuade to become a purchaser has never had experience in thoroughly warming a whole house, truth, "the whole truth, and nothing but the truth," as to how much coal will be needed, will rather astonish the individual upon whom his eloquence has been expended. And if he musters courage to tell the naked truth, won't the other fellow stretch it just a little, just enough to knock him out of the hoped-for contract? What shall he do? The sin may seem very small, while the temptation to commit it is very great. If advice is asked of us as to the proper method of proceeding in such a quandary, we should answer, tell the truth; tell it without hesitation or seeming to hesitate; but do it so that the man whom you wish to purchase your apparatus may understand why it is the truth, and so, when the other fellows begin to underrate fuel consumption, your man will be prepared to read their inner souls and know that they are—well, let us say, misled by zeal into inaccuracy of statement.

How to Rate Fuel Consumption.

"My dear sir," we should say, "there is a vast deal of difference between warming a small dining room, parlor and perhaps, also, a bedroom, with a good kitchen fire always going to help the thing along, and thoroughly warming a three-story and basement house of 12 rooms, with an abundance of glass in the form of bay windows in front and a conservatory at the rear. Your architect, either by his own computation, or advised by an expert, has decided that it will take 750 square feet of radiator surface besides risers, radiator connections, &c., to do this warming in zero weather. Now, for each hundred feet of this surface 30 pounds of water per hour must be made into steam in the boiler I hope to put in, or (if I am to be disappointed in that hope) by any other boiler you may decide to purchase. Therefore, no matter what apparatus you use, unless the amount of heating surface required has been overestimated, you will need to evaporate 225 pounds of water per hour in extreme weather to keep this house uniformly warm from attic to cellar. Now, my boiler, which I claim to be more efficient than the average, will generate 8 pounds of steam for each pound of coal burned, provided it has a fair chance, and hence it will burn a trifle over 28 pounds of coal per hour under the conditions named. If the temperature is to be kept uniform in all parts of the house, it will, in severe weather, take 24 times 28 pounds of coal to do the warming, or 672 pounds per day. If the other fellows claim they can beat this, ask them how many pounds of water per pound of coal they can evaporate per hour. If they say 9, you have room for doubt. If they say 10, you had better doubt pretty hard till they verify their claim. If they say 11, go to some disinterested expert and ask him what he thinks of the possibility of obtaining such efficiency in any boiler of a capacity to evaporate 225 pounds of water per hour, and see if he don't say that the zeal of the other fellows to make a sale has led them to—well, to an inaccuracy of statement."

Trade Education Abroad.

We have much pleasure in presenting this week a notice of one of the latest acquisitions to the ranks of technical training institutions and trade schools in Great Britain. The account of the Borough Road Polytechnic Institute of London will, we believe, be acceptable to those of our readers who are interested in the matter of trade education. This important question is, we are glad to observe, receiving much attention from the trades and general public in the United States. All information, therefore, in regard to the methods pursued in other countries to further the better technical training of their artisans should be valuable to us, and we may glean useful hints from the procedure of other nations in this respect. One feature in connection with the establishment of the educational work of the above-named institute which is not touched upon in the article appears to us to be worthy of special notice and commendation. In the first days after the opening of the building for use, and previous to commencing the educational classes, special meetings of London artisans of various branches of trade were called together. These meetings were held under the auspices of the different trades guilds and companies represented, and were free and open to all. The object was to confer as to the course of instruction that should be followed in the various classes. Conferences of plumbers, builders, sheet metal workers, boot and shoe makers, printers, photographers, &c., took place at the institute. From the representatives of these trades many practical suggestions and much shrewd and useful advice were obtained, and in many cases acted upon. The general sense of these meetings appears to have guided the governing board of the institute in the arrangement of the course of instruction; and we have no doubt the result will be of the greatest benefit.

Gas as Fuel.

Gas, both from natural and artificial sources, has been found a very convenient fuel for many purposes and its use is likely to increase with improvements in appliances for burning it. In only one way, and that a very uneconomical way, has it been applied to heating rooms so as to be free from objection from a sanitary standpoint. Gas logs in grates where the gases of combustion are allowed to escape freely through an open flue aid in keeping pure the air of the rooms in which they are placed, through their action in drawing the least pure air from the lower part of the inclosed space and carrying it out into the exterior atmosphere. But when so used a very large amount of heat produced by the combustion is wasted. About the only heat utilized is that radiated from the flame and the heated logs into apartments before the heated gases enter the flue, and as the passage from the jets to the throat of the flue is short, there is only a fraction of a second of time after ignition for this action to take place before the radiation from the hot gaseous mixture is almost entirely cut off. If one could light the gas issuing from gas logs, then immediately extinguish it, and measuring the quantities of heat that respectively are thrown out into the room and wasted through the flue, most people would be astonished at the extent of the waste. One foot of gas burned within a space to be heated in a good Bunsen gas burner will affect the temperature of an apartment nearly or quite as much as 10 feet burned in an open grate. But the burning of gas enough to heat a room in cold weather without any provision for escape of the products of combustion not only vitiates the inclosed air, but is also attended with other inconveniences. A large amount of water in the form of steam is generated in the combustion of gas. The condensation of this

steam from gas burned for illumination only does not give much annoyance, but in cold weather used even for this purpose it often clouds windows with vapor that either drips down or freezes on the glass, thus rendering the windows unsightly by day and obstructing vision. This effect is so intensified in a room wholly heated by gas jets in the free space as alone to become an important objection to the method. A room so heated also acquires an odor not only unpleasantly perceptible to nearly every one, but to many persons quite intolerable.

An Improved Gas Stove.

There thus arises a want for a gas stove in which gas may be economically burned for warming rooms without the above-named objections. Such a stove would meet with a large and ready sale in all large cities wherein a considerable number of people are forced to live in rooms for which no special means of warming have been provided. 1. Such a stove should have Bunsen burners, or equivalent burners for completely consuming the gas. In this way all the heat possible to be generated by the combustion of a given quantity of gas will be obtained. 2. Means for extracting this heat from the gas flame by suitable conducting and radiating surfaces must be supplied. Lastly, the burned gas, after having been cooled by contact with the surfaces that transfer its heat to the surrounding air and objects, must be conveyed into the outer air. These are the three requirements for a gas heater that will remove the objections hitherto existing against common illuminating gas as fuel for warming apartments. In order that in avoiding these objectionable features another serious objection may not be introduced, the cost of the apparatus must be within reasonable limits. It does not seem so difficult to secure the three requirements named, together with the fourth, as to deter an inventive mind from grappling with the problem. The burners already exist. A sufficient metallic surface, arranged to allow the heated gas to flow over one side while the air to be heated flows over the opposite side, will meet the second requirement. A suitable pipe for carrying away the spent gases and water vapor through an opening cut in a pane would meet the third requirement, though doubtless to construct this part of the apparatus in such manner that the draft would always be outward might tax ingenuity. As to cost, the designer should neglect nothing that tends to reduce it, provided that the other requisites are not interfered with. Efficiency, at the sacrifice of ornamentation even to the extent of entire absence of decorative features, should be the prime consideration.

The Welsh Tin Platers.

Reports are current of labor difficulties in tin-plate factories in which newly-arrived Welsh workmen are employed. In some cases it is known that such radical differences arose between the management and their Welsh employees that all of the latter were discharged and their places filled with men of other nationalities, who were expected to prove more reasonable and less under the control of hide-bound prejudices against the use of labor-saving devices. We know of one instance in which a very progressive and energetic manufacturer found himself so hampered by continual opposition to his wishes and steadfast adherence to ancient customs transferred to his factory from Wales, that he has put himself on record against the employment of another Welshman in his establishment. The experience of this gentleman was that every step taken by him was regarded with suspicion. His whole force was arrayed against him, and the merest alteration in the arrangement of any portion of the factory was at once the subject of the most earnest consultation, and if its object was not thoroughly explained and then perfectly comprehended by the workmen, they dropped their tools and walked out.

Valuable Workmen.

From the knowledge of such occurences as these arises the temptation to generalize, and to conclude that because such things have happened, therefore Welsh workmen are wholly unreliable. We are happy to say this is not the case. There are other tin-plate factories in which but slight difficulty has ever arisen between the management and their Welsh workmen, and the latter have proved to be quick to adapt themselves to new conditions, very reasonable in their view of the adoption of new processes and labor-saving machinery and willing to assist their employers in establishing the new industry on a plane advanced above that established in Wales. We hear of very good results in notable instances in which newly arrived Welshmen have been employed, and in these cases manufacturers deem themselves fortunately situated in being able to secure skilled workmen of long experience to enable them to turn out tin plates of immediately acknowledged superiority.

The Welsh in Other Trades.

In this country, with its mixed nationalities, it is a very easy matter to excite prejudice against a particular race. Ideas of such a character are imbibed unconsciously by persons who pride themselves on their judicial fairness. There is too great a tendency to permit the conduct or disposition of a few representatives of a race to determine how it is to be regarded as a whole. In the matter of the Welsh tin plate workers, the narrow-mindedness of individual workmen causes their fellow-countrymen to suffer. The fact is overlooked that Welsh workmen are not new to this country. Immigrants from Wales were among the earliest settlers here, and they and their posterity have contributed much to the glorious record of America in industrial as well as commercial, financial, military and intellectual achievements. Their influence has been felt particularly in the iron and coal trades. There are honored Welsh names in the list of those who have become prominent as captains of industry and leaders of mechanical progress. Men who bear such names as Thomas, Williams, Jones, Morgan, Richards, Davis, Evans, Roberts, Hopkins, &c., are of Welsh extraction. Those who bear them lie under no ban, but can point to the history of the American iron and coal trades, with which their family histories or personal histories are interwoven. At this late day a few obstreperous and wrong-headed men among the many tin-plate workers who have come over here can hardly bring more than slight discredit on a people known and honored among us from the earliest settlements.

The Boy in the Barrel.

There is an often quoted adage which is, "Nothing succeeds like success," and this seems indisputable, but sometimes we find our success a failure. For instance, a man may save a flow from the top of his barrel and lose it at the bung hole. Apropos to this is an ancient yarn, which may illustrate the point and also point a moral.

Mr. X had a barrel with one head in place and wished to use it empty with both heads attached. From his lack of cooper skill or may be because, as he said, "The pesky thing was out o' kilter," it would not hold its head up while the hoops were driven, but let it drop at the first blow. After several failures he put his small boy inside to hold up the contrary head and soon said, "There, that's done; nothing succeeds like success." Voice from the barrel, "Father, I want to git out." Response from outside, "Well, I'll be durned." There have been times in almost every one's experience when, having a special end in view, we have thought only of ultimate success regardless of the means employed, finding in our hours of triumph that we had left the boy in the barrel.

There was a time, still remembered by the ancients, when boys were "bound apprentices" to learn trades, and being compelled to remain under tutelage for a term of years would, if not incorrigibly dull, come out at majority with a freedom suit and a practical knowledge of at least the first chapters of their calling. But that style of technical education has passed and now the average learners of the trade, with the possible exceptions of graduates from trade schools, will stay under instruction about long enough to master the shop vernacular, and then fancying themselves full fledged journeymen, seek employment successfully, which lasts until some job presents that they have neither theory nor practice in, forcing them to admit the error of leaving a boy in the barrel. Men who embark in business ventures with limited capacity, capital or credit may succeed in persuading the public temporarily that such buried investments as family and personal luxuries that a struggle for social position usually requires are warranted by their profits, leaving a margin for trade purposes, but often it is found that they are unavailable, like the boy in the barrel. Trade unions are, no doubt, of advantage to their constituent membership, which may be enjoyed without a refusal to recognize the claim that all men, including employers, are in the words of our vaunted Declaration of Independence "endowed by the creator with certain inalienable rights." Failing to see this truth and confining the application of their maxim, "an injury to one is an injury to all," to a limited number, they would compel a following of their theories on work and wages notwithstanding their admitted conflict with the laws of supply and demand. Men by concerted action may arrest for a time the revolution of industrial wheels, but while engaged as brakes they are liable to be broken, and the muscles which refuse labor, for reasons which do not square with the Golden Rule, may get out of practice in conveying food to the mouth. Here also is a striking instance of the boy in the barrel. More might be written concerning this matter of success without succeeding, which, though it reads like a paradox, is often met with in life, teaching in the dear school of experience that it is better to keep the boy out of the barrel.

PLUMBING AND GAS FITTING.

The New York Examining Board of Plumbers.

There is considerable dissatisfaction expressed at the dilatoriness exhibited by the chief executive of New York City in the failure to carry out the provisions of chapter 620 of the laws of 1892, otherwise known as the act to secure the registration of plumbers and the supervision of plumbing and drainage in the cities of the State of New York. Four weeks only now remain within which to appoint the board, to have the board organize and formulate rules to be observed, to examine the qualifications of new applicants, and to issue licenses to every plumber doing business in the city. The bill requires (Sec. 6) that after March 1, 1893, it shall not be lawful for any person to engage in or carry on the trade, business or calling of an employing or master plumber unless he can produce his certificate of competency for the inspection and satisfaction of the Health Department at the time of registering in the department. If they are not in possession of this certificate they must either suspend business operations until they have complied with the law or take chances by violating the statute.

Some years ago, when Commissioner Rollin M. Squire was at the head of the Department of Public Works, the plumbers were required to surrender their old licenses and take out new ones, the applicants to be examined by the License Committee of the Master Plumbers' Association. The time occupied in this cancellation and renewal was considerable, and the plumbers' committee were compelled to sit every night up to a late hour at their rooms to examine applicants so as to facilitate the work. There are very many more master plumbers in New York now than at that time, and it will tax the resources of the board to the utmost to put all the applicants through before March 1

The plumbers owe it to themselves to bring pressure to bear upon the Mayor to make the appointments. Other cities in the State have already recognized the mandatory character of the law, and the Empire City should not be allowed to fall behind in the march of progress.

Water Pipes Clogged by Fungus Growth.

From INQUIRER, *New York.*—Can you account for the presence of a sort of fungus growth in water pipes in New York City, by which the pipes get filled with matter somewhat resembling very fine oakum? A prominent master plumber in this city—Frank Reynolds—has had some perplexing experience of this character which involved considerable outlay of time and thought before he could successfully cope with the obstruction. Have any of your readers had a similar experience? It would be interesting to know how they overcame the difficulty. Mr. Reynolds, I learn, has solved the problem to his own satisfaction.

Answer.—As the information contained in the above is too scant to enable us to construct a theory, a representative of *The Metal Worker* interviewed Mr. Reynolds, and obtained his views on the subject, which we present as the most practical answer to our correspondent. Mr. Reynolds describes it as something resembling oakum, which from long soakage in water had become, as it were, rotten. This was carried into the stop cock on the main in the street, and even into the building, frequently in such quantity as to choke off the supply, necessitating the digging up of the streets. On investigation the material proved to be a sort of fungus growing on the inside of reservoirs known as "snake grass," as fine in texture as very fine oakum. In the passage of the water through reservoirs this grass or fungus becomes detached, and floating through the large mains is drawn into the house main, with the clogging effect already stated. To such an extent did it abound that in the neighborhood of the building affected, and in which Mr. Reynolds was interested, a fire hydrant on being opened was found so completely clogged as to afford sufficient snake grass to fill a bucket. Mr. Reynolds had some thinking before he devised a means of excluding it from the house, in which he eventually succeeded. As "Inquirer" states, it would be interesting to our readers and to the trade generally to learn if difficulties of a similar character have been experienced by plumbers in other places. Diagrams of devices adopted with explanation will be acceptable if forwarded to *The Metal Worker*, and in the meantime we shall endeavor to procure one of the devices used by Mr. Reynolds.

Thawing Frozen Pipes.

From E. D., *Halifax, Canada.*—I would like to find out through *The Metal Worker* how the craft in some of your frost-smitten towns deal with frozen water pipes. Our winters here are not made up of continuous cold weather. We are liable to sudden changes and this takes people off their guard, the thermometer sometimes dropping 20° and 25° between nightfall and daybreak. The result is, hurried calls for the plumber. Thawing water pipes is probably the most disagreeable work that the tradesman undertakes. Where the pipes are accessible the steam lamp generally makes short work of starting the water, but within covered walls and under floors a job is often met with that taxes all the ingenuity of the work man, for it goes without saying the plumber disturbs the woodwork as little as possible. In such cases we know of nothing better than the old time coil ½-inch composition gas tube with a funnel stuck to one end. This works well, however, until a bend in the frozen pipe is met, when a carpenter must be summoned and a fresh start made at a new point. It is not at all likely that we are acquainted with the best methods of treating such jobs. We get our cues chiefly from the English—that is, old country—plumbers and they, as a rule, are good workmen. But there is not frost enough in their moist island to enable them to acquire much experience in this line of work.

The Master Plumbers' Convention.

From HOOSIER, *Indianopolis, Ind.*—Can you inform me why it was that the Executive Committee of the National Association of Master Plumbers at its recent meeting in New York voted to change the place of meeting of the convention in June from Indianapolis to Milwaukee? It cannot be that they were afraid we were not up on the entertainment question.

Answer.—We have no reason to think that the Master Plumbers' National Committee entertained any such idea. The representative of *The Metal Worker*, in his intercourse with the members of the National Committee when in this city, understood from them that there were certain weighty reasons for the change, but no thought derogatory to Indianapolis entered for an instant into the consideration of the subject. It was a matter of business policy, which under the circumstances the Executive Committee were competent to decide.

New York Master Plumbers.

The officers elected for the year 1893 by the New York Master Plumbers' Association are as follows:

President, Henry G. Gabay.
Vice-president, Wm. J. McDermott.
Recording secretary, Henry J. Pattison.
Financial secretary, Thos. J. Cummins.
Treasurer, Jas. N. Knight.
Marshal, John C. Starck.
Sergeant-at arms, Chas. Kranichfelt.
Trustees, James Gilroy, Thomas J. Tuomey, Jonas A. Rossman, Thos. J. Cummins, Thos. F. Gaynor.

This is the third term for President Gabay, who is possessed of good executive ability and deservedly popular with his brother craftsmen, both of the New York and National associations.

Another Joint-Wiping Expedient.

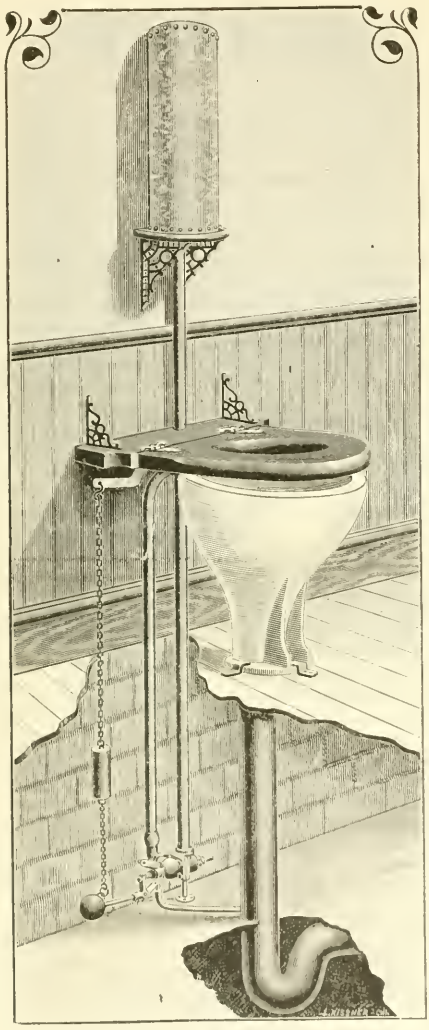
From F. F. D., *Dover, N. H.*—As we have to be governed by circumstances very often as to what method we shall use in doing a piece of work, I will describe an expedient I have used in a case similar to that mentioned by "A. L. R." in *The Metal Worker* of December 10, 1892.

A joint was to be made in a lead pipe leading from the water main to a dwelling house. As ice and salt were not handy, I cut the branch and plugged the end of the section attached to the water main, thus stopping the flow of water and then soldered over the plug. Then I replaced the bad pipe with good. The next thing was to connect the two sections. I made a short T on the end of the repaired part, the end of the T lapping over the part which had been plugged, and soldered the end of the T to the top of the plugged pipe. Then I inserted a bit into the T and bored a hole in the plugged pipe so that when I withdrew the bit the water flowed

out through the top of the T. It was only necessary then to place another plug in the top of the T and to solder over it, when the connection was completed.

The Kelly Frost-Proof Water Closet.

In the accompanying illustration we show a general view of the Kelly self acting after flush frost-proof water closet, manufactured by Thomas Kelly & Brothers, 123 Franklin street, Chicago. The chief claim made for this closet is that there is no water remaining in any part above the freezing point. When the seat is pressed down, the tank, which can be set at any desired hight, fills with water so far as the pressure will compress the air in the tank, with, it is said, force enough to clear the closet and sewer. We understand that these closets have given much satisfaction during the recent cold weather in the Northwest.



The Kelly Frost-Proof Water Closet.

The Setting of Flush Rim Water Closets.

From Y. P., *Camden, N. J.*—What is the best way to set flushing rim hopper closets? I was sent to put in two closets of the short hopper and iron trap pattern in a private house last week, and put them up in the same way as the foreman used to set them where I learned my trade. The owner now complains to my boss that they do not work satisfactorily; that the flush does not strike them in the proper place and that the back of the bowl is always filthy. How can I improve on the work.

Answer.—There should be no trouble in setting a hopper closet if a young man exercises his intelligence. The common practice is to run the 1½ inch flush pipe down over back of closet seat so that the flush will come down with an unimpeded rush. A little observation will show that the force of the flush, under this arrangement is directed toward the front of the inside of the closet bowl, which does not need it as much as the back part. If in setting the bowl the inlet for flush pipe were set nearly in front the desired object would be accomplished, for the full force of the stream would be thrown on the back of the bowl. To do this it is only necessary that the flush pipe, after it gets below the closet seat at the back, be carried round under the seat so as to make the connection as near the front as possible. If our correspondent tries the effect of the above plan he will find it to work all right and give satisfaction.

New York Trade Schools.

The Trade School Committee of the Master Plumbers' Association visited the schools on Wednesday, January 18, for the purpose of making the acquaintance of the students of the day class in plumbing. The members of the committee present were Edward Murphy, Frank Reynolds and T. J. Toumey. They arrived at the schools about three o'clock and spent an hour in examining the work that the students had done since the commencement of the term. When the closing hour arrived, the class was assembled in the lecture room of the schools and Mr. Brill, the secretary, introduced the members of the committee, each of whom made a few appropriate remarks. Mr. Murphy also distributed a book on plumbing, a gift to each of the students from Colonel Auchmuty.

The Position of the Plumber.

From H. S. & D., *Charleston, W. Va.*, —"In New York the art and mystery of plumbing is taught in the public manual training school. Graduates will be enabled to make an intelligent kick, even though they may not attain sufficient skill to do their own robbing."—*Minneapolis Tribune.*

The above clipping is quite too old a "chestnut" to merit any comment. We regard it due the craft and to our workmen, as well as plumbers in general, to express resentment to the alleged greed of a useful and intelligent class of skilled mechanics.

We desire to call attention to one fact that was apparent to our citizens and probably those of many other towns during the week before last—namely, that the only mechanics seen on the streets going to work during this unprecedented cold spell were plumbers.

Realizing that a temperature of zero to 20° below would shut off the water supply of hundreds of dwellings and bring actual suffering to many households, and thereby create a demand for relief much beyond the combined ability of all the plumbing shops in the city to meet, we suspended all new work and placed our entire force, including every member of the firm, on repair work. When our shop doors were opened at 7 a.m. Monday morning the telephone was ringing. In a few hours we had as many calls as we could respond to in a week. They came by telephone, by mail, by messengers, by customers in person, each and every one was urgent. It was no time to banter or cavil about prices, but a time to act. Before the week closed our call list resembled an application for an important post office.

Every man in our employ reported promptly each morning during the week and without a single exception went out without a murmur or a word of objection, no matter how cold or stormy the weather,

to do his utmost to relieve the pressing necessities of our customers. We did what we could, working early and late at night and in one case all night. Everywhere our men were gladly welcomed.

Knowing by actual experience the exceeding discomfort of handling tools and frozen pipes in biting cold air, we felt it not unjust to make a moderate advance on our usual prices for repairs.

If any reader of this wishes to know what a pleasant job such work is let him with wet hands handle a wrench or pipe tongs where the thermometer is ranging near zero. It may appear simple enough, but continue it for a single hour and then tell us how you like the work the plumber has to do to repair your burst pipes and this most frequently in rooms where a fire is not only impracticable but absolutely dangerous. You may think he can protect his hands with gloves or that wet hands are avoidable. If so take down a pipe frozen full of ice and see how long your hands will remain dry.

Believing that a mechanic who possesses sufficient pluck to continue at his work while all other mechanics are sitting at their firesides or mingling with the throng in the well-warmed corridors at the capitol, or possibly lounging at the saloon or billiard room, to be justly entitled to liberal pay, we voluntarily added one-fourth to the regular week's wages of every mechanic and helper in our employ Saturday evening.

If $2.50 to $4 per hour is not too much for the hire of a single horse and sleigh (actual prices charged here), we believe we shall not stand unjustified for paying our men a similar sum for a full day's labor and charging a like advance to those of our customers who had the benefit of their services.

We venture to assert that among the scores of patrons served by us during the week none will find occasion to complain of excessive charges or robbery. The facts and experiences of one week in a plumbing shop we have but very faintly portrayed. Our experience was doubtless just like that of plumbers all over the country. We believe the plumber to be the peer of any craftsman, and while he works at the trade or follows the business for the money there is in it, he gets no more for his services than those who are his equal in skill and intelligence. We think the time has come when he should no longer be made the object of dirty flings or classed among robbers. What other craft is there that can say one-half as much to the credit of their workmen?

TRAPS AND VENTS.

A LAW WAS PASSED by the New York State Legislature last winter, says our Albany correspondent, creating a board of examining plumbers in cities throughout the State, and at Albany a small appropriation was made in the last annual budget to enable the plumbing board to begin its work. The law says that on or before March 1, 1893, every employing or master plumber is to register at the office of the local Board of Health, if holding a certificate granted by the examining board. It is the opinion of the Albany plumbers that the law will do much to raise the standard of work, allowing only those thoroughly qualified to become master plumbers. The local board has been assigned rooms in the City Hall by the Mayor. There such simple apparatus and material will be on hand as may be needful in having the candidate practically demonstrate that his knowledge is sufficient to enable him to do such work as he professes. By this means he will show what he knows about the various branches of plumbing. The local board have already organized, and chosen City Engineer Andrews, who is a member by virtue of his office, president. William J. Halpen has been elected clerk. The other members of the examining board are: J. Edward Jones, D. H. McCormick, H. F. Wescott and Inspector of Plumbing Gorman of the Health Board.

JOHN E. HARRISON has been appointed plumbing inspector for the board of plumbers of Schnectady, N. Y.

ANDREW GREEN AND ALLEN L. HENRY of Nyack, N. Y., have formed a copartnership in the plumbing business under the firm name of Green & Henry. They are both experienced men in the plumbing line.

M. S. DIXEY of Philadelphia, Pa., has been awarded the following contracts on the new barracks to be built at Plattsburg, N. Y., by the Government: Plumbing officers' quarters, $8400; plumbing barracks, $6400; plumbing mess house, $1900; gas piping quarters, $560; gas piping barracks, $150; gas piping guard house, $35; gas piping mess hall, $55. Babcock & O'Donnell of Syracuse, N. Y., will do the guard house plumbing for $1032. Ban & Creeman, Rochester, N. Y., will put in the steam heating apparatus for $7210, and Bramhall, Deane & Co., New York, the cooking apparatus for $3000.

THE TORONTO STEEL CLAD BATH & METAL COMPANY, LIMITED, send out a New Year's greeting, announcing to their friends and patrons that they have improved their facilities for the manufacture of the steel-clad baths and can produce them with greater dispatch and better satisfaction than heretofore. This announcement is printed on a card, the back of which carries an illustration of the bath.

PECK BROS. & Co., plumbers' supplies, 259 Wabash avenue, Chicago, have secured the services of M. H. Hogle, who will represent the firm on the road the coming season. Mr. Hogle was formerly connected with the National Tube Works Company.

Standard Gauge for Sheets.

(*From Our Washington Correspondent.*)

The friends of the bill to establish a standard gauge for sheet and plate iron, both on the Committee on Coinage, Weights and Measures, and in the House, feel much encouraged at the prospects of action. The committee have authorized a favorable report on the Stone bill, and an effort will be made to have the Committee on Rules fix a day for its consideration.

There is no reason for opposition in the House other than the narrow notions of a few hide-bound partisans, who seem to mix up everything in the line of national legislation to secure uniformity in all the States as an infringement on State rights.

John Jarrett and C. H. Kauffman are in Washington enlightening legislators who wish to be enlightened on the advantage of establishing a standard gauge as proposed.

Mr. Jarrett says the "benefits to follow from the fixing of a standard weight and thickness for the sheets and plates of iron and steel are many. Take 28 gauge. Some manufacturers make it 8 ounces and others 10 ounces to the square foot. What we want is a uniform standard, as follows: Take a square foot of iron, 1 inch thick, weighing 640 ounces as the basis of calculation. From that uniform thickness and weight we can easily calculate the exact weight of the different thicknesses. The establishment of a uniform standard will be an advantage to the wage worker, the manufacturer and the consumer. The scale which has been submitted differs slightly from the English gauge, but we think the American standard is better, as it is based upon simpler rules and more scientific adjustment of size and weight."

New York Hardware Dinner.

We give below an important official announcement of the Dinner Committee of the Hardware Club, who are making arrangements for the trade dinner, February 21. It is especially desired that at this gathering there be a general representation of the trade at large, manufacturers and merchants, whether residing in New York, its vicinity or other parts of the country. As it would be a matter of very considerable difficulty to send special invitations to all the members of the trade who would be welcomed at the dinner, the committee by the publication of the announcement given below extend an invitation to manufacturers and merchants in Hardware and related lines, in view of which all who desire to attend will feel free to do so. It is hoped that there will be a large attendance of the manufacturing interests in this line, and it would be an especial pleasure if at the dinner there might be a goodly number of prominent Hardwaremen from other cities. The following is the official announcement of the committee:

FIFTH DINNER
OF THE
HARDWARE AND METAL TRADES.

RECEPTION, 6 TO 7 O'CLOCK; DINNER 7 O'CLOCK.

The fifth dinner of the Hardware and Metal Trades will be held under the auspices of the Hardware Club of New York, in the Banquet Hall of the Manhattan Athletic Club, Madison avenue and Forty-fifth street, on Tuesday evening, February 21.

We are under obligations to the officers of the Manhattan Club for the courtesy of extending to our guests the privilege of inspecting their magnificent building in all its departments during the evening.

We are not issuing individual invitations, but all merchants and manufacturers in Hardware and related lines are hereby cordially invited to attend the dinner, which it is hoped will be a thoroughly representative gathering of the trade in all parts of the country.

Tickets, $5 each (wines à la carte), can be had from A. D. Clinch of Underhill, Clinch & Co., 94 Chambers street.

The demand for tickets for the dinner of 1892 exceeded the supply, and it is hoped that applications for tickets this year will be sent in early, as the issue will be limited, so as not to exceed the comfortable seating capacity of the hall.

Dinner Committee:

ALFRED D. CLINCH, *Chairman.*
PETER MCCARTEE.
JOHN L. VARICK
EDWARD C. VAN GLAHN.
EUGENE BISSELL.

The imports of rubber into the United States in 1892 amounted to 34,300,000 pounds, principally from Brazil. This is a decline compared with the previous year.

Loss of Heat from Range Boilers.—II.

TEMPERATURE OF FIRE.

First, then, we will say that the effective temperature of fire in contact with the water back must be considerably below 1100°, which is probably true, and it may be, say, 750° to 800°. But as this will decrease the heating capacity but 20 per cent., or from 230 gallons to 194 gallons per hour, there is still a large discrepancy, and we must look further for the cause. We know the calculation for conductivity to be correct, and the only other apparent source of error seems to be in assuming that the circulation was perfect. If, however, it be defective from any cause, the entire efficiency of the heating apparatus will be affected, as the very small amount of heating surface in proportion to the volume of water renders the storage portion of the apparatus a necessity; and unless it be kept in sufficiently rapid circulation to absorb the heat from the fire as rapidly as it can be transmitted by the material composing the heating surface, the capacity of the apparatus must be reduced in proportion as the circulation is defective.

For instance, if the circulation is sluggish, the water in water back will remain so nearly stationary as to allow it to become heated to a very much higher temperature than would be possible if it were being continually and rapidly displaced by the cooler water from the lower portion of the boiler, and the quantity of heat conveyed to the upper portion by this smaller quantity of hotter water will be much less than the conducting capacity of the water back due to the temperature of the fire. There are numerous causes which will affect the rapidity of circulation, and if one or more of these exist the result will be more or less unsatisfactory. The principle involved in this circulation by heat is the difference of specific gravity or weight of the water, due to the temperatures existing in the upper and lower levels of the boiler, or at the points at which the two connecting pipes are attached. The greater the difference of these temperatures, of course, the more rapid will be the circulation. It is important, therefore, that the inlet and outlet pipes connecting the water back and boiler be properly located with reference to this point. Should the upper or discharge connection from water back enter the boiler too low, it will have the effect of heating the lower stratum of water, and possibly to such an extent as to cause almost a complete equilibrium of temperatures (and consequently of specific gravities) at the two connections, and hence the circulation will be reduced, or entirely suspended, until such time as the necessary difference may be again established, and the circulation—instead of being continuous—becomes intermittent.

BOILER CONNECTIONS.

As the location of these connections in both boiler and water back is fixed by the manufacturer, the supposition is that they are correctly made, on rules derived from practical experience, and the matter is, therefore, beyond control of the plumber, except as to making correctly the connections between the two portions of the apparatus. In some cases the difficulty is due to a partial stoppage of the lower opening in the water back, from deposits of lime, scale, or rust caused by the water. This, of course, will only happen as an effect of continued use, and is not an inherent defect. It may be easily remedied by disconnecting the pipe at the union and cleaning out the deposit. Or it may be that the leaden pipes—one or both—may have become partially closed by being kinked or dented through carelessness. This, of course, would affect the circulation more or less, according to the amount of obstruction.

As we have found by our previous figures that the actual efficiency of the boiler is about 50 gallons per hour, it would seem that the circulation is only about one-half as rapid as would be necessary to utilize the full conducting power of the water back. Therefore the 194 gallons will be reduced to 97 gallons as the actual capacity. On this basis, then, we may figure the proportionate loss from exposure of the surface of boiler. As we have found the quantity of heat per gallon for the 64° between 100° and the initial temperature of the water to be 533.76 units, the quantity contained in the water heated per hour will be $533.76 \times 97 = 51774.72$ total heat units. The amount of loss from boiler being 4554 units, we have $4554 \div 51{,}775 = 0.088$, or 8 8 per cent. at 100°, or 13.2 per cent. at 150°.

Of course, the estimate of the amount of loss in efficiency of the heating portion of the apparatus, from defective circulation, is pure guesswork; but that it is but a very small percentage of the capacity due to temperature and conductivity of the water back has been very clearly demonstrated. If, however, the efficiency is correctly shown by the foregoing figures, the proportionate loss from the boiler becomes a matter of considerable importance, and the possible saving of a large percentage on this item may be the means of furnishing an additional supply of hot water sufficient to meet the existing deficiency. The quantity of water represented by the 4554 units of heat lost is $4554 \div 533.76$ = about 8½ gallons per hour. In the above calculations to ascertain the amount of this loss only the simple rules have been used, for the purpose of demonstrating the possibility of systematic investigation. As will be shown later, the actual loss is considerably greater than above, and consequently, the saving possible—though of the same percentage—will represent a larger quantity in the aggregate.

HEAT IN THE KITCHEN.

As to the effect of the diffusion of this quantity of heat upon the temperature of the atmosphere in room, we may calculate as follows: Suppose the room to be of dimensions 10 x 15 feet x 10 feet high = 1500 cubic feet. As 13.14 cubic feet of air at 62° F. weigh 1 pound, and the specific heat being 0.2379 (water being 1.0), the number of heat units contained in this volume for each degree of temperature will be $\frac{1500}{13.14} \times 0.2379 = 27.16$; and $\frac{4554}{27.16} = 167.7$. The heat lost by the boiler &c., in one hour will, therefore, be sufficient to raise the temperature 1°, of a volume of air 167.7 times as great as the capacity of room, or, say, of the single contained volume $\frac{167.7}{6} = 28°$ in ten minutes. Now, while this is very desirable for the purpose of assisting to maintain a comfortable temperature in cold weather, provided the heat given out by the range itself is insufficient, it is certainly not good economy to obtain the result at the expense of the necessary supply of hot water; while in summer it is a by no means inconsiderable addition to the discomfort of the occupants of the kitchen, though its effect on the water supply may be unimportant.

COVERING FOR BOILERS.

The jacketing of boilers and steam pipes is now considered indispensable in steam engineering practice and there does not appear to be any good reason why the same method should not be applied to domestic apparatus. Of course some modifications would be necessary as to the nature of the covering. It must be neat in appearance and cheap, as an unsightly or expensive covering would be out of the question. It should also be practically fire proof, or at least sufficiently so to prevent danger of ignition from the continued heat of the boiler. There are numerous materials which would be effective as non-conductors which possess the qualities mentioned. Hemp canvas, paper felt, wool felt, asbestos board, &c., are comparatively cheap and easily applied. They may also be made neat in appearance and are sufficiently durable to be considered permanent. As to their efficiency, let us see, for example, what effect the use of paper felt ¼ inch thick will have if the shell and heads be entirely covered by it.

We have seen that the loss from this metallic surface is entirely by radiation and contact of air. Conductivity is not considered, for the reason that so long as it is considerably more rapid than the loss from the former causes the equilibrium of temperature is maintained throughout the entire thickness of the metal, and the two surfaces, internal and external, are of the same temperature as the contained water. The loss from conduction (supposing the boiler to be entirely surrounded externally by water at a constant temperature of 65° instead of the air) would be $\frac{18\ 85 \text{ sq. feet}}{0.1 \text{ inch thickness}} \times 35° \times 233$ heat units = 1,537,217.5. By the previous calculation, the loss from the actually existing causes has been found as 717 heat units, therefore the relation between conduction and the combined effects of radiation and contact of air will be as 1,537,217 ÷ 717, or 2144 to 1. As these two sources of loss may be considered as, in reality, representing the conductivity of air, we may call the latter $\frac{1}{2144}$ or 0.00047, as compared with sheet iron as 1, under the given conditions. From this we see that air is the best of all non-conductors, for, although the above calculation cannot be taken as exactly correct, it is approximately so, and the result may be safely considered as illustrating the value of air as a non-conductor. It should be mentioned that the loss at higher temperatures, as shown by experiment, is considerably greater than where the difference does not exceed 20° or 30°. For instance, at 35° difference it will be 1.15 times as great as by the rule used in our first calculation, while from 212° to 60°, or 152° difference, it will be 1.65.

LOSS OF HEAT IN COVERED BOILERS.

As the calculation necessary to obtain the exact loss is somewhat complicated, it may be well to omit the details and use for our purpose the summaries only. Using the previous temperatures of 100° internal, 65° atmosphere = 35° difference; with boiler shell $\frac{1}{10}$ inch thick and 18.85 square feet external surface the actual loss for the naked boiler will be 62.07 heat units per square foot, and $62.07 \times 18.85 = 1170$ heat units total. This loss as compared with that of a felt covering ¼ inch thick is as 2.16 to 1. Therefore $\frac{62.07}{2\ 16} = 28.7$ units per square foot, or $\frac{1170}{2.16} = 541.7$ units total, and $1170 - 541.7 = 628.3$, or 53.7 per cent., gain from use of covering. This gain may be still further increased by leaving an air space between the boiler and covering of, say, ¼ inch. The ratio will then be as about 0.75 to 1, or $541.7 \times 0.75 = 406.27$ heat units total loss, and the total saving from ¼ inch air space and ¼ inch felt $(1170 - 406.27) \div 1170 = 0.653$, or 65.3 per cent. of the loss by naked boiler. With thicker material composing the jacket the saving will be proportion-

ately greater. For instance, while for ¼ inch the ratio of loss is as 1 to 2.16, for 1 inch it is as 1 to 5.5. The latter, however, would probably be objectionable on account of its cost, and also for other reasons, but the same does not apply to the thinner material mentioned.

Of course there are many feasible methods for accomplishing the insulation of the boiler which are inexpensive and otherwise unobjectionable and there is no doubt as to the fact that many boilers which at present are totally inadequate may by this means be made to furnish an ample supply of water at all times when there is an average fire in the range. The lead pipes, having a comparatively unimportant share in the loss of heat, may be neglected, particularly as the usual arrangement of those that are exposed is such as to render the covering both inconvenient and comparatively expensive.

While the foregoing deductions are necessarily based upon hypothetical conditions, they may be regarded as very closely approximating those actually existing. Their purpose, however, is not so much for the ascertaining of exact quantities as it is the suggestion of an intelligent method of investigation as to causes of such defects—in other words, the diagnosis which must precede the prescription of an efficient remedy. While there are many boilers to which our remarks do not apply—as they are of ample efficiency—it is safe to assert that they are in a very small minority, and that by far the greater number stand in need of improvement as suggested.

The New York State prison industries are referred to by Superintendent Lathrop in his annual report, and evidence is afforded that an effort has been made to conform to the requirements of the new law regulating labor. He has endeavored to select such industries as would make the smallest competition with free labor, and to find such employment for the men as would be educational and would in a fair degree fit them for employment and self-support after release. The operation of industries which have been selected and established has not been stable. New laws have required changes. For obvious reasons this course has been attended with loss of power and income. The number of men employed is over 2000, or nearly three fifths of the entire number confined. To lessen competition still further the labor societies desire to abolish machinery. It would appear that labor has been more profitably employed than was expected, as nearly one-half of the $500,000 appropriated for its prosecution was turned into the State treasury.

J. Y. McClintock, City Surveyor of Rochester, N. Y., has furnished to the *Engineering News* some interesting data to show the effect of corrosion by locomotive gases on an overhead bridge. The bridge in question carries East Main street over the main tracks of the New York Central & Hudson River Railroad at the west end of the company's freight yard in East Rochester. The bridge is 112 feet 1 inch long, and its top and bottom chords of the triangular truss are made up of angles and webs. The bridge was built in 1879, and in August of last year, after 13 years' use, measurements were taken to ascertain the effect of corrosion. The measurements covered a number of angles, and showed a decrease in section varying from 25.9 to 61.5 per cent., it being over 40 per cent. in most of the angles measured. The web plates exhibited similar loss of metal.

For $100,000 J. M. Shenk and Thomas Evans purchased a controlling interest in the Lebanon Iron Works.

Weekly Prize Competitions.

$25.00.

FOR MORE THAN six months Weekly Prize Competitions ($10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of $12.50, a second prize of $7.50 and a third prize of $5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. These competitions are open to every one, and it is hoped that there will be a general response from business men. Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers to the different questions will be favorably regarded as meeting the purpose for which these competitions are announced. We shall have the privilege of publishing any or all of the contributions received.

Weekly Prize Competition No. 3.

SUBJECT:

Waste in the Store and How to Avoid It.

This subject is given at the suggestion of a practical Hardwareman, who writes as follows:

I have noticed with pleasure the different subjects for competitions as they have been announced, and am satisfied that a good deal of matter interesting to merchants will be brought out. Permit me to suggest as a subject that might with advantage be ventilated, the matter of leakages in business. There are many ways in which profits may be seriously diminished as the result of carelessness, and the proprietor be at a loss to account for their disappearance. Among the ways this may happen are: Over-weight and over-measure; wasteful use of paper and twine; unnecessary burning of lights; giving away small articles or small quantities when customers would willingly pay for them; abuse or damaging of stock, and the cutting of prices of goods by employees to particular friends. The subject seems to me to be an important one, and if you should see fit to lay it before the trade it is probable that some of your enterprising correspondents will be able to suggest other leakages and how this kind of waste is to be avoided.

The above letter describes in general terms the scope of the competition, and we invite a full discussion on the subject.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

Replies are to be received not later than February 18, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Weekly Prize Competition No. 2.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 1. Closing February 4.
How to Avoid the Accumulation of Dead Stock.

No. 2. Closing February 11.
How to Keep the Store Neat and Clean.

No. 3. Closing February 18.
Waste in the Store and How to Avoid It.

Another subject will be announced in our next issue.

Our readers are also reminded of the following Prize Competitions, announced on another page, in each of which four prizes, of $50, $25, $15 and $10, are awarded:

No. 6. Closing February 18.
How Retailers Can Best Advertise and Extend Their Business.

No. 7. Closing February 18.
Travelers' Yarns.

No. 8. Closing February 18.
How to Treat Clerks.

No. 9. Closing February 18.
Shop System of Keeping Track of Jobs.

No. 10. Closing February 18.
Business Maxims—At Least 10.

No. 11. Closing February 18.
How Small Retailers May Keep a Record of Prices.

The designs for two bridges to be built across the East River by the East River Bridge Company were approved by the Secretary of War with this single modification, that the hight of the lower span of the roadway shall be raised at its center 140 feet above mean low water, which is 5 feet higher than that of the bridge now existing. The Maritime Exchange and some of the pilots advocated 150 to 160 feet as the necessary hight, and the Secretary of War accepted a compromise. At least half a dozen ships have lost their topmasts while going under the East River Bridge, and for this reason warehouse property is more valuable if situated below the structure.

Governor Flower has appointed Thomas J. Dowling Commissioner of the Bureau of Labor Statistics in place of Charles F. Peck. Mr. Dowling was formerly President of the State Workingmen's Assembly. He is a blacksmith by trade, and at one time lived in Brooklyn. He has since lived in Albany.

THE TIN SHOP.

Triangulation in Pattern Cutting.—XVIII.

By Triangle.

PATTERN FOR THE FRUSTUM OF AN OBLIQUE PYRAMID HAVING SQUARE BASE AND TOP.

In Fig. 137, plan A, let F G H E be the plan of the base and J K L M the plan of the top of frustum, above which is shown the elevation of side E′ J′ M′ H′, corresponding to the side shown in plan by E J M H. In elevation B, F″ K″ J″ E″ shows the side represented in plan B by F K J E. While the elevations only show two sides, the slant hight of the four sides is given, which gives us the means of describing the patterns, in connection with the measurements to be derived from either plan. The operation of obtaining the four patterns is rendered much more simple and easy by placing the T-square at right angles to the base lines of elevations A and B and dropping lines from the points in elevations through the plans (which are drawn under and in line with the elevations), indefinitely. For the pattern of E J M H of plan A, we would place the T-square parallel with line E H of plan, and at any convenient point draw the line *j m* of pattern No. 1, cutting the lines dropped through J M of plan. From *b*, set off the distance *b h*, equal to the slant hight of side, as shown by J″ E″ in elevation B. Then draw *h e*, which connects the lines dropped through the points H and E in plan A. By drawing lines through the points *e j m h*, we have the pattern for part of article shown on pla by E J M H. The remaining patterns are obtained in a similar manner. In pattern No. 2, *g c* represents the slant hight K″ F″ of elevation B. In pattern No. 3, *f n* is derived from the slant hight E′ J′ of elevation A, and *g o*, of pattern No. 4, is derived from H′ M′ of the same elevation. It will be observed that the letters in patterns correspond with letters in plan representing the part of article for which the pattern is intended.

We will now proceed to describe the pattern by triangulation, and for this purpose we can construct a diagram of triangles showing the length of miter lines and the distances from points in the top to points in the base. In order to avoid confusion of lines we have constructed two diagrams of triangles, as shown in Figs. 138 and 139. For the diagram in Fig. 138, at any convenient point draw X W, in length equal to A J of elevation A, and lay off W E at right angles to it. Let X represent all points in the square, which is the plan of the top of the article. Lay off from W the distance from points in the plan of top to the corresponding points in the plan of the base. Thus, make W-E J equal to E J of the plan, W H M equal to H M, W-F K equal to F K, &c. Draw the radial lines E J X, H M X, &c. In a like manner construct a corresponding diagram, as shown by Z Y J in Fig. 139, using for the spaces in J Y the length of the diagonal or dotted lines between the plan of top and base in Fig. 141, and connecting the points in J Y with Z. By means of these two sets of lines, converging at X and Z respectively, we have the actual dimensions of the triangles into

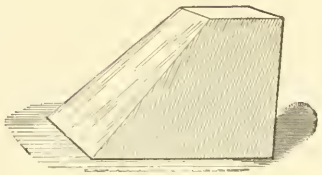


Fig. 136.—View of the Finished Article.

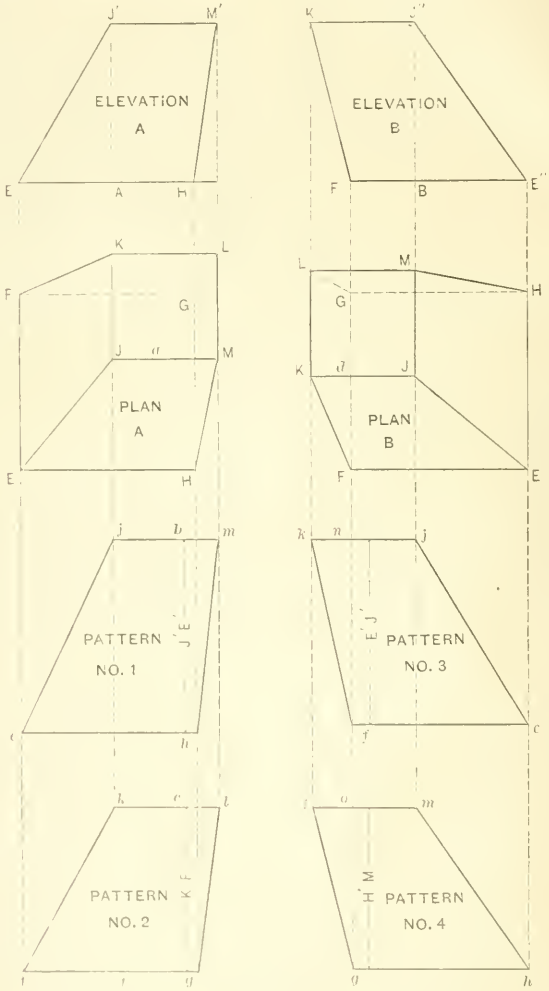


Fig. 137.—Patterns Obtained from Plans and Elevations.

PATTERN FOR AN OBLIQUE PYRAMID.

which we have imagined the surface of the article to be divided. On the duplicate plan in Fig. 140 is shown the triangles similar to those in Fig. 138, drawn on the solid lines in plan, and on the duplicate plan in Fig. 141 is shown the triangles drawn on the diagonal dotted lines. For the pattern in Fig. 142 the line E″ *j*″ can be drawn the length indicated by E J-X in Fig. 138, or equal to E *j* in Fig. 140. For the pattern it is necessary to obtain the length or distance from the point E of plan to the point J of top, as it could be measured on the finished article; this distance is given by either E J-X in Fig. 138 or by E *j* in Fig. 140. The part of pattern lying to the right of line E′ *j*″ will be completed by the use of the diagrams in Figs. 138 and 139, and the plan in Fig. 140. With E″ of pattern as cen-

ter and E H of plan as radius, describe an arc (H″), which intersect with a second arc struck from j'' as center, with radius J′ H′-Z of Fig. 139, thus establishing the point H″ of pattern. Then with H M-X of Fig. 138 as radius, with H″ of pattern as center, describe an arc, which cut with another arc struck from j'' of pattern as center, and J M of plan as radius, thus locating the point m'' of pattern. The point G° of pattern is struck from H″ as center, with H G of plan as radius, and from m'' as center, and M′ G′-Z of Fig. 139 as radius. With G° as center, and G L-X of Fig. 138 as radius, describe an arc, which intersect with one struck from m'' as center and M L of plan as radius. Lines traced through the points thus obtained will form the part of pattern shown by E″ H″ G° l'' m'' j''.

To illustrate the use of the triangles drawn on plans, we will describe the remaining part of pattern, which is located to the left of the line E″ j', by the triangles and plans in Figs. 140 and 141. These triangles could be drawn on one plan, but we have drawn them on duplicate plans to avoid confusion of lines. The length E″ F″ of pattern is established by the length E F of plan. The length from j'' to F″ of pattern is obtained from F′ $j°$ in Fig. 141. The distance F k'' of pattern is obtained from F k in Fig. 140, as is the length J K, represented by j'' k'' of pattern. The distance G″ k'' of pattern is obtained from K′ $g°$ of Fig. 141, while the remaining distances in pattern, as G″ l'' and k'' l'', are obtained from G l and K L in Fig. 140.

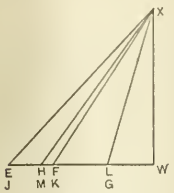


Fig 138.—Triangles Corresponding to Solid Lines in Plan.

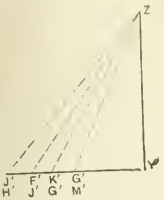


Fig. 139.—Triangles Corresponding to Dotted Lines in Plan.

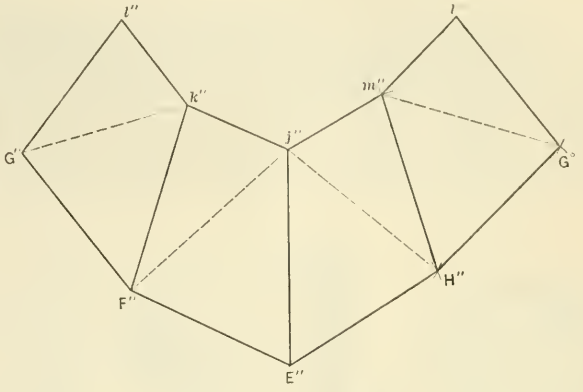


Fig. 142.—The Pattern Shape.

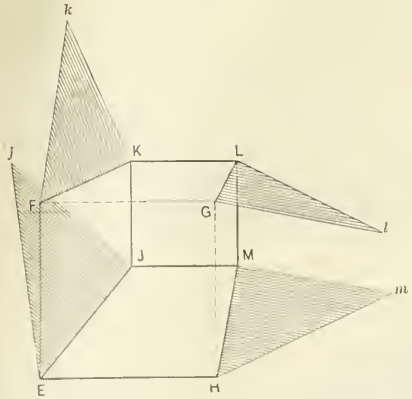


Fig. 140.—Triangles Drawn on Solid Lines in Plan.

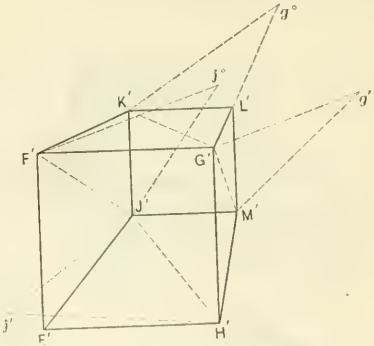


Fig. 141.—Triangles Drawn on Dotted Lines in Plan.

PATTERN FOR AN OBLIQUE PYRAMID.

Barstow & Kimball, Grand Rapids, Mich., issue a neat little illustrated circular and price list relating to Kimball's Pipe Joint Delineator, a device that was illustrated and described in *The Metal Worker* some time ago. The cuts show the delineator open and closed, and a description is presented of its method of operation and the various applications to which it is adapted. Full tables of sizes and prices are likewise given. A list of purchasers is also printed, showing some of those who have used the delineator and to whom reference is made.

The injury done by destroying the forests is not in lessening the total rainfall, but in producing the unequal flow of the streams. The trees, by preventing rapid evaporation, keep the falling snow and the moisture from heavy rains under their shadow for a much longer period, so that instead of heavy freshets, soon followed by drought, there would be, if the forests were standing, a steadier supply of flowing water.

Some of the residents at Homestead talk of persuading Carnegie to "let up" on the proceedings against alleged rioters and conspirators, as though he could condone offenses against the State. Do they comprehend the gravity of the charges that they must refute?

ROOFING AND CORNICE.

Pressed-Zinc Work.

"A correspondent sends us the following inquiry. "Please publish a method for making pressed-zinc work, such as egg and dart molding, scrolls, &c. I have seen a press made of two pieces of wood, 2 x 4 inches, standing upright, with the male die sliding up and down between two guides, and the female die resting on a work, it is proper to remark, in this connection, that it does not pay to set up an outfit for stamped-zinc work where only a small quantity is required. Any variety of designs can be obtained from manufacturers of pressed-zinc work, the prices being so moderate that the labor involved in making the castings sometimes costs more than the stamped article itself. This correspondent desires to know how to pre pare the castings for pressed ornaments, such as egg and dart moldings, scrolls, &c. As the method employed is the same, a different ornament has been chosen. Let us assume that a number of rosettes were required in the panels of some cornice work. In Fig. 1 is shown a front and sectional view of a pressed-zinc rosette, the panel being made of galvanized iron, and the ball B and the flutes A being pressed of sheet zinc and tacked with solder inside of the panel as shown. Fig. 2 represents an enlarged front and sectional view of the ball shown in Fig. 1; to obtain the pattern for this ball proceed as follows: Divide the section of the ball shown in Fig. 2 into a number of equal parts, as shown. Now draw any horizontal line, as shown by A B, Fig. 3, upon which place the stretchout of the section shown in Fig. 2; through the center of the stretchout draw a line at right angles to A B, as shown; then taking one half of the stretchout in the dividers as radius, strike a circle as shown by 1 9. Now set the dividers to 1 inch more

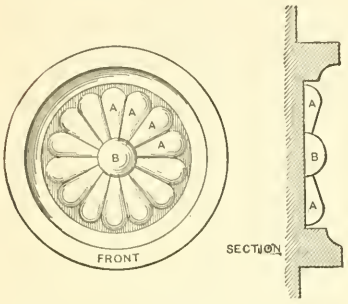


Fig. 1.—Front and Sectional View of Pressed-Zinc Rosette.

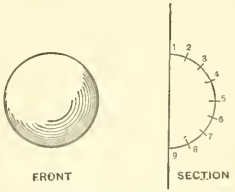


Fig. 2.—Enlarged Front and Sectional View of Ball.

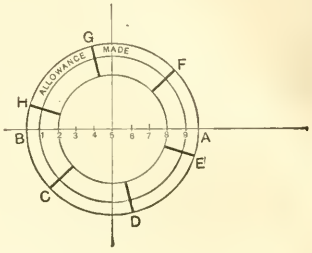


Fig. 3.—Pattern for a Stamped or Pressed Ball Shown in Fig. 2.

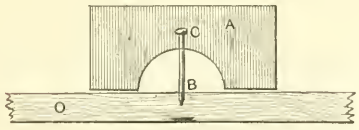


Fig. 4.—Reverse Profile of Half Ball with Pin Attached.

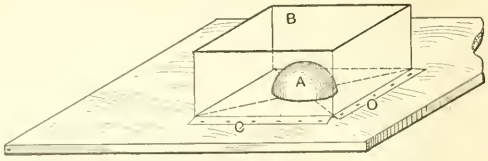


Fig. 5.—Clay Ball with Metal Flange Around It.

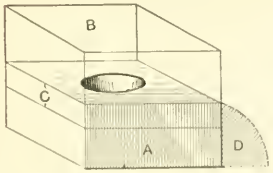


Fig. 6.—Plaster of Paris Model Ready for the Molten Zinc.

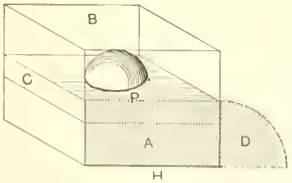


Fig. 7.—Male Zinc Die with Metal Flange Ready to Cast Female Die.

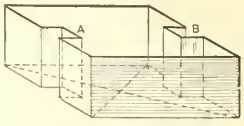


Fig. 8.—Sheet Metal Flanges Bent for Sliding Dies.

PRESSED ZINC WORK.

block of wood and fastened in place with screws. What I want to know is what kind of clay to use to make the model, and where I can get it, and after the model is made and the impression is taken in plaster of paris, how to cast the zinc dies. Also, is the plaster mold shellacked before making the zinc cast and what is the object of shellacking? In fact, I would like to know all about such work."

The following extensive answer to our correspondent's inquiry has been prepared by a practical sheet metal man, who has experience in this particular work:

Before describing two of the methods employed for obtaining pressed zinc radius, and strike circle as shown by A B. Then will A 9 and 1 B represent the allowance for a flange around the bottom of the ball. Six notches are made on circle as shown by C, D, E, F, G and H, in Fig. 3; these notches overlap each other in stamping and give a smooth surface. Having now drawn the shape and pattern of the ball, we are ready for the clay model. The clay used is known as modelers' clay, and can be obtained from dealers in such supplies. In Fig. 4 is shown a reverse profile of ball with pin attached, for developing a ball in clay. O represents a portion of a wooden board or bench, A a heavy piece of sheet metal, B

a wire nail of the required length, the head of the nail being flattened at C, so as to solder to the reverse profile A exactly in the center, as shown. In practice the wire nail is driven into the board or bench, as shown at B, Fig. 4, so that the profile A still has play room to turn. The clay is placed around the center pin B until a little more than the required hight is obtained. Now slowly turn the profile A until the ball is developed. The profile and pin are now carefully removed, and the small opening made by the pin in the clay ball filled up. It is proper to remark here that the clay should always be kept moist in working, and in case an article was being modeled which could not be finished the of mucilage it is ready to cast. This must be done as quickly as possible, for the plaster hardens very rapidly. It is better to have too much plaster mixed than too little, for if the die was cast and it was found that more plaster was required, by the time the second mixture was ready the first would have hardened and a firm joint could not be obtained. After the plaster is cast into the die, shown in Fig. 5, and has become hard, the metal flange B is carefully loosened on the outside soldered joint and the nails drawn out of the board, when it will be found that the flange, on account of being oiled, can be taken off the plaster without doing any injury. It is the practice of some to cast cast made, which will look as shown at A, Fig. 7. The hight from P to H should be about 3 or 4 inches. Fig. 7 shows the male zinc die obtained as explained, and also shows the metal flange around it ready to cast the female die. If the flange used in Fig. 6 is taken off carefully it can be used again in Fig. 7, as the size of the die is the same. In putting on the flange B, Fig 7, be careful that the hight from the top of the ball to the top of the flange is not less than 3 to 4 inches. Close the joint between the flange and zinc mold with clay, as shown at D, Fig. 7. In casting the molten zinc on the male die care should be taken that the male die is cooled and covered with a coat of graphite or

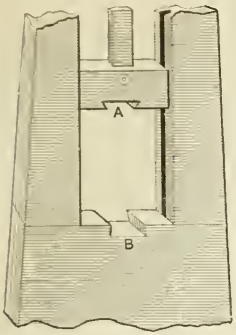


Fig. 9.—Drop Hammer for Stamping Sheet Metal.

Fig. 13.—Right and Left Scroll.

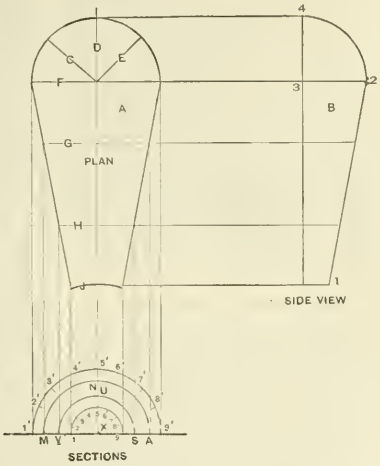


Fig. 10.—Sections Required to Construct Model Shown in Fig. 11.

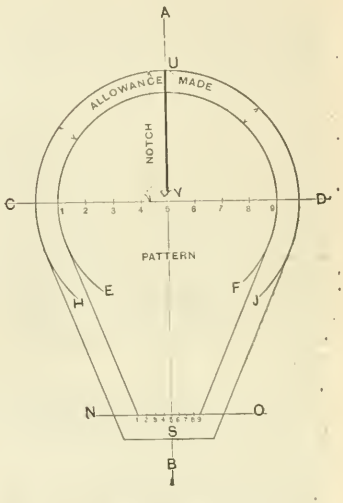


Fig. 12.—Obtaining Pattern for Portion of Rosette Shown at A, Fig. 1.

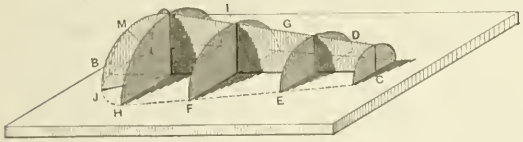


Fig. 11.—Model Prepared of Sheet Metal Ready for the Clay.

Fig. 14.—Egg and Dart Molding.

PRESSED-ZINC WORK.

same day a moist rag should be laid over it, which will prevent the clay drying and cracking and keep it moist and in good working order. Let A, in Fig. 5, represent the half clay ball which was developed by the use of the reverse profile shown in Fig. 4. A metal flange, shown at B, is nailed on to the board, as shown at O O, to receive the plaster of paris. The hight of the flange above the top of the ball should be about 2 to 3 inches. When casting plaster models the plaster has a tendency to attach itself to any surface when drying. To prevent this take a little linseed oil, and with a small brush oil the entire inside of flange and board, it not being necessary to oil the clay. Now obtain an old can in which to mix the plaster of paris. Fill the can with as much water as would be required to fill the mold shown in Fig. 5, and gradually sprinkle the plaster of paris into it, always stirring the water so that the plaster will not form in a lump at the bottom of the can. When the plaster has the consistency the molten zinc directly upon the plaster of paris mold; before doing this, however, the plaster cast must be thoroughly dried out in an oven, or over a heated stove, for if the plaster cast is not thoroughly dried and the molten zinc is poured into it steam is formed, causing the zinc to blister and the plaster cast to crack. Let A, in Fig. 6, represent a plaster of paris die, thoroughly dried, around which is placed a metal flange, B, of black sheet iron. If any other than black iron were used, such as tin or galvanized iron, the molten zinc would attach itself to it and could not be loosened. Care should be taken in lapping the flange shown at C, Fig. 6, so as to obtain a tight fit. After the flange is placed on the plaster model cover the joint between flange and plaster with clay, as at D, to prevent any leakage of molten zinc.

Next cover the surface of the plaster mold with ordinary graphite or stove polish, which gives a smooth surface. The scrap or other zinc is then melted and the stove polish. Now cast the molten zinc in the mold shown in Fig. 7, and we have the male and female die ready to stamp the half balls.

If our correspondent desires to use upright posts for the male or female dies to slide upon, as he suggests, the flange would be bent as shown in Fig. 8, the grooves A and B being made of the same size as the uprights. This flange would have to be used in the work shown in Figs. 5, 6 and 7, the same as before explained. In doing stamped work, in a case in mind where perhaps from 30 to 50 leaves or balls were required, all that was used was a large block of wood about 3 feet high by 12 inches square, on which to place the dies, a small sized sledge hammer, a few pieces of hard wood, a pair of pliers, a can of water and a good fire in a furnace, made either of coke or charcoal, it not being necessary to adjust uprights for these few ornaments. In case hundreds of ornaments of different designs were required, then instead of constructing uprights of wood,

it would be well to obtain a drop hammer, as shown in part in Fig. 9. These drop hammers can be obtained from manufacturers of presses, dies, &c., the drop hammer being made to suit the force of the blow required. If a drop hammer was used, the zinc castings would have to be provided with a dovetail to fit into the dovetails shown at A and B, Fig. 9. Although other joints could be made on the hammer and block, the dovetail is about the best method that can be employed.

Now to explain the method of stamping balls without the use of the wooden uprights or the drop hammer. The number of balls required having been cut after the pattern shown in Fig. 3, a charcoal or coke fire is started in a furnace to heat the zinc. Put the wooden block in the right position, heat the male and female dies, then place a piece of zinc on the fire, care being taken not to burn it. To tell whether the zinc has the right heat, dip a stick of wood into the can of water and let a few drops of water fall on the zinc. If the metal has the required heat the drops of water will jump off at once. Take the zinc off the furnace with the pliers and place it on the heated female die, being careful to set the zinc exactly in the center, (leather gloves are useful for this to prevent burning the hands). Place the male die on the sheet. Take a slat of hard wood in the left hand and lay it on the die, and using the small sledge with the right hand, gradually drive the male into the female die. This operation would have to be performed two or three times, always heating the sheet, until the finished ball was obtained.

In Fig. 10 are shown the sections required to construct model shown in Fig. 11. Let A Fig. 10, represent the enlarged plan view of one of the flutes shown at A, Fig. 1. B, Fig. 10, is the side view or section of flute. Divide the plan view into sections, as shown by the lines C, D, E, F, G, H and J. The sections shown underneath the plan indicate the sections taken through the lines F, G, H, J; 2, 3 and 4 on side view represents the section through the lines C, D and E in plan. Having the sections now prepared, the model for the clay is made as follows: Let Fig. 11 represent the model prepared of sheet metal, ready for the clay Fig. 11 represents a board, on which a duplicate of the plan, shown in Fig. 10, is placed.

Upon the center line B C, Fig. 11, place the side view shown in Fig 10; on the line C, Fig. 11, place the section shown by 1, 5, 9, Fig. 10; on the line E D, Fig. 11, the section V U S, Fig. 10; on the line F G, Fig. 11, the section M N R, Fig. 10; on the line H I, Fig. 11, the section 1' 5' 9', Fig. 10; on the lines J X, B X and M X, Fig. 11, the section shown by 2 3 4, side view, Fig. 10. Now fill the metal model with clay, and smooth off even with the top of the sections. Place a flange around it and cast the plaster of paris, the same as explained for the balls. In Fig. 12 is shown the pattern for stamping the flute shown in Fig. 1. To obtain the pattern proceed as follows: Divide the outer and inner circles of sections shown in Fig. 10 into any number of equal parts, as shown. Now draw perpendicular line, as shown by A B, Fig. 12, and at right angles to A B draw the line C D, upon which lay off on each side of the center line A B the half of the stretchout of the outer circle of sections shown in Fig. 10, as shown by the small figures 1, 2, 3, 4, &c., in Fig. 12. Set one leg of the dividers on the point 5, and with 5 9 or 5 1 as radius, strike an arc, as shown by E F; make an allowance of 1 inch and strike another arc, as shown by H J. Measure the distance from 1 to 2, side view, Fig. 10, and lay it off on the line A B from 5 to 5, Fig. 12. At right angles to A B draw a line through the point 5, as shown by N O, Fig. 12, upon which place on each side of the center line A B the stretchout of the inner circle of sections shown in Fig. 10, as indicated by the small figures 1, 2, 3, 4, &c., in Fig. 12. From the points 1 and 9 on the line N O draw two lines tangent to the arc E F, as shown from 9 to 9 and 1 to 1, which will be the required pattern; make the same allowance on the lower part of the pattern as shown by H J and S. A notch is made from U to V to allow the zinc to overlap. In Figs. 13 and 14 are shown sketches of a right and left scroll and egg and dart molding. The cast zinc models would be made in the same manner as before described.

Another way of making pressed zinc work is as follows: After the plaster model has been obtained and partly dried, a coat or two of shellac is given to it, so as to make a smooth surface. It is then taken to the iron founder and an iron model cast. A flange of black sheet iron (not tin or galvanized) is placed around it, using the clay so as to stop any leakage of molten lead. After the flange is in position lead is cast into it. Several lead casts are made, for the lead being softer than the iron, when the male die is not laid properly on the female die the result is that the lead die becomes flattened and a new one is required. Cast zinc can be used in connection with the iron die with good results.

Sheet-Metal House Fronts.

The St. Paul Roofing & Cornice Works, St. Paul, Minn., have been very successful in the sale of their sheet-metal house fronts in various parts of the country. We are pleased to note that they have taken a very large order from Adams & Holler, contractors, of Camden, S. C., for the Burdell Block, in which are situated the offices of the Bank of Camden. The building is, we understand, one of the handsomest erected by this firm. These metal siding plates, which have been recently patented by C. D. Pruden, the manager of the St. Paul Roofing & Cornice Works, are very durable and of artistic design. In reference to the Burdell Block, the Charleston *News* says: "It is intended to be one of the handsomest buildings in the State. The front is to be of steel in imitation of stone and plate and cathedral glass, surmounted by a handsome steel cornice on which is 'Burdell Block 1892,' and just over the bank entrance on the corner 'Bank of Camden.' The same lettering will be seen on the corner on the south side of the block, which faces on Rutledge street. At the corner of Broad and Rutledge, a square tower of handsome design will be erected, which will be of the same material as the front, even having the glass windows on its four sides." We are informed that the architect specified the galvanized steel work, doors and frames, also cast iron work, plate and cathedral glass, all of which were supplied by the St. Paul Roofing & Cornice Works.

FLASHINGS.

In a Bridgeport, Conn., paper a very appreciative notice is given of Henry Beutelspacher, who does an extensive business in sheet-metal work, plumbing and gas fitting. Reference is made to special work he does in copper also.

The year 1892, according to one of our English exchanges, was the best in the slate trade which the quarries have had since 1876. The demand during the year was good and is likely to improve still further, as merchants have been for some time booking orders for future delivery. The output of slate will probably show a diminution, though not so great as in 1891, the returns in that year showing a decrease of over $250,000 in value. The supply cannot be readily increased owing to the very limited area of good slate rock and the time and expense required to open new quarries.

For the week ending Saturday, January 7, the aggregate shipments of slate from Slatington, so far as the *News* of that place was able to secure figures, included 34 cases of blackboards, 10 cases of school slate, 3 crates and 35 pieces of flagging and 524 squares of roofing slate. The shipments from Walnutport for the same period consisted of 95 squares of roofing slate, 4 cases of school slate and 4 crates of blackboard.

A pipe hanger for water conductors forms the basis of a patent granted on January 3 to Edward G. Minnemeyer of Peoria, Ill. The essential feature of this invention consists of a base formed with a flat-bearing surface, integral with which is provided a screw or spike for penetrating the surface upon which it is designed to be adjusted. There are also bifurcated-bearing arms shaped to conform with the usual pipes or down spouts, of a circumferential wire staple, held in connection with the support and designed to be twisted with its terminal ends together.

W. J. Burton & Co., 164 Barned street, West, Detroit, Mich., send us an attractive calendar for the new year. The card, measuring 11 x 14 inches, carries a panel picture representing an oriental interior, executed with remarkable fidelity to details. Above this is the name and address of the company and the statement that the firm manufacture cornices, ceilings, skylights, finials, shingles and give attention to slate, tin and steel roofing. The 12 leaves constituting the calendar proper are attached to the card below the panel picture and are printed in black upon a white ground. In addition to the days of the week and month, each sheet also gives the phases of the moon.

The citizens of Canton, Ohio, have appointed a committee to secure subscriptions to an increase of capital of the Canton Steel Roofing Company, with a view to retaining the company in Canton.

Geo. L Mesker & Co. of Evansville, Ind., who manufacture and erect Galvanized House Fronts and similar work, have recently occupied their new factory. It is a very handsome building, having a frontage of 310 feet and a width of 150 feet, and three stories in hight. It is said to be one of the largest sheet-metal buildings in the country.

The Cambridge City Punch, Shear & Roll Company of Cambridge City, Ind., are making a slitting and squaring shear which will cut metal up to 16 gauge. It has a 16 inch throat, an automatic holddown and rear and front gauges. The manufacturers state that owing to the peculiar construction of their machines they can make them with 16 or 18 inch throat so as to cut 12 to 16 iron or steel.

The Panama Railroad may yet be under American control, according to dispatches from Washington, depending on the success of negotiations said to have taken place between an agent of the Treasury Department and President Nunez of Bogota. The explanation is made that so many shares of the stock of the railroad are at the disposal of the receiver of the canal company that the Pacific Mail Steamship Company, backed by the Gould-Huntington interests, feel confident that in the end they will come into possession. The canal franchise having been forfeited, President Nunez is vested by the Congress of Colombia with full power of action.

"The Metal Worker" Competition in Skylight Pattern Cutting.

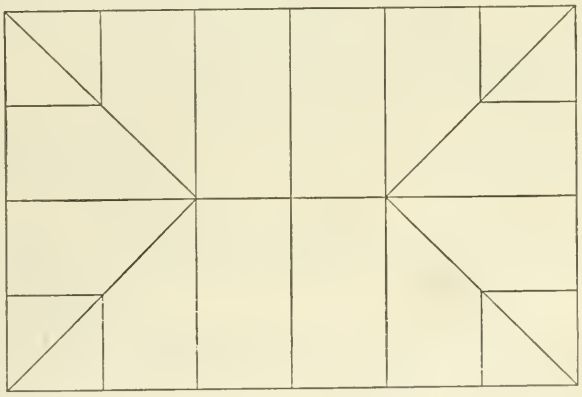
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

THE LETTER BOX.

Another Country Problem.

From S. J., *Troy, N. Y.*—The apple problem in *The Metal Worker* puts me in mind of the farmer who had a square farm containing 1000 acres. The farmer had four sons and he wanted to give them each a farm and keep one for himself, so that all should be of equal size. Furthermore, he wanted his own farm in the center with his four sons around him. Now, the question is, how did he do it? I send this for the benefit of your correspondent who spent six cents for postage on the apple problem.

Note.—Our correspondent also inclosed an answer to this problem which we will print in a later issue. We trust in the meantime to receive solutions from other correspondents as the problem is an interesting one.

Fitting Up a Store.

The accompanying diagram of the floor plan of a store is submitted to our readers for suggestions as to the best manner of fitting it up. It is the design of our correspondent to handle builders' hardware, carpenters' tools, stoves and tinware. The room is 16 x 78 feet in size, with a 12 foot ceiling, and it is desired to so arrange it as to accommodate the largest quantity of goods in a convenient manner for handling. One section of shelving is 30 feet long, and extends from the floor to the ceiling, in which drawers or boxes will be put to accommodate shelf hardware. The size of the boxes and their arrangement are also questions requiring a solution. Doubtless many of our readers can make valuable suggestions covering these points, which, as a result of their experience, will be of much assistance to our correspondent. We shall be glad to hear from many of our readers.

Fitting Up a Store.

Cements and Soluble Glass.

From E. J. F., *New York.*—Can you give me any information on cements which can be used in filling space and in joining wood and iron, such as iron arms inclosed in a wooden shelf? How about soluble glass in connection with other light substances?

Answer.—The following receipt for fastening metal plates on wood might be useful: Melt together 6 parts of rosin and ½ part of linseed oil and stir into the melted mass 1 part of burnt ocher and ½ part of plaster of parts. Another cement for iron and wood is: Melt together 4 paris of black pitch and 1 of wax and stir 1 part of brickdust into the melted mass. The following information about soluble glass may be of interest: When finely pulverized chalk is stirred into a solution of soluble glass at 30° B. until the mixture is fine and plastic, a cement is obtained which will harden in six or eight hours, possessing extraordinary durability and alike applicable for domestic and industrial purposes. It might be used for uniting stone, brick, &c., and for filling up cracks. In short, it seems to be applicable to about the same purposes for which plaster of paris is used, but is much harder and stronger.

Trouble with Gas Range.

From G. R., *Mansfield, Pa.*—We have two gas ranges in different houses which are causing a great deal of trouble by reason of vapor gathering on the walls and ceilings, both upstairs and down. This seems to be a very common occurrence in burning natural gas in a range, and we desire to know what causes it and if there is any remedy for it. The walls and ceilings become so wet that the water runs from them. The rooms have plenty of ventilation and there are other fires in most of them, yet we cannot account for the trouble.

Answer.—This inquiry we thought warranted special treatment, so we submitted it to an expert in gas, who answers to the effect that natural gas contains a great deal of hydrogen, and that the pressure under which it burns permits the gas to escape and condensation occurs upon the walls. This explanation seems to us so inadequate that we endeavor to account for the phenomena in the following way: Natural gas, as has been noted, contains a very large amount of hydrogen in the form of what is known to chemists as "marsh" gas. This marsh gas composes over 90 per cent. of the volume of natural gas and is itself a compound of carbon and hydrogen, the latter being present in very large proportions. When the natural gas is burned the product from the marsh gas part of it is carbonic acid, which is the ordinary product of flame, and water, which is produced by the burning of hydrogen. So much hydrogen being present in the natural gas, it is a fair inference that a large amount of water must be given off from the flame. Of course, as the water is produced by combustion, it is in the form of a very thin vapor, which is carried up by the hot air, and only deposits when it strikes a relatively cold surface, such as the walls and ceiling of the room. Our correspondent mentions that the room has plenty of ventilation, but this expression is only a relative one. We have no doubt by running an exhaust blower, and drawing the air rapidly from the upper part of the room that the condensation would be avoided. We do not offer this as a practical suggestion, but simply to illustrate the fact that a forced ventilation would remove the difficulty. A better plan, we think, would be to connect the gas ranges with the chimneys, for we assume that they are not so connected at present. In this way the vapor would be carried up the chimney by the warm air, and probably would not deposit until it came to the outer atmosphere. It is the better plan in all cases to connect a fire with a chimney. This question of burning natural gas and the result of condensed water from it is an interesting one, and we wish that others in the West who have had experience in this line would give us an account of any similar trouble and what they have done to remedy it.

Preserving Tin Roofs.

From E. F. B., *Greenville, Pa.*—In *The Metal Worker* of January 7 I find quite a discussion on the subject of preserving tin roofs. With your permission, I would like to add the experience of 30 years' practice in this line. My advice in the matter is this: To begin with, a new tin roof should not be allowed to accumulate any rust before painting. I would recommend good Venetian red, mixed with good raw linseed oil and the best quality of asphaltum varnish for dryer, with a small quantity of turpentine, and the whole put through a paint mill and spread on with a fine brush smoothly. Let the first coat stand four weeks, then apply the second coat; let it stand six weeks; then apply the third coat. Cover the last coat with sand. The sand is applied by means of a funnel, which is used to shake it over the paint. Good sharp washed sand, thoroughly dried, should be used and should be sprinkled on the paint before the latter is dry.

Tinning Soldering Coppers.

From E. T., *Milwaukee, Wis.*—If one is to do a good job of soldering, especially on new work, it is necessary the coppers should be in the best of order. While most tinners and apprentices may agree with me regarding the above statement, how many take the time or trouble to have their coppers in proper condition for soldering? To tin coppers properly they should be first heated to a cherry red, when the old solder can be removed by means of a coarse file. If the points are too blunt or out of shape, draw them out, and while red hot plunge in cold water. This softens the metal so they can be

filed with ease. The coppers are then to be heated so they will just melt solder, then rubbed on a board with solder and rosin. If the coppers are too hot while being tinned they will not solder nicely. Sal-ammoniac is used by some in the place of rosin, but the result is not as satisfactory.

A New Use for "The Metal Worker."

From L. F., *Philadelphia.* — I have read your paper since 1881. I landed in New York City July 3 of that year and did not know one word of English, but by the aid of *The Metal Worker* I have translated my German into English—both trade and language. Every foreigner with the same trade can gain more English from *The Metal Worker* than any other paper I know of. I am not versed in English as well as I could be if I would take more pains, but I will endeavor, by the aid of your *Metal Worker*, to learn as I grow older.

Note.—The idea that *The Metal Worker* should ever come to be used as a text-book of the English language has never occurred to us. And yet there is a great deal of reasonableness in a foreigner who is familiar with the trades we represent studying his English by aid of the descriptions of the cuts. It treats of the subjects in which he is most interested and with which he is most familiar, and we can readily believe that it would prove an excellent text-book.

Alloying Zinc and Lead.

From F. & B., *Grand Rapids, Mich.*—Please let us know through the columns of *The Metal Worker* what will make lead and zinc mix?

Note.—Our correspondents' inquiry is very brief, but we presume they wish to know how to alloy the two metals, lead and zinc. Our answer must be equally brief, for to the best of our information there is no means of making these metals mix together. They will of course alloy in limited proportions, but so far as we know they cannot be compounded in the way that lead and tin or other alloying metals are mixed.

Size of Registers for Round Pipes.

From FURNACE.—One of the problems that confronts one in furnace work is to determine the size of floor registers to be used in connection with round heating pipes. Will the readers of *The Metal Worker* inform me what size of registers should be used with first-floor pipes, 9, 10 and 11 inches in diameter, or other sizes commonly used?

Russian Sheet Iron.

From W. C. R. K., *Orleans, Ind.*—What is known of the manufacture of Russia iron in Russia, and how do they manage to keep their secret, if it be such, from the outside world?

Answer.—The manufacture of Russian sheet iron is carried on almost exclusively in the Ural Mountains of Siberia. The furnaces and mills are in close proximity to mines yielding some of the richest ore in the world. All requisites for smelting it are found in quantities on the spot. The process of manufacture has been observed and described by several foreign visitors, as seen recently in a Siberian mill. It is briefly as follows: The pig iron is puddled immediately after it is put out from the furnace and made into blooms of 100 pounds to 200 pounds weight. Great care is taken to hammer the blooms well to get rid of all impurities under either a steam hammer or a tilt hammer. The blooms are at once reduced to bars 5 inches wide, which are cut into pieces 29 to 30 inches long, each piece representing a future sheet and varying thicknesses for sheets of different weights. Sheet iron in Russia is invariably made 4 feet 8 inches by 2 feet 4 inches and of all weights from 6 pounds to 20 pounds per sheet. The puddled bars are next heated in a charcoal furnace and rolled down into sheets by three separate operations. After having been examined and brushed the sheets are dipped in a bath of warm water, powdered with prepared charcoal, reheated for seven or eight hours, brushed with a wet fir broom, and then in bundles at a dark-red heat they are placed under a 15 hundred tilt hammer, which delivers over 200 blows to each bundle. Each sheet is then carefully examined on both sides, every speck of dirt being removed. The bundle is then made up again as before and reheated for an hour, after which the sheets are again put under the hammer, receiving 750 blows. This process is repeated six times, by which time they have received 3000 or 3500 blows. The bundle, after re-examination, is then handed to the finishers. By them the sheets are separately examined, and made up into bundles of 200, receiving, while cool, some 60 to 80 blows from a hammer on a cast-iron anvil. They are then "half-finished," and are allowed to cool over night. The next morning they are cut to size by hand shears, and treated by a polishing hammer, which delivers about 150 blows to each. Each sheet is afterward subjected to minute inspection, only about 50 per cent. being, as a rule, passed as No. 1—*i. e.*, those which are found to have an equal polish all over the sheet. The remainder are either classed as No. 2 or are rejected. The only secret—and it is a perfectly open one—is the great expenditure of time, care and labor in the manufacture. This, with the good ore and other natural advantages, is sufficient to account for the excellence of the material. The process above detailed occupied some 30 hours. Labor is abundant and the cost of it but slight. Some of it, we believe, is convict labor, which receives very little remuneration. Material is cheap and everything is in favor of the manufacturer.

Laying Tin Roofs.

From A. K., *Edon, Ohio.*—There is one thing I have noticed where tinners make a mistake in regard to roofing—when they lay too much to the contraction and expansion of the tin—for in most cases the trouble is due to the use of green lumber for sheeting. When I first came here the people told me there was no good tin roof in the country and it was hard work for me to convince them that I could put on one. I soon found out what the trouble was. Logs were cut green and hauled from the mill direct to the building and put right on and covered with tin, and instead of using heavy soldering coppers light ones were employed, and only the edge of the seam was soldered. Is it any wonder that such work did not stand? I advised the people differently and did good work by getting seasoned lumber for sheeting and soaking the seams thoroughly and the result was that I acquired a reputation for good work.

Against the Interchangeable Ticket.

Opposition has developed from an unexpected source to the scheme of a 5000-mile interchangeable railroad ticket. This has been a pet idea with the associations of traveling salesmen in the West. They have urged railroad companies to adopt such a ticket for the greater convenience of the traveling fraternity, and have worked up a tremendous volume of public sentiment on the subject, adding immense petitions to cogent and persuasive arguments such as traveling men know so well how to employ. So thoroughly had this work been done that success seemed almost within their grasp, favorable action being expected by the Western Passenger Association at the meeting in Chicago in March.

It was, of course, taken for granted that the employers of the traveling men were in favor of a movement which promised to save them some outlay for the traveling expenses of their representatives. But here is where the unexpected happens. The Minneapolis Jobbers' Association step in with the following communication to the Western Passenger Association:

In regard to the proposed 5000-mile interchangeable mileage ticket, to be considered by your association at its next regular meeting, our association has authorized me to state that we are emphatically opposed to the adoption of this ticket; and, in addition, will state that expressions on this subject from associations whose members employ and pay large sums of money to commercial travelers for railroad fare, &c., should have more weight before your body than the wishes of commercial travelers whose tickets cost them nothing.

This is a very severe blow to the project, and is quite likely to offset the very hard work done by the traveling salesmen in winning railroad managers to their way of thinking. If the men who pay for the traveling see no advantage to themselves in an interchangeable ticket, but are willing to continue to pay on the old basis, their representatives lose the strongest argument they have in support of the change they advocate. It will be observed that no reason is advanced for this opposition. It would be interesting to know what the reasons are for such apparently heroic self denial on the part of the jobbers, who do not ordinarily object to anything which promises economy in expenditures.

Enoch Washburn, a well-known dealer in stoves and tinware, died on the afternoon of January 12 at his residence in Orange, Mass. He had been engaged in business in that place for over half a century. He was a native of Rochester, Vt., but went to Orange from Templeton, which was then much the larger and more thriving place. He went to work in the tinshop of a Mr. Caswell or "Old Cæsar," as he was called, and after a time bought out his employer and became proprietor of the business, which he has since carried on. Mr. Washburn was something of a farmer as well as a merchant, and owned at the time of his death about 100 acres on the south side road to Athol.

The total receipts of the New York Post Office last year were $7,059,000, and the net revenue nearly $4,500,000.

WORLD'S FAIR NOTES.

Juries Will Judge.

Members of the Board of Control have decided that a system of juries of awards shall pass upon the merits of all exhibits displayed at the exposition. In reaching the decision the board adopted the report of the special committee consisting of George V. Massey, J. W. St. Clair and E. B. Martindale.

What promised to be a fight in the board over this question turned out in the end to be an amicable settlement of a perplexing question. Commissioner John Boyd Thacher of New York, chairman of the Executive Committee on Awards, had submitted a scheme for a system of expert individual judges to pass upon the merits of all exhibits. After wrestling with this system for nearly three months, the Board of Control finally decided to adopt what is known as the jury system. This means that the judges or examiners appointed to review each group of exhibits will as a body determine the points of excellence instead of accepting the opinion of one judge.

Mr. Thacher after a long conference with the board harmonized with this opinion and wrote a letter declaring that the modifications of his rules as adopted were perfectly satisfactory to himself. This means that they were satisfactory to the Committee on Awards. The following extracts from the committee's report cover the most important points:

Your committee having carefully considered the scheme of rules contained in the supplementary report of the Committee on Awards referred to it as last aforesaid is constrained to the conclusion that certain features of amendment thereto are essentially necessary to make them conform to the action of the commission, as well as to the requirements of the act of Congress, which, in the judgment of your committee, do not involve any radical revision, but simply more clearly define what your committee understands, after conference with the chairman of the Executive Committee on Awards, is intended to be the effect of the same when put in practical operation, and do not, moreover, so interfere with the general scheme of said committee as to deprive it of the characterization as an "American system."

It shall be the duty of each individual judge to make a report in writing over his own signature of the result of the examination of each exhibit primarily examined by him as each examination shall have been completed; and as to every exhibit so examined which he shall deem worthy of an award he shall formulate in words the specific points of excellence or advancement disclosed thereby, and which in his opinion renders it worthy of an award. Every report shall be submitted as soon as possible to the committee of which such judge is a member for a finding in the premises; and in every case where, by the vote of the majority of such committee, it is determined that an exhibit is worthy of receiving an award, said committee shall forthwith formulate in written words the specific points of excellence or advancement which, in his opinion, warrant the award, and transmit the same, certified by its president or vice-president and secretary, to the Executive Committee of Awards. And in case the finding of the committee shall differ from the conclusion of the individual judge making the primary examination, either as to its being worthy of an award or as to the character of the points of excellence or advancement it possesses, it shall be so distinctly stated in the report of said committee.

In every case where the finding of the departmental committee coincides with the conclusion of the individual judge, the said committee shall transmit, with such finding, the report of such individual judge to the Executive Committee on Awards; and in those cases where the finding of the departmental committee does not coincide with the conclusion of the individual judge, then the finding in each such case shall be accompanied by the written report of one of its members who shall have examination of the exhibit, formulating therein in words the specific points of excellence or advancement possessed by such exhibit.

In every case where the finding of the committee is not in accord with the conclusion of the individual judge it shall be within the power of the Executive Committee on Awards, if in its judgment justice demands it, to refer the report back to the committee of that department whence it emanated, with the direction to review and further consider the case and report its finding under such review, without delay, to said Executive Committee on Awards, and such finding shall be conclusive.

The World's Fair Yachts.

The fleet of water craft to navigate the lagoons and basins at the fair is now calling for the labors of 200 or 300 shipwrights. The 50 electric launches for the lagoons are being constructed at Detroit and Racine. The larger boats for the basins and naval exhibits, commodious steam yachts in size, machinery and appointments, occupy the stocks in the shipyard of Charles P. Willard & Co. of Chicago, on the North Branch of the Chicago River. There are 12 of these steam yachts, exactly alike above the water line. Alongside of them are five larger boats, all designed for World's Fair traffic next season. If there is time a half-dozen more will be constructed before the opening of the fair. The later additions will be smaller and have less engine power.

When Mr. Willard secured the concession of running boats on the basins he was confronted with the question of what he was going to do with a dozen boats after the fair was over. At best they would be second hand, and must be disposed of at some price. It could not be hoped that the profits of the World's Fair season, after handing over 25 per cent. of the gross receipts to the Exposition Company, would be large enough to offset a big depreciation.

Acting on this idea, the boats were designed to be large and stanch. The exposition fixed the limit of length at 50 feet, and Mr. Willard took the limit.

Outside of the machinery the dozen boats for the basins and the five larger yachts are now nearly completed. The 17 standing side by side on the stocks make a pretty sight, even on a cold day with the wind and snow blowing through the chinks in the huge shed. On some the permanent cherry and mahogany awning is being fitted. On a pleasant day next April the procession will steam out of the North Branch and down Chicago River to the lake. No finer fleet of steam yachts ever specked Lake Michigan than will be these boats as they hug the shore on their way to Jackson Park.

When the first boat was completed, with the exception of machinery, Mr. Willard made a temporary launch. The boat was towed to a stone derrick by the river side, and exactly 29,500 pounds of stone was lowered into the boat. Just 2 feet of its white side was out of water. Although the displacement had been carefully figured, still there might have been an error, and the shipbuilder was taking no chances. Counting the machinery, fuel and permanent fittings to weigh 5 tons, the boat would have a carrying capacity of 10 tons. This left a wide margin for the local steamboat inspectors, who passed on the plans and fixed the Government limit at 75 passengers.

All 17 boats will have triple expansion engines exactly alike. The cylinders will be 4½, 7 and 12 inches in diameter with 8-inch stroke. The boilers will be the Roberts safety water-tube style, to stand the Government test of 200 pounds pressure to the square inch. Running wide open the machinery will develop 100 horse-power. With the ordinary cut off of steam they will show an economical working force of 83 horse power. This is in excess of the requirements at the fair, as high speed will not count for much in the short runs, but after the fair is over a good 12 mile boat will be much more salable than one of less speed. The machinery alone will cost over $3000 for each boat.

The World's Fair yachts are built with rather bluff, straight bows, and are intended to sit squarely in the water. The boilers and engines are amidships, and are low down in order to lower the center of gravity. A cabin, the roof of which is 3 feet above decks, will cover them. The steering wheel will be in the open space at the bow. Awnings, supported by permanent frames, will extend the entire length. The engines have bronze connecting rods and will be highly ornamented. They will run without noise, and, as the furnaces will use hard coal, the boats will be pleasant for sightseeing. The planking is of oak and white cypress, 1 and 1½ inches thick. The frames are of oak. Brass openings with automatic valves take the place of the usual "scuppers" by which water runs from the deck on a heavy sea.

The five larger steam yachts are trim in model. They are 66 feet keel, 74 feet long over all and 10½ feet wide. They will have a cutter bow, with bowsprit, and two spars, fore and aft. Being extremely sharp, they will have greater speed on the same power than the shorter boats. The boiler and engine will be housed in, but otherwise the decks will be free. Awnings, held by the spars, will be their covering. The rail is handsomely paneled in quarter-sawed oak. These yachts will cost about $7000 apiece. They will be for charter during next summer to private parties who prefer that way of going to Jackson Park.

Already clubs are being formed among residents of the North Side to charter or buy steam yachts for next season. The example of the Buena Park Club in having its own steam yacht has called general attention to the pleasures of yachting on the club plan, and Mr. Willard has prepared for quite a craze in that direction by having speedy and commodious boats which can be chartered by those who do not care to buy. The five will be ready for service at the same time the dozen will sail for the fair grounds.

Following the custom of some steamer lines, the steam yachts will be named after countries the names of which begin and end with "A." The first one, of course, will be the "America."

Time for the Big Building.

There will be many grand objects to gaze upon in the Manufactures Building when the exposition opens, but there is to be one especially which will not fail to attract the attention of all who enter the place. That will be the imposing clock tower which is to stand in the center of the building. It will be 120 feet in hight and 40 feet across at the base. The base will be formed of four round towers rising to a hight of 40 feet. The spaces between the tops of the towers will form archways 30 feet high, which, like the whole structure, will be the same on all four sides. Each tower will be hollow and 10 feet in diameter. One of them will be used as a stairway to the upper part of the main structure and the others will be rented out as concessions.

The archways between the four lower towers will terminate in a groined dome. Over this dome will be the first floor of the clock tower. It will be surrounded by an ornamental balcony, having for its principal ornamentation at intervals the shields of the different States of North America and the coats-of-arms of the South American States. At each corner of the balcony and immediately over the base towers will be domes supported by eight small columns.

The width across the big tower at this point, which might be termed the second story, will be reduced to 24 feet. Within this space will be the resting room for the select few who shall be admitted to this favored spot, for it is believed that if the general public was allowed to enter there would be considerable overcrowding.

Over this room will be another, in which is to be placed the mechanism of the big

clock, whose dials will show forth the time of day at a distance of 70 feet from the floor of the building. There will also be in this room a keyboard, by means of which chimes can be played on nine bells situated high up in the tower.

The fourth story will be the location of the hands of the clock, the dials of which will be 7 feet in diameter. According to the design there is an allowance of 1 foot diameter for the dials for each 10 feet from the ground.

The fifth story will change from the square build of the rest of the tower underneath to a round shape. It will be open and have four double sets of arches. In here will be placed the nine bells. The upper arches will support a dome about 20 feet in diameter, and the whole will be surmounted with a large globe, at a hight of 120 feet, showing the old and new continents in bold relief. The great body of the entire tower will be in white and gold, and all the ornamentation is to be richly gilt.

The base of the structure will be open between the towers, thus allowing free travel to the sightseers. Near the lower part of each tower will be illustrations showing a history of the discovery of America, and the keystone of the arches will be formed of the shields of Ferdinand and Isabella of Spain

The balconies on each of the four sides will be arranged as music stands, from which the various bands will at times be heard.

The clock will be self-winding. In place of having a man go up into the tower every now and then to wind it an electric motor will perform the work automatically. At stated intervals the working of the clock will establish an electric circuit and set the winder in motion.

The clock is loaned without cost by the Self-Winding Clock Company of New York City. The chime of bells is put in by the Clinton H. Meneely Company of Troy, N.Y.

Assignments of Space.

Director-General Davis has submitted to the Executive Committee a report on the amount of space allotted to foreign and domestic exhibitors. Practically all the room in the 13 exhibits buildings has been assigned. Space for the live stock display has not been allotted because it is too early as yet to determine how a proper apportionment should be made.

Out of the 3,642,966 square feet of exhibit space foreign governments have received 1,420,027 feet and domestic exhitors 1,787,263 feet. This is apparently favorable to domestic exhibitors. At the Centennial Exposition there were approximately 24,000 foreign exhibitors and 10,000 domestic ones. According to the allotment made by Colonel Davis, the domestic exhibitors are given the most favorable opportunity practicable for securing space.

While 90 per cent. of the available space has been apportioned, the final notices to exhibitors have not all been sent out.

The following table indicates the total area in square feet in each one of the exhibit buildings and the amount of space assigned in the same to foreign and domestic exhibitors :

Department.	Total area.	Foreign exhibitors.	Domestic exhibitors.
Agriculture	415,348	154,732	251,451
Horticulture	158,593	49,516	69,612
Live stock (no assignments until later).			
Fisheries	80,598	21,875	42,732
Mines and mining	272,615	86,380	142,918
Machinery	455,961	129,982	204,771
Transportation	360,589	166,954	102,934
Manufactures	790,042	428,070	215,927
Electricity	185,100	60,932	137,072
Fine arts	102,436	161,992	30,441
Liberal arts	346,206	119,751	202,420
Ethnology	101,312	43,656	57,656
Forestry	82,566	22,604	29,092
Totals	3,642,966	1,420,027	1,787,263

Out of the entire amount of available space 211,465 square feet has been reserved for concessions. This room will be occupied chiefly by restaurants, booths for the sale of catalogues, mineral waters, guides, &c.

Much disappointment will doubtless be experienced over the space assignment. Many firms who had reason to think that they would secure a fine allotment for the display of their wares will find that they have been omitted altogether. At least 9000 concerns who expected to get into the Manufactures Building have been shut out. This may give rise to the charge of unjust discrimination and partiality, but the exposition officials claim that they found themselves obliged to discriminate and that they have accepted only such exhibits as appear to them to be of the highest character and calculated to reflect credit on an international display.

World's Fair Appropriations.

Appropriations for the fair by foreign governments and the different States of this country are practically closed up and President Harrison will shortly be officially informed by President Palmer's report just how much the United States and all countries are going to do for the big fair. Foreign governments have, all told, set apart approximately $5,843,598.

This amount is distributed among 86 nations, colonies, principalities, &c. Of this number 38 have organized official commissions to conduct their World's Fair business. The remaining number will have exhibits at the fair under less pretentious aspices. There are already in progress of construction 16 foreign government buildings. These pavilions are special in their nature. Countries which will make exhibits in the main buildings have not deemed it necessary to construct special pavilions.

Here is the list of foreign countries which have made appropriations and the amounts of the same:

Argentine	$100,000	Guatemala	$200,000
Austria	102,300	Hawaii	40,000
Belgium	57,000	Honduras	20,000
Bolivia	50,000	Hayti	25,000
Brazil	600,000	India	30,000
British Guiana	25,000	Japan	630,000
British Honduras	7,500	Jamaica	24,333
Barbadoes	5,840	Leeward Islands	6,000
Colombia	100,000	Liberia	7,000
Costa Rica	150,000	Mexico	50,000
Canada	100,000	Morocco	150,000
Cape Colony	50,000	Netherlands	100,000
Ceylon	65,600	Nicaragua	31,000
Cuba	25,000	Norway	56,280
Denmark	67,000	New South Wales	243,325
Danish West Indies	1,200	Orange Free	7,500
Dutch West Indies	5,000	Paraguay	100,000
Ecuador	125,000	Peru	140,000
France	733,400	Russia	46,326
Germany	800,000	Salvador	12,500
Great Britain	291,000	San Domingo	25,000
Greece	60,000	Spain	214,000
		Sweden	108,000
		Trinidad	15,000

Following the recital of what moneys have been appropriated by foreign countries comes a list of the States which have set aside money for the fair. Thirty-one of the States are erecting pavilions. Their appropriations run as follows and aggregate $3,100,045:

Arizona	$30,000	Nebraska	$50,000
California	300,000	New Hampshire	25,000
Colorado	100,000	New Jersey	20,000
Delaware	10,000	New Mexico	25,000
Idaho	20,000	New York	700,000
Illinois	500,000	North Carolina	25,000
Indiana	75,000	North Dakota	25,000
Iowa	125,000	Ohio	100,000
Kentucky	100,000	Pennsylvania	300,000
Maine	40,000	Rhode Island	25,000
Massachusetts	75,000	Vermont	15,000
Michigan	100,000	Washington	100,000
Minnesota	50,000	West Virginia	40,000
Missouri	50 000	Wisconsin	65,000
Montana	50,000	Wyoming	30,000

A number of States expect to secure increased appropriations. New York is asking for $300,000 more from its State Legislature and Governor Flower has recommended it. New Jersey is pleading for $70,000. North Dakota also wants more money.

Miscellaneous.

An interesting feature of the Government exhibit will be a model of the earth, with all the geometrical accuracy that mechanism and art can give to such a difficult representation. It is intended to form a part of the exhibit from the General Land Office of the Interior Department. So far as known it is the largest globe ever constructed. It will surmount a star-shaped edifice, which pedestal will elevate the monster globe 15 feet above the floor, so that it will rise above the surrounding exhibits. The globe will be 63 feet in circumference. A stairway in the pedestal will give access to a gallery at the base of the globe, which will revolve on a horizontal axis.

George Westinghouse, Jr., who has the contract for furnishing the incandescent electric lighting plant for the fair, does not appear to be disturbed by the injunction secured by the Edison Company against his concern. Mr. Westinghouse has just issued a circular announcing that the new stopper incandescent lamps now being manufactured by him will be exclusively used. "At least 92,000 of these lamps," he adds, "will be required by the time the exhibition opens, and it is anticipated that the requirements of exhibitors will increase the number to 130,000 or more."

Germany's list of exhibitors at the exposition numbers 5077 names. In it are represented 230 cities and towns, and of these 40 cities send more than 10 exhibits each. Berlin leads with 283 exhibitors, Munich is next with 187, Leipsic follows with 149, Frankfort is next with 57, Hamburg has 55 and Chemnitz has 41. According to this statement it appears that the cholera-infected city will have a big bundle of goods to display at the fair, but the Director General thinks there will be no danger of infection.

George Chessworth of the London & North-Western Railway of England arrived in Chicago last Wednesday, and called on Chief Willard A. Smith for the purpose of arranging for the installation of the exhibit of that company. The principal feature will be a passenger train headed by a Webb compound locomotive weighing 47 tons, a model ticket office, full-sized models of George Stephenson's "Rocket," Trevithick's locomotive of 1804, and a representation of the L. & N. W. signaling system.

The New York Statue of Liberty, which stands at the entrance of the harbor of the metropolis, is to be shown at the exposition in a model carved out of salt. The exhibit will come from the Salt Union of Cheshire, England. The model will be 12 feet 6 inches high. The ornamental base, which is to be enriched with mouldings, panels and inscriptions, stands upon a sub-base of rough, amber colored rock salt. The statue of the goddess herself will measure 5 feet 6 inches high.

There is some friction between the Dominion and Manitoba governments over the Canadian exhibit at the World's Fair. The Manitoba Government has decided not to exhibit in the Canadian section of the World's Fair, but to have a show of its own outside the fair grounds. This action has aroused the ire of the Dominion Government, as it was understood that Manitoba would take part in the Canadian exhibits and give $2000 toward the erection of a Canadian pavilion.

Electric belt and other appliances of a like character will be given no space in the electricity department of the World's Fair. Chief Barrett and his assistant, Chief Hornsby, have decided to exclude this class of exhibits, as they do not consider these devices as being strictly electrical in their character.

The brick and tile manufacturers of the country and the manufacturers of fire extinguishing machinery have decided practically to put up special buildings adjacent to Machinery Hall for exhibits of these industries.

Steam and Hot-Water Circulation

The Blower System of Heating and Ventilation.

By Walter B. Snow.

(*Concluded.*)

REGULATION OF AIR SUPPLY.

By a proper arrangement of supplementary heaters or by a double system of hot and cold-air ducts, the temperature of the air admitted to any room may be varied at will without changing its volume. The vent registers should usually be so proportioned as to cause a slight pressure to be maintained within the room—causing all leakage to be outward, and avoiding that most prominent objection to the vacuum system—viz., the tendency to draw air into the room from all sources, good or bad.

As almost universally arranged, the entire steam hot blast apparatus is placed in the basement (or first floor when no basement exists), together with all distributing mains. Air is supplied to the rooms above through vertical risers, either of brick or metal, the air being discharged therefrom through outlets 8 or 10 feet above the floor. There is thus avoided all danger from the leakage and freezing of coils incident to any direct system, for in the blower system the entire heating surface is massed in a single heater in connection with the fan, and there are no isolated coils or extended lines of steam supply and return pipes.

The compactness of this heater and its reduced size, as compared with the heating surface required to produce the same results when applied as direct radiation, form marked features of this system.

The condensation of steam in a given heater is dependent upon the temperature of the air, the pressure of steam and the amount of air coming in contact with the heater pipes in a given time With natural circulation, the amount of air passing through the heater is comparatively small and the condensation correspondingly light.

CAPACITY OF HEATERS.

With a forced circulation of air, however, the volume of air may be varied at will. In ordinary practice with the blower system in mill and factory heating from 25 to 35 cubic feet of air pass through the heater per minute per square foot of pipe in the heater. What enormous condensation results may be realized when we see that through a heater of 1000 square feet there may every minute be caused to pass a volume of 25,000 to 30,000 cubic feet of air at an entering temperature of zero degrees in a single row of 1-inch pipe placed crosswise of the air current under high pressure steam (80 pounds or thereabouts) with air entering at zero, in the above cited propositions the condensation may mount up to 5 or 6 pounds per square foot per hour. The ordinary rough boiler rating is 15 square feet of heating surface per horse-power, which at 30 pounds of steam per hour per horse-power indicates an evaporation of 2 pounds per square foot per hour in the boiler, which is only one-third to two-fifths of the condensation per square foot per hour in the heater. There would thus be required 166 to 200 horse-power of boiler to supply steam to the single row 1000 foot heater.

Although a single row heater is not practical, nevertheless these figures illustrate most vividly the difference in conditions between natural and forced circulation heaters. The ordinary mill heater for the blower system is 16 to 18 rows deep of 1-inch pipe, and the condensation therein under above conditions will run from 1½ to 3 pounds per hour per square foot, according to conditions.

Under similar circumstances 1 foot of pipe in a heater in connection with a fan is as efficient as 3 to 5 feet in the ordinary direct radiator.

UTILIZING EXHAUST STEAM.

To a very large extent in the heating of manufacturing establishments exhaust steam is used in the heater during the day—the condensation being much less than with live steam—which is used at night if the apparatus is in operation.

In hot blast heating apparatus driven by direct connected engines the engine exhaust is always utilized in the heater, and in mild weather often suffices for the heating. This utilization of the exhaust reduces to almost nothing the cost of driving the fan, for the exhaust from the fan engine is practically as efficient for heating as the live steam when it first entered the cylinder. In numerous cases the fan is provided with tight and loose pulleys, being driven during the day by a belt from line shaft and by night by a special independent engine.

The blower system is thus seen to be positive in action, capable of adjustment to any degree of ventilation and always under immediate control. As compared with direct radiation, far less heating surface is required, danger of leakage and freezing is avoided and all the steam and drip valves are upon the apparatus itself rather than at distant points. Purity of air, equality of temperature and a resulting improvement in the health of the occupants mark the advent of the blower system in any building.

The American Boiler Company.

The American Boiler Company were organized in Chicago on Monday last, with a capital of $1,500,000, and have purchased the steam and hot-water boiler business of the Pierce, Butler & Pierce Mfg. Company of Syracuse, N. Y.; the Richardson & Boynton Company of New York City and Chicago, and the National Hot Water Heater Company of Chicago. The directors of the company are: W. K. Pierce and Clarence V. Kellogg of Syracuse, N. Y.; H. T. Richardson of New York City and A. P. Richardson, George E. Downe and Henry S. Downe of Chicago. The headquarters of the company will be located in Chicago, probably at 34, 36 and 38 Dearborn street, and they have already secured locations for branches in Boston, New York, Philadelphia, Chicago, St. Louis, Denver, San Francisco and Portland, Ore.

By this movement they secure the control of the manufacture and sale of the Florida hot-water and steam boilers, the Perfect hot-water and steam boilers, also the Spence hot-water heater and the Soleil safety steam boiler, with plants at Syracuse, N. Y., Brooklyn, N. Y., and Canton, Ohio.

The management state further that it is their purpose to handle a full line of wrought iron and steel tubular boilers for power and heating purposes and a full line of steam-fitters' specialties. Competition in this line of goods has been in the past exceedingly sharp and expensive, as all of the companies above referred to have maintained branch houses in the principal cities of the country, and at the same time a large and expensive corps of traveling men. Practically all of the managers, together with the best salesmen of the respective concerns, will be retained in the organization of the new company and for the most part covering their old territories, and it will be the policy of the new company to follow those methods which have been followed by these companies so successfully.

The American Boiler Company will make one radically new departure, the numerous criticisms of the various patented hot-air and hot-closet systems of heating and ventilating schoolhouses having prompted them to organize an entirely separate department in their business, which will be devoted exclusively to the matter of heating and ventilating schoolhouses and public buildings. W. M. Mackay, formerly manager of the boiler department of the Richardson & Boynton Company of New York, has been placed at the head of this department. The local steam fitter is in a position to execute all contracts for schoolhouse heating far more economically and far more satisfactorily than can any foreign company, and believing that the local fitter in such cases should have the preference, plans and specifications will be furnished by the company, if desired, so that any member of the trade can execute such contracts with absolute confidence in his success.

Most of the men who are well known to the members of the trade have already associated themselves with the new organization. Thomas E. Crone, formerly manager of the Florida Heater Department, will be manager of the New York branch, with headquarters at 94 Centre street, and W. H. Oakes, formerly secretary of the National Hot Water Heater Company, will be in charge of the New England branch, with headquarters at 195–197 Fort Hill Square, Boston. It is rumored that it is not at all improbable that the company will acquire by purchase control of some other of the well-known boilers in the market, and with their complete organization they cannot help but be a most important factor as regards the trade in house heating boilers.

One of the aims of the new company will, we understand, be to attempt by equalizing prices to so harmonize the interests of the trade that better prices may be secured to the steam fitter for house-heating contracts.

The officers of the company are: William K. Pierce, president; George E. Downe, vice-president; Clarence V. Kellogg, treasurer; A. P. Richardson, secretary; Henry S. Downe, assistant secretary; and the management of the new company is in the hands of those who have practically had the management of the three companies above referred to.

HEATING NOTES.

With the consolidation of the Florida, Perfect and Spence boilers into the American Boiler Company it was feared by some that the recently organized United States Steam and Hot-Water Heater Manufacturers' Association might fall through. On account of this important business change a special meeting of this association was begun at Buffalo, N. Y., on Thursday of this week to decide upon the future of the organization.

The Toronto Radiator Mfg. Company, Limited, Toronto, Canada, favor us with a calendar for the current year. It is plain but neat in design and the large, well-printed calendar sheets will be appreciated by those who wish a calendar to tell the days of the month rather than for a wall decoration. The upper part of the sheet carries the announcement of the company with a glorified form of Industry resting on a Safford radiator, which in turn is supported on a base made up of many business virtues. The background is a part perspective view of the company's foundry, with all of Canada and two oceans seen in the distance.

H. H. Burns, 113 State street, Boston, Mass., is the sole agent for Maine, New Hampshire, Massachusetts and Rhode Island for the Ardent portable steam heater for gas or oil. The heater consists of a radiator with a burner below, so that steam is formed from the water and the heat is given off from the radiator surface. The heaters are furnished in various sizes from four to ten sections.

We are under obligations to the Nason Mfg. Company, 71 Beekman street, New York, for an exceedingly useful and pretty little envelope opener and paper cutter. It is in the shape of a 5-inch scale, rounded at one end and beveled toward the other with a thin edge. At the butt of the paper cutter is the modest announcement of the Nason Mfg. Company and of their Equator heater. The chief charm about this souvenir is its material, being made of aluminum, and it is in consequence light, bright, and serviceable.

Ernest W. Mehrino has been appointed manager of the Minneapolis and St. Paul branches of the American Radiator Company, 111-113 Lake street, Chicago.

The newly organized American Boiler Company are about to distribute to the trade a handsome calendar for the current year. It will be issued on February 1, and will, without doubt, be much appreciated by those who receive it. The card is of oblong shape, decorated in colors by an arch with the signs of the zodiac. Some cheerful verses occupy part of the space, and the plain announcement of the American Boiler Company is conspicuously printed in the center. Reference is made to the branch offices in Boston, New York Chicago, Denver, San Francisco and Portland. At each side of the calendar proper are lists of the Steam and Hot-water Boilers, the factories of the American Boiler Company and the names of the directors.

A. A. Spear, 88 Lake street, manager of the Chicago branch of the Magee Furnace Company, Boston, Mass., reports a favorable trade in the Boston combination heaters for warm air and hot water. Among the residences in Chicago and vicinity in which the Magee system of warm air and hot-air heating has been placed can be mentioned those of A. N. Merriman, 143 Hoyne avenue, two heaters; S. L. Williams, 306 Ontario street; Geo. A. Tripp, Greenwood avenue; F. M. Baxter, 3029 Grand Boulevard; Mrs. Max Hjortsberg, 387 La Salle avenue, and E. A. Driver, Riverside, Ill.

Combination of Emery Wheel Manufacturers.

The Columbian Emery Wheel Company, with $600,000 capital, were organized under the laws of the State of New Jersey, at Trenton, January 12, 1893, and officers were elected as follows:

Frederick S. Dickson, president.
F. H. Pietsch, vice-president.
L. Pest, secretary.
F. R. Preston, treasurer.

The following have been chosen directors of the company:

Frederick S. Dickson, Philadelphia, Pa.
F. H. Pietsch, Chicago, Ill.
L. Best, New York, N. Y.
C. Ross Grubb, Camden, N. J.
Clarence Tebbets, Waltham, Mass.
F. R. Preston, Detroit, Mich.
Harlan Page, Philadelphia, Pa.
Geo. Maitland, Detroit, Mich.
Geo. W. Jackman, Bridgeport, Conn.

The company will endeavor to obtain control of the principal emery mines of this country, and it is expected, as the above list indicates, that all of the most prominent manufacturers of wheels will enter the combination. We are informed that one of the main points aimed at is to reduce the cost of marketing the product by properly apportioning the territory and by systematizing the selling. No attempt will be made to raise prices, but an effort will be made to have something like a standard price. It is expected that the company will begin business in a few weeks with the following firms as members: Northampton Emery Wheel Company, Leeds, Mass.; Chicago Emery Wheel Company, Chicago; Sterling Emery Wheel Company, New York; Morton Emery Wheel Company, Worcester, Mass.; Grant Corundum Wheel Company, Chester, Mass.; the Abrasive Wheel Company, Philadelphia; Michigan Emery Wheel Company, Detroit; Vitrified Emery Wheel Company, Westfield, Mass.; Springfield Emery Wheel Company, Bridgeport, Conn.; Celluloid Emery Wheel Company Newark, N. J.; Waltham Emery Wheel Company, Waltham, Mass.

BUSINESS ITEMS.

James Shaw of Marlborough, N. Y., is building a two story establishment and, when completed, will do a general stove, tin and hardware business with W. H. Newman of the same place.

Morris Warner & D. Milroy will open a hardware store at Mayfield, N. Y., February 1.

We are indebted to Frank J. Ross, Tell City, Ind., for a neat little business souvenir that he is distributing to his friends in the trade. The device is a self-feeding match box built of cardboard and covered with glazed colored paper. The reservoir, or match chute, at the top carries an announcement concerning Frank J. Ross and his business in stoves and kitchenware. The announcement is arranged as an acrostic with the proper name in capital initial letters.

We have received, with the compliments of G. W. Reeder of Newville, Pa., a very neat calendar for the new year. It measures 4½ x 7 inches, and is embellished with a colored panel picture, which occupies the upper portion. The name and address of Mr. Reeder occupy the central portion of the card, while beneath are the leaves forming the calendar proper.

We have received an invitation to be present at the wedding of Walter E. Leidy and Alma B. Richards at the Third Christian Church, Richmond, Va., Wednesday evening, February 8. Mr. Leidy has our most cordial congratulations for the coming event, and we are sure that all his friends in the trade will join us in wishing him prosperity and happiness. We understand that the firm of M. S. Leidy will, after June, be known under the name of M. S. Leidy & Son.

The Nova Scotia Coal Fields.

A grand consolidation of the bituminous coal interests of Nova Scotia is on the eve of being consummated through the joint efforts of American and Canadian capitalists, and a similar movement for the control of the mines in New Brunswick is reported. The Nova Scotia Legislature regards the matter of so much importance that a special session has just been called to legalize the transaction, which step may be explained by the financial necessities of the province, as it appears that the coal managers have promised to pay the Government 12½ cents royalty. It has been assumed by writers on the subject that the United States citizens concerned are calculating with confidence that Congress will soon put coal on the free list, thus opening the way for remunerative speculation. Canadians generally, especially in the larger cities, are taking a deep interest in the subject, as they obtain the bulk of their coal supplies from Nova Scotia and are apprehensive of a "corner" prejudicial to their interests. The proposed combination, it is said, will be in a position to compel any independent company not included in the arrangement to co-operate in its policy. There has been a large development of the coal trade of Nova Scotia during the last 14 years. The sales in 1878 were 888,000 tons; last year they were 1,761,000 tons. Between one-third and one-half of this finds its way to Quebec and Montreal. The New Brunswick Company claim to have located two seams, one of 6 feet and the other of 10 feet, of pure anthracite coal. Attempts to work this coal field have been made off and on for many years, but, owing to the want of capital, with little success. Of course Boston and the Eastern States watch events now transpiring with interest, as manufacturers in that region naturally entertain the hope of a trade with Nova Scotia that may prove highly advantageous, not only with reference to imports, but as opening a profitable market. For example, the Dominion might find it difficult to compete in supplying the Bluenoses with flour, and a more liberal interchange of products would be likely in course of time to bring all the maritime provinces into closer commercial connection.

In reference to railroad pooling, which railroad managers earnestly desire to sanction, when an amendment of the Interstate Commerce law to this effect was proposed in Congress last week, a negative was encountered in the House.

Eiffel's plan for a great bridge across the River Neva at St. Petersburg has just been accepted, and the St. Petersburg municipality has voted the 26,000,000 rubles required to build it.

American travelers returning from Honduras report that a large number of Americans are in that Republic and that the capital is almost an American city.

TIN PLATES.

American Tin-Plate Brands.

The recognized position which American tin and terne plates have now attained in the home market, and the fact that native material is winning its way into general use, make it desirable that some definite knowledge of the various new tin-plate brands that are to day being placed on the market by American manufacturers should be possessed by our readers. It is unlikely that the average consumer has, as yet, much notion of the number of fresh brands and trade-marks on plates and boxes, which have cropped up so luxuriantly of late in connection with our domestic tin-plate manufacture, and we fancy buyers must occasionally feel themselves somewhat at sea among the new names put before them in the market. Some of the brands adopted by the pioneers in the tin-plate industry and the more prominent makers are doubtless more or less familiar in the trade, but a large number of them must be still new and strange. The past 12 months have seen a number of new tin-plate brands come into existence, and every month brings additions to the list. It appears to us, therefore, that the time has arrived when it will be well to promulgate all the information it has been found possible to obtain on this subject, which, we believe, will be of much interest and utility to those who use this newest domestic product. With this end in view we print below under the headings of different concerns now making tin and terne plates in the United States the names and grades of their products, together with such information in regard to sizes, weights, qualities, &c., as they have afforded us. In addition, we have, whenever practicable, reproduced in *fac-simile* the brands and trade marks stamped on plates or boxes by the various makers. The plates mentioned below are only such as are being actually produced and placed on the market to-day from American tin plate works. A glance at the list will show that several grades and varieties of both bright and roofing tin are represented among the manufactures.

Besides the firms whose names appear below, there are others who make tin plates solely for their own consumption. We regret that from a few makers the necessary information has not reached us in time for incorporation in the present list. These brands we expect to give in a supplementary notice.

American Tin & Terne Plate Company,

Philadelphia, are making two brands of terne plates, stamped, respectively, "KEYSTONE" and "PURITAN."

American Tin Plate Company,

Elwood, Ind., are producing an extensive line of both tin and terne plates. They do not stamp any of their plates, nor have they yet adopted any trade mark. The marks on their boxes are stenciled lettering for "coke," "charcoal" and "terne" plates respectively. The company will probably adopt distinctive names for their various brands before long.

American Tin Plate Machine & Mfg. Company,

Philadelphia, make a specialty of continuous sheets of roofing terne, soldered together and tinned, in one operation, by their special automatic machine. The material can be made and supplied in rolls up to 80 feet in length.

Baltimore Steel, Iron & Tin-Plate Company,

Baltimore, Md., commenced operations with the opening of the present year. Their present productions consist of one brand of bright tin plates, named "ARTO," and so stamped on boxes. The sheets are made of Siemens steel. Also, one brand of terne plates, stamped on boxes "LILY."

Cleveland Tin Plate Company,

Cleveland, Ohio, have been in operation for about a year and are putting on the market both bright and roofing plates of the following gauges and qualities: IC, IX and IXX in 10 x 14, 14 x 20 and 20 x 28 sizes. The company's registered trade-mark, as shown in Fig. 1, is "Buckeye," by which name their various productions are known.

Fig. 1.—Trade-Mark. Cleveland Tin Plate Company.

Each box of plates is marked on the cover with the stenciled brand shown

Fig. 2.—Stenciled Marking. Cleveland Tin Plate Company.

herewith, Fig. 2, in addition to the gauge and quality mark on the side.

McKinley Tin Plate Company,

Wilkinsburg, Pa., have hitherto confined their efforts to the production of

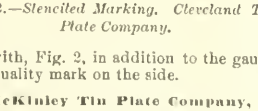


Fig. 3.—"McKinley" Stamp. McKinley Tin Plate Company.

terne, and will not make bright tin so long as the demand for roofing plates continues as pressing as is now the case. Their output includes three brands of terne, IC and IX, 14 x 20 and 20 x 28 viz.:

1. "*McKinley Roofing.*"—A heavy rolled plate, coated by the palm oil process. Boxes are marked on one side "M'KINLEY ROOFING," with gauge and quality; on the other side, "M'KINLEY TIN PLATE CO., PITTSBURGH, PA.," and each plate is stamped with the brand "McKinley." (See Fig. 3).

2. "*Fort Pitt.*"—A light weight rolled plate, coated by palm oil process. Black sheets weigh 180 to 190 pounds. Boxes are stenciled similarly to "McKinley Roofing," except that the name "FORT PITT" is substituted for that brand. The plates are each stamped with the name "Fort Pitt," as in Fig. 4.

Fig. 4.—"Fort Pitt" Stamp. McKinley Tin Plate Company.

3. "*Wilkinsburg Re-Dipped.*"—An old style hand-dipped plate. The box marks are similar to both the above, except that the name "WILKINSBURG RE-DIPPED" takes the place of the other brand names. (See Fig. 5.)

Fig. 5.—"Wilkinsburg Redipped" Stamp. McKinley Tin Plate Company.

Weight guarantee is given to the purchasers of all these plates.

Morewood Tin Plate Mfg. Co.,

Elizabethport, N. J., have only one brand at present in use for their plates, viz., "P.T.L." Several grades of both bright and roofing tin, bearing similar brands to the corresponding plates made by this firm in Wales, are shortly to be put out.

Norristown Tin Plate Works,

Norristown, Pa.: The output of this concern consists of two brands of Terne plates.

1. *Norristown, Pa.*—A dull terne. Made in sizes—20 x 28 and 14 x 20. The boxes

are branded on the side with the name, as above, as well as IC or IX, according to gauge. Each plate is stamped with the name, traversed by arrow, as in Fig. 6.

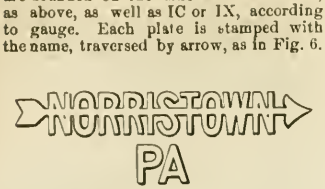


Fig. 6.—"Norristown, Pa.," Stamp. Norristown Tin Plate Company.

2. "*Earnest*," are bright ternes, of standard sizes. Boxes branded on the side with brand name and gauge. The plates are not stamped.

Both grades run in weight as follows:
IC, 14 x 20, 108 pounds per box.
IC, 20 x 28, 216 pounds per box.
IX, 14 x 20, 136 pounds per box.
IX, 20 x 28, 272 pounds per box.

Locust Point Iron & Steel Works Company,

Baltimore, Md., Messrs. Coates & Co., are producing bright tin plates of standard sizes. No brand has yet been adopted, but

Fig. 7.—Trade-Mark and Box Stencil. Coates & Co.

each box lid is stenciled with the company's name and trade-mark, an eagle and goat, as shown in Fig. 7.

Phillips Tin Plate Company,

Philadelphia: The present output of this concern consists of three grades of American bright tin plate and two grades of roofing terne.

The bright tin plates are marked on boxes as follows:

1. "*Vernon*" branded on front, with size of plate; "BEST CHARCOAL" on one side, and "BRIGHT TIN" on the other side.

2. "*Rees No. 1*," so branded on front of box. Side marks are similar to the above.

3. "*Hengoed*" branded on front. On one side, "BEST COKE;" on third side, "BRIGHT TIN."

Terne-plate boxes bear the following marks:

1. "*Phillips' Best*," so branded on front of box. One side bears the words "HEAVILY COATED." The opposite side is marked with size, &c.: "20 X 28, IC," or "IX," "AMERICAN ROOFING."

2. "*Phillips' O. K.*" Name branded on front; "MEDIUM COATING" on the one side, and size, &c., on the opposite side.

Pittsburgh Tin Plate Works,

New Kensington, Pa., are turning out two brands of roofing plates, IC and IX., in sizes 14 x 20 and 20 x 28, viz.:

1. "*Westmoreland*," so marked in plain 1-inch letters at the end of the box, together with the letters IC or IX, and size marks. On the sides of the box are stamped the words "AMERICAN ROOFING PLATES." Each plate is stamped with the brand name, as in Fig. 8.

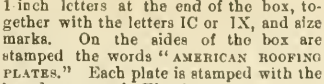


Fig. 8.—"Westmoreland" Stamp. Pittsburgh Tin Plate Works.

2. "*Kensington*," so marked on the end of the box. All other box marks are similar to those detailed for "Westmoreland." Plates are stamped with name as shown in Fig. 9.

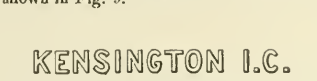


Fig. 9.—"Kensington" Stamp. Pittsburgh Tin Plate Works.

In bright tin the company produce a best charcoal plate, "KENSINGTON," so stamped on one end of the box; the other end is marked with the size and thickness, and the word "CHARCOAL" is displayed on the side.

The lids of all the company's boxes are stenciled

"FROM
PITTSBURGH TIN
PLATE WORKS,
NEW KENSINGTON, PA."

Record Mfg. Company,

Conneaut, Ashtabula County, Ohio, produce only bright charcoal and coke tin, in five grades, for stamping and manufacturing purposes. Each box is marked on the side with brand and quality, as follows:

1. "*IC*" (or "*IX*") "*Record Charcoal. A.1.*" This is a bright charcoal plate corresponding to "Melyn."

2. "*IC*" (or "*IX*") "*Record Charcoal. A.*" A bright plate representing "Grange."

3. "*IC*" (or "*IX*") "*Record Charcoal. B.*" This quality is composed of charcoal "Wasters."

4 "*IC Record Coke*," and

5. "*IC Record Coke. W.*," containing coke "Wasters."

James B. Scott & Co.

Pittsburgh, Pa., are now placing upon the market two qualities of terne plates.

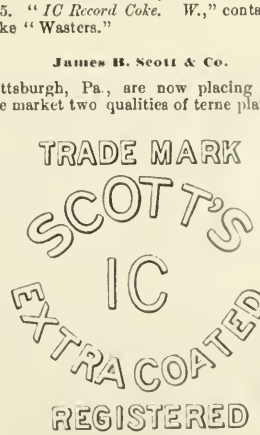


Fig. 10.—Jas. B. Scott & Co. Trade-Mark.

1. "*Scott's Extra Coated*" IC and IX, 14 x 20 and 20 x 28. A guaranteed plate, with, it is claimed, the heaviest possible coating, containing a large proportion of pure block tin. Average weight exceeds 240 pounds per box IC 20 x 28, and 290 pounds for IX 20 x 28. 14 x 20 size one-half of above. Each plate stamped with registered trade-mark, illustrated in Fig. 10.

Boxes stenciled with name of plate, gauge and "JAMES B. SCOTT & CO., PITTSBURGH, PA." "AMERICAN MADE."

"Scott's Extra Coated" plates are hand made in open pots by pure palm oil process; the sheets being best quality soft steel. Each box contains an assorter's card, with registered trade-mark, and a guarantee. The card bears the initials of the assorter, and is requested to be returned should any sheet not be found up to standard.

No imperfect or "Waster" sheets are stamped.

2. "*Neville*," a bright terne plate, made of best quality steel by the roller process, and carrying a fairly heavy coating, with large proportion of block tin. Each box

Fig. 11.—"Neville" Brand. Jas. B. Scott & Co.

is marked with name of brand as above, gauge and name of maker, &c., similar to that noted for "Scott's Extra Coated." Each sheet is stamped as in Fig. 11.

Somers Bros.,

Brooklyn, N. Y., are turning out several qualities of bright coke and charcoal plates for stamping purposes in uniform size 14 x 20, gauges IC, IX and IXX. All boxes are branded on the side "SOMERTON."

THE PHILLIPS TIN PLATE COMPANY, Philadelphia, who have recently started into operation in the manufacture of American tin and terne plates, inform us that the demand for their material has been very satisfactory. They have been obliged to work overtime to keep up with orders received; and are already contemplating increasing the capacity of their works.

An electrically heated soldering tool has been patented by Charles L. Coffin, Detroit, Mich. The head of the tool is filled with melted solder, which is retained by a screw plug arranged to close an orifice. The electrical current heats the head until the solder is melted, and by regulating the screw mentioned the solder can be laid upon the joint as desired.

Manning, Bowman & Co., Meriden, Conn., are the assignees of a patent recently issued to Edward B. Manning of that place for a handle for culinary vessels. The construction of the handle is such that it may be readily applied to or detached from the article as occasion may require.

The first of a series of semi-monthly social gatherings given by the Auchmuty Musical Society to the members of the day classes of the New York Trade School was held Thursday night in the main lecture room of the school, Sixty-seventh street and First avenue. At ten o'clock a supper was served, and afterward the young men met their different instructors for an hour's informal talk regarding their work and progress.

Borough Road Polytechnic Institute of London, England.

Through the courtesy of C. T. Millis, principal of the Educational Department of the new Borough Road Polytechnic Institute of London, we have been favored with a prospectus of that institution which is of great interest. The pamphlet contains, among other matter, an outline of the course of instruction given in the evening educational classes of the institute during the present term—viz., from October 1, 1892, to May 31, 1893 This document provides some interesting information in regard to the technical and trade subjects taught in the classes, which we believe will be of use to our readers. We therefore propose to give some account of the institute and its methods as they bear upon the manual and theoretical instruction provided for such trades as come more particularly within the scope of this paper.

INAUGURATION OF THE INSTITUTE.

The Borough Road Polytechnic Institute, which is, we believe, the first one opened under the act of Parliament recently passed to encourage such establishments, has been planted down among the homes and haunts of the London workingman. It is situated in the southeastern part of the city, on one of the main arteries of the great London street system—the Borough Road—a quarter settled by a class of artisans and tradesmen who would be most likely to profit by such an institution. The institute building is a handsome structure of ample proportions, containing a large number of well-equipped class and lecture rooms, workshops, laboratories and all the necessary paraphernalia for a thorough instruction in the comprehensive fields of practical and theoretical study which the institute aims to cover. The instruction is offered at an almost nominal cost to all who wish to avail themselves of it. The building was opened for use on the first of last October. Consequently the present is the initial season of its operations, for which reason no reports of results can yet be given. The enterprise can, however, hardly be considered as a new venture. The members of its staff have all been previously connected with similar work in the large Technical College at Finsbury, London, or other kindred institutions. They, therefore, bring such a wide practical experience in the various methods of technical education to the new field that the success of the institute should be fairly assured.

GENERAL AIMS OF THE INSTITUTE.

Mr. Millis, the principal of the Educational Department, himself long connected with the Finsbury College, writes to us as follows in regard to the aims of the promoters of this establishment: "Let me call your attention to the fact that as far as possible both theory and practice are taught in every technical and trade class. I am also endeavoring to make our science and art classes especially useful to those engaged in the various trades or industries for which we have classes. For this reason the governors of the institute permit any of our students attending, say, the plumbing, carpentry, pattern cutting, bricklaying or other class to join any science and art class at half fees. And apprentices in any trade are admitted to the class for their special trade at half fees. Our workshops are fitted up with the same style of tools and appliances as those used in factories and workshops outside. But we do not attempt to teach trades. We only supplement the training of the workshop and teach the higher branches of the trade." And herein lies the principle of the whole institution, which is not to give a thorough education, commencing from the groundwork—as is the case with the majority of the trades schools in this country—but the Borough Road Institute aims at helping the youth or man who is already working at a trade to improve himself and more quickly to render himself efficient in his occupation. At the same time it holds out to him inducements to study in other fields more or less connected with his own business and to improve his mind by joining some of the science or art classes, the cost of such instruction being reduced to a minimum. The science classes treat of such subjects as elementary mathematics, geometrical drawing, applied mechanics, machine and building construction and drawing, chemistry, &c. The art classes embrace freehand, model and perspective drawing, with lectures on design. That these opportunities will be appreciated and made use of by many trade students we do not doubt, for many of the subjects bear directly upon the theoretical part of their own business—a knowledge of geometrical drawing, applied mechanics, and even chemistry, would not come amiss to a plumber or sheet-metal worker; but would certainly tend to make him a more thoroughly efficient workman.

PLUMBING CLASS.

The technical and trade classes cover a wide field of industry and embrace such varied occupations as brick work and masonry, carpentry and joinery, plumbers' work, builders' quantities, sheet-metal work, photography, tailoring, wood carving, hat manufacture, paints and oils, typography, tanning, boot and shoe manufacture, &c. Of these we may make special mention of such trades as appeal more directly to the interests of the readers of *The Metal Worker*, viz.: Plumbing and sheet-metal work. Of the former we regret having no detailed information as to the course of instruction pursued. The classes for this trade are, however, held on two evenings of each week, from 8 to 10 o'clock, one evening being devoted to theoretical and the other to practical instruction, both of which, we are informed, are very thoroughly taught. It is stated that it is the intention of the governing body of the institute to open special classes for adult plumbers before long. Such classes have been tried and successfully carried on at Westminster, London, for some time.

SHEET-METAL WORK.

This branch of trade is taught on one evening of the week, from 7 30 to 10 o'clock, and special lectures on subjects connected with metals, sheet-metal pattern cutting and other topics of similar interest are delivered for the benefit of the students on other evenings, admission being free. The course of lessons as outlined in the prospectus for sheet-metal workers, including tin, iron and zinc workers, boiler makers and coppersmiths, &c., is very wide reaching. The subjects taught include the following: Problems in plain geometry useful to metal plate workers, introduction to solid geometry and its application to pattern cutting, sections, elbows, T elbows, construction of patterns for round, oval, oblong and other tapering articles of equal and unequal slant; oval canister tops, tea bottle tops, &c.; bath patterns; cones, their development and application to various patterns as cowls; soldered, grooved and riveted joints; the manufacture and properties of iron, galvanized iron, tin, lead, zinc, copper, &c.; solders and soldering composition, preparation and uses of various solders, action of acids, behavior of metals when hollowed, raised and planished; tinning processes, &c. The laboratory and workshops for metal workers at the institute have, we are told, been fitted up with blowpipes and the necessary appliances to enable students to test the physical properties of the various metals, to prepare alloys as solders, &c.; and also to construct models from their drawings.

TUITION FEES.

The fees for the course of instruction in each class are, as we have intimated, almost nominal, and place them within the reach of all. For those classes which are held on but one evening of the week the fee is 4 shillings ($1) for members of the institute (who become so on payment of a small annual subscription), while non-members pay 5 shillings. In the plumbing classes, however, and all those which are held twice a week, these amounts are doubled. While to apprentices under 19 years of age, who can produce certificates from their employers that they are actually working at a trade, even these small fees are reduced by half. In addition to this the science and art classes are open to trade students at half the above rates. These advantages could only be offered by an institution having some solid financial backing; and in this case such is afforded by Government grants, under a special act recently passed by the British Parliament, for the purpose of encouraging the establishment of such educational institutions throughout the British Islands. The connection of the Borough Road Institute with the wealthy "City and Guilds of London Institute" no doubt also strengthens its financial position. But however that may be, we feel assured that the Borough Road Polytechnic Institute is doing and will do a good work, for which it appears peculiarly well equipped.

OBITUARY.

VICTOR COLLIAU.

Victor Colliau, the well-known inventor, mechanical engineer and artist, died 17th inst., in Detroit. He was born in Paris, France, in 1828. He belonged to a family of ironmasters who for three generations had conducted extensive works at a small town 30 miles from the French capital. Young Colliau was given an excellent education in chemistry and engineering, and had as tutors some of the best instructors of the times. An inventive strain ran through the Colliau family for years before the subject of this sketch was born. The first wire nails ever made by machinery were the result of the genius of his grandfather, and the first machine-made wire rope was the invention of Colliau's father. Having completed his education, he was placed in charge of his father's establishment, a position he held until the business went under in the stagnation which followed the coup d'etat in the '50s. In 1857 some French adventurers formed a bogus stock company for the purpose of working large tracts of mineral lands in West Virginia, and Victor Colliau, at that time a rising young engineer, was employed to superintend the mines Later Mr. Colliau went back to France, where he saw a device for the saving of fuel in iron melting. He returned to this country and patented an improvement on the French idea. In 1884 he invented the present Colliau cupola.

An entry was made in the United States Circuit Court at Cleveland on the 11th in the action of the Pittsburgh Reduction Company of Pittsburgh against the Cowles Electric Smelting & Aluminum Company. The decree was for the complainant, the Pittsburgh Reduction Company, declaring the validity of the Hall patent and that the Cowles Company had been infringing that patent.

STOVE TRADE NOTES.

Changed Conditions in the Stove Trade.—IV.

By Stovemaker.

The demoralization in the stove business resulting from the entrance of furniture dealers in the retail field, which was enlarged upon at an earlier stage of this article, was not limited to its effect upon the welfare of the stove departments, but was responsible to some extent for the losses in the repair department as well. As previously remarked, the furniture dealers added stoves and all stove fittings to their business except repairs, and those they would not bother with. Those who did try them found that their customers expected a new grate free in consideration of a large bill they had bought, and the dealers found it paid them better not to keep repairs at all. This cut off the opportunity of the salesmen to sell repairs when taking the stove order, as they had always done with the stove dealers, and as, in fact, they had been specially ordered to do when the repair men began to grow in numbers and make themselves felt, but the position of furniture men with regard to repairs blocked the effort to a certain extent.

That being the case, it might be asked why the stove salesman did not canvass specially for repair orders among the stove dealers whose stove business had declined, but whose repair business for a while had increased? The answer is that many of the stove dealers could not be convinced but that the manufacturers were largely responsible for the growth of the furniture store trade in stoves, and they would have bought of the pirates even at a higher price rather than patronize the manufacturers for anything they could buy elsewhere; and again the desire to capture furniture men as stove customers, and the time and effort required to do it forced the repair issue to one side.

Hence the repair men flourished and branched out. Small brick works and foundries have been established hereabouts, supply concerns have sprung up in all the cities and the repair business has gone almost wholly into their hands. What is sold by the manufacturers to repair their own stoves is but a shadow of the demand constantly being satisfied by repair men with castings that never saw the inside of the stove man's foundry, and along with it has gone the trade for a whole lot of things, of which a good many were always sold by stove manufacturers, such as pokers, lifters, dampers, pipe, elbows, stove boards, mica, hollow ware, &c.

With the spirit of accommodation for which these men have always been noted, they established wagon deliveries to supply their customers more promptly and to secure all the trade they could. They likewise canvassed among the real estate agents and janitors of flats when the modern apartment houses had grown to be so numerous in this city, and of which so many thousands were erected in this same period of change in the stove trade between 1882 and 1892. The thousands of ranges used in these flats, the repair of which is often under the control of either the janitor or agent, furnished a lucrative business for the repair men, and they were not slow at seeing their advantage.

They soon learned with what particular make of range certain blocks of houses or localities were furnished, and supplied their wagons with the requisite repairs for them.

EFFORTS TO CHECK FURTHER INROADS.

Some effort has recently been put forth to check further inroads into the repair business by the formation among manufacturers of associations, of which the one in this city is a specimen, for the sale of all repairs in competition with the repair men. A pool is formed and all interested turn into the association their repairs at a small price. The selling price is regulated by what the repair men charge. If the repair dealers reduce certain castings ½ cent or 1 cent per pound the association does the same, the stockholders agree to stand the loss, if any, proportionately.

The ultimate success of the undertaking is in doubt. As an investment, however, rumor credits it with earning a fair profit, but its success can hardly be measured by dividends on the stock so much as by the dislodgment of its rivals, which up to date it has not accomplished, and stands simply as one more repair shop in the field. It is young, however, and may in time bring about the result desired by its founders. There are some who consider that the adoption of a more aggressive policy and a greater reduction in prices than was made would more surely dismay the repair men. So far they have not appeared greatly frightened. Whatever may be the outcome of this or any other organized effort that may be put forth, it will not restore to manufacturers the profits on lost sales of repairs during the past ten years, or suffice to destroy the monument erected by themselves to their own masterly inactivity and neglect.

FLATS AND APARTMENT HOUSES.

Having reviewed the second great change in the stove business between 1882 and 1892, we will take up the third, namely, the one due to changed conditions of house building in the city and vicinity.

Previous to 1882 and before the extension of the elevated railroads to their present limits far up town the number of French flats or apartment houses erected had been comparatively small and a good many that were built did not contain the conveniences and furnishings found in those constructed to-day. The architect's plans did not frequently call for ranges except for first class apartments, and tenants were expected to furnish their own stove, the same as in old-fashioned tenements and cheap private houses. But as soon as the people fully realized the great growth of the city and benefits sure to result from rapid transit, and the women had overcome their fears of riding on the elevated cars, the demand for houses in New York set in and the tendency to take up residence in the surrounding cities and towns was checked; building received a boom and the stimulus given to inventive genius by the demand for anything new in the construction of flats brought out hundreds of ideas for the comfort and convenience of people living in them.

Among the first improvements introduced in apartment houses of the middle class, and quite generally too of the cheapest, was naturally hot and cold water, and hence hard coal water-back ranges were first in demand for that purpose, although many different devices have since been introduced, which have divided up the trade. At first these ranges were furnished to the builder by one of the contractors doing other work on the building who included the ranges in his contract—generally either the roofer or plumber. He bought them of the wholesale stove men, carting them to the buildings and furnishing his own labor to set them. As each such flat usually contained ten such apartments and each apartment a range, it is easy for any one who knows anything at all of the growth of New York City during the past ten years to understand that the wholesalers did an enormous business in this particular line. Block after block of these buildings were erected in all the avenues and streets near the elevated railroad stations during the five or six years following 1882, the ranges for each being supplied in the manner stated, and the business by the manufacturers done with simplicity, directness, and free from any complications in relation to the responsibility of the builder or any other person except the one to whom he sold.

CHANGED REQUIREMENTS.

The erection of such buildings has continued since and with little abatement as to numbers, but the conditions with regard to the ranges, both as to numbers used and the manner of supplying the demand, have changed. Other appliances have been invented and used in many cases and coal ranges do not have the exclusive call; in addition to that, the competition of builders to undersell each other forced them to buy closer and caused a cutting of prices by the plumbers and roofers which has reacted on the makers, and when the cuts thus secured failed to satisfy some of the more enterprising or shrewd, they went to the wholesaler direct to buy their ranges and drive their bargains and left them out of their plumber's or roofer's specifications altogether.

Some of the manufacturers for a while refrained from dealing with builders direct for these small ranges, notwithstanding the numbers wanted were generally large enough to hold them unassailable on the ground of retailing, and notwithstanding, too, that the settiug of furnaces and brick-set ranges had always been excluded by manufacturers from their promise not to retail goods. They did so from the commendable impulse to protect the middlemen, whom they considered as justly entitled to an intermediate profit between themselves and the builders; but times have changed, and there is no more room nowadays for old-time conservatives in the stove business, and no living for those who hang on to old-time traditions. The one who holds out the longest is the worst left. It went against the grain to refuse to sell 50 or 100 ranges in deference to a principle that after a while nobody else had any respect for, and so they all finally were in one boat.

(To be continued.)

Banquet of the Reading Stove Dealers' Association.

The second annual banquet of the Reading Stove Dealers' and Metal Workers' Association was held on the evening of Monday, January 23, at Rajah Temple Banquet Hall, in Reading, Pa. Representatives of the Mt. Penn Stove Works and Orr, Painter & Co. were present, together with some 40 members of the association, all of whom enjoyed a very pleasant occasion. After the following *menu* had been duly considered, there were appropriate toasts and speeches which indicated in a striking degree the good fellowship and pleasant relations existing among the trade in that city :

MENU.

Oysters
Celery Olives Pickles
Soup
Broiled Fish and Sauce
Roast Turkey and Cranberry Sauce
Vegetables
Peas Potato Balls Corn
Roman Punch
Fried Oysters
Chicken Salad
Fruits and Ice Cream
Coffee
Wines
Y. B. Cigars.

The committee having the banquet in charge consisted of Lewis Dauth, William Bitting and William B. Loucks. The association holds monthly meetings for the purpose of considering the best interests of the trade. The effort to make the interests of all concerns in the trade harmonious has met with a great deal of success, and as a result, bitter rivalry and ruinous competition is practically unknown. It is said that not even a bond is given by any member to maintain and abide by the rules governing the association, a condition of affairs largely due, it is claimed, to the interest and co-operation of the local stove foundries.

The Southern Stove Works Company

of Richmond, Va., favor us with an attractive copy of a catalogue and price-list which they have issued embracing cook stoves, ranges, heaters, hollow ware, lawn vases, settees, fronts, grates, fenders, &c. The publication is made up of 44 pages of liberal size, bound in colored paper covers, the fourth page of which shows a general view of the company's works. An interesting feature of the publication is found among the opening pages in a number of directions for putting up stoves. The company's latest improvement in cook stoves is the Fitz Lee, a four hole construction of attractive ornamentation and made in six sizes. It is designed for burning coal or wood, and has been brought out to meet the demands of the Southern trade. The oven is large, the flues deep, the anti-clinker grate is heavy and the knob and hinge pins are nickel plated. The panel of the oven door carries a tile bust of ex-Governor Fitz Lee of Virginia, after whom the stove is named. Other members of this class include the Waverley, made in four sizes; the Durham, Tip-Top and the Clipper for wood only. The company's patent detachable reservoir is made to fit any cook stove or range simply by bolting down over the pipe collar of the stove a corresponding collar on the rear of the base for the pipe. Among the heaters the Olivette is the company's latest open-front Franklin. This is a very pretty stove, decorated with nickel and cast ornamentation, and is made in three sizes. The Rescue is a two-hole heater, which can be used for hard or soft coal or wood; the Tidewater, a heavy globe stove made in several sizes; the Norfolk, Pinafore, Farmers' Favorite and Bay are some of the goods to which attention is invited. The closing pages of the catalogue are occupied with illustrations and prices of grates, fenders, vases, hollow ware, &c.

Impossible Stoves.

A Western firm of stove founders send us a postal card recently received which we take the liberty of reprinting. The body of the note, as it appeared, is as follows:

"We have heard of a stove called the 'Retort,' which is said to be made by you folks, which leaves no ashes. It is something new. Please answer."

We are much more interested in the construction of this stove than the correspondent who sent this postal card, for it is a device that has all the necessary features to revolutionize not only the stove trade, but the heating trade as well. A stove that will leave no ashes in burning ordinary coal would be a most interesting affair. It deserves to be classed with a wonderful furnace that was discussed a few years since, in which a roaring fire was obtained (so the inventor claimed) without any updraft in the chimney. In fact, as we recollect the matter, there was a down draft, the voracity of the flame drawing the oxygen of the air from all quarters and annihilating it apparently, for in the description of the device there were apparently no gases given off. That stove, however, left ashes and, all things considered, was a less remarkable affair than the "Retort" that is noted in the postal above quoted.

Traveling Salesmen for 1893.

The Noyes & Nutter Mfg. Company of Bangor, Me., are represented this year on the road by George H. Nutter and Frank E Bell, who cover the State of Maine.

The traveling salesmen who will represent the Weir Stove Company, Taunton, Mass., for the ensuing year are: C. M. Leonard, who will cover Central New England; Edward Fry, the remaining portion of the New England States with the exception of Maine, while the latter territory and New York and Ohio will be covered by N. S. Staples.

The New England Stove Company of Taunton, Mass., are represented in the New England States this year by L. B. West and W. H. Lindsay.

The Sill Stove Works of Rochester, N. Y., have a force of traveling salesmen, embracing R. B. Johnson, who will cover Southern New York and Northern Pennsylvania; B. M. Ross, Eastern and Northern New York, and C. M. Ryan Western New York, Ohio and Michigan. The company's representatives from their Chicago office are W. H. Scott, John J. Walker and H. Chaffee.

The Mount Penn Stove Works of Reading, Pa., will be represented the ensuing year by the same staff of salesmen as last year. Allen W. Ymer will look after the trade in Eastern Pennsylvania and a portion of New York and New England, together with the company's Southern trade, which is not drummed by the Philadelphia house. Harry A. Norton will travel in Western Pennsylvania, Western New York, Ohio, West Virginia and portions of Western Maryland and Virginia.

The staff of traveling salesmen of S. B. Sexton & Son, Baltimore, Md., consists of H. F. Hildebrandt, who looks after the company's interest in Maryland and the District of Columbia; William Stumpfh in the city of Baltimore, and Capt. John Tayloe in the Southern States from Virginia to Texas. In Pennsylvania, Ohio, Missouri, Colorado and other Western points the company have established local agencies.

The Corning Stove Company of Corning, N. Y., have engaged the following salesmen for the ensuing year, who will cover the territory named: E. S. Lindley will look after the company's interests in Western New York and Ohio; C. C. Drake in Central and Eastern New York, George W. Drake in Southern New York and Northern Pennsylvania, and Charles E. Clark in Chicago and the West.

The interests of Noyes & Goddard, successors to Goodell & Co., Waterville, Me., will be represented this year by Oliver Thurston, who will cover the eastern portion of the State; L. F. Wade the western part and T. Danton the State of New Hampshire.

The Perry Stove Company of Albany, N. Y., have arranged with the following salesmen to cover the territory named.

F. Pickering in Ohio; Chas. L. Smith, in Indiana and Michigan; Geo. P. Lynd, Jr., in Western New York and Western Pennsylvania; Geo. J. Day in Central New York; N. R. Bond in Eastern New York; Chas. H. Shepard in New England; A. M. Werum on the Pacific Coast; W. K. Corr in New York City; E. L. Tallmage in New York City; Wm. Van Blarcom in New Jersey, Maryland and Eastern Pennsylvania, and J. M. Litchfield in cities adjacent to New York City.

Crea, Graham & Co. of Allegheny, Pa., have a force of salesmen for 1893 consisting of J. L. McKee, who will represent the company in Western Pennsylvania, Ohio and Indiana; Robert H. Graham in Central Pennsylvania and Virginia; William S. McKee, who will look after the local trade in Pittsburgh, Allegheny and nearby towns, while George W. Stevenson & Brother will act as retail agents in the city of Pittsburgh.

The Portland Stove Foundry Company, Portland, Maine, have a force of traveling salesmen for 1893 consisting of W. H. Wiggin, who will travel in Massachusetts, Connecticut, Rhode Island and lower Vermont, and George H. Lawton, who will cover Maine, New Hampshire and upper Vermont.

The traveling salesmen who will represent the Magee Furnace Company of Boston, Mass., for the year upon which we are now entering include H. A. Tinkham, who will cover the territory west of Chicago and north of Kansas; Rood Brothers Stove & Furnace Company, in Kansas and the Southwest; S. Olin Field, in New York, New Jersey, Pennsylvania and Ohio; J. M. Sweeny, in New York City and immediate vicinity, and S. E. Newell and Jesse Cudworth in the New England States. The company's branch house in New York City is in charge of J. Q. A. Butler, and that in Chicago is managed by A. A. Spear, who travels more or less.

The S. M. Howes Company of Boston, Mass., will be represented in the New England States this year by F. B. Streeter, J. H. Brown and Fred Hall.

Charles Heath & Co.

We are indebted to Charles Heath & Co., with office and salesroom 4 North Liberty street, Baltimore, Md., for a copy of a very neat catalogue of nearly 80 pages, relating to fire-place heaters, stoves, ranges and furnaces. It is bound in colored paper covers in an attractive style. The business of the company has been established since 1854 and a large trade is at present enjoyed. The goods have established a wide reputation and are meeting with a gratifying sale. The leading lines include Heath's Grand Domestic fire-place heater, made with square, circular or French frame; Heath's

Bristol heater, brought out to meet the demand for a single illuminating stove of large capacity; Heath's Chelsea, especially adapted for dining rooms and small parlors; Heath's Domestic Jewel, a low-priced construction; Heath's Domestic range, made to meet varying requirements; the Ideal, Parkton, Kitchen Comfort, Myrtle, New Model, Valley Pride and Gem Welcome ranges. The Damascus, a full revertible flue heater, is fitted with duplex or draw center grate and is decorated with art tile and nickel trimmings. Other heaters include the Vall y Queen, made in two sizes; the Elsie, made in five sizes; the Welcome Bee, Pikeland and Lotus, the latter being a laundry stove made in five sizes. A number of pages are given up to the Royal Empire Ventilating grate and heater, set with art tile; Heath's Active Domestic wrought iron furnace with steel dome, stationary radiators and shaking and dumping grate; Heath's Ideal hot air furnace, and Heath's Grand Domestic hot air furnace. Hints on setting a furnace are presented, together with price-lists of registers; tables giving capacity of pipes and registers; illustrated notice of the Electric oil stove, the Yale gas stoves, Jewel process stoves and vapor stoves, together with Never Break wrought steel cooking utensils, stove boards, waffle irons, &c.

A Soliloquy on Baking.

BY ALFRED ALLEN.

It was guaranteed a good baker—I mean the range I sold to the woman who is kicking. The letter said thousands were in use giving better than average satisfaction, and that house don't lie.

She says it won't bake. Of course it won't. The grub bakes, but the range has got to bake it. There's something wrong that's got to be changed; now how shall it be done? The old plan is to rip her out and send her back. That won't work now, for they told me last time that the stove I sent back worked, and when I was in town they showed me that it would and quietly gave me to understand that to send such a stove back wasn't much credit to my ability or grit. They told me it was all common sense and no mystery, and that if I stuck to it and used experience right I could make a reputation and some money by making

Bad bakers bake beautifully After Alfred Allen's alterations.

Gosh dast if I don't try, and if I catch the bang of it in this one I'll bang that out for a sign. Let me see. Every fool knows heat goes up. Yes, but the oven is down. The bottom of the fire is way up above the bottom of the oven. So how is the heat to get down there. Well, the chimney draws. "Spose" it does, it draws up. Let me see. That chap seems to know a heap, and he said, "Mind you, here is the whole thing in a nutshell: *All of the air that goes out of the top of any chimney must get into it through the fire.*" He also said that kitchen chimneys were often too low and they should never be lower than the highest peak of the main house roof, or wind might blow so as to stop the draft coming up. He said if the chimney was a big old fashioned stone affair it might cool the gases before they got out, then they would drop back and make trouble, and if they did, to run enough pipe up the chimney to make the chimney warm and start her drawing. He said that the pipe should fit into the chimney as near air tight as possible or enough air would go in around it to fill the chimney without any going in through the fire, which would kill the draft, the reputation and the profit, and that last killing is what kills me.

If it had a fireboard in it every crevice must be made air tight by pasting three or four thickness of paper over it, but that it was better to put a throat piece in the chimney and to fill in the crevices between the edges and the chimney with fire clay, dirt, ashes, putty or anything to make it air tight and that it could be done through a hole in the throat piece that could be closed with a slide damper. He said that that would be cheaper than having a second hand stove in stock. Some chimneys have a brick left out so they can be cleaned out at the bottom and sometimes this is in the cellar or on the opposite side of the chimney, and if the brick is loose it lets in air or gets knocked out to let in more. Another hint in the lecture was that a fellow all fired mean who tapered his pipe down small to save a little was likely to make trouble and expense for himself.

Mrs. Jones' range had a 5-inch collar and would'nt work, so I made a piece of pipe 5-inch to fit on the collar and the other end 6 inch and ran 6 inch pipe all the way to the chimney and she brags on her stove now. He said that if the covers and centers were old and warped so they let in lots of air that would kill baking, and I know the widow Jones' stove worked so she said she would'nt trade it for a new one after I got the top all rigged out new and tight.

Azariah Brown used to swear he had the best stove made, but grew faint in his praise after awhile and had me see it, and the trouble was because the grate warped all in toward the fire, so that you could put your hand in the space and the air that went in there was equal to taking a cover off for checking the draft, but a new grate started Azzy's wind instrument again, and he is blowing that stove and me right into the people at the tavern and the church alike. It's his gospel.

Sarah Smith got her stove in town to save something and to show me that I did not own the entire traffic. Well, it wasn't screwed down any too tight and the top jumped up and some of those little nibs that should hold it in place held it up above the front and the air just went in as fast as it wanted to, and besides, a flue strip fell down out of place, and when she got it up it smoked like a boy on his first cigar and drawed like a balky mule. Well Sally was spunky and wouldn't send for me till she couldn't help it, and as she was churchy and stuck on her grammar, I thought I'd cut her comb a little, and when I come I said, "Sal, you've got a durned nice stove and it's too durned bad that it works so durned mean, but I'll do my durndest to make it do its durndest," and I'll be durned if I didn't, and when Sallie paid me she said my expressions were inelegant, but if she had to do it over again she would buy her stove of me.

Well, I've rambled around some through my advices and experiences, and "I want to know." I guess I do know, and I believe I can make that kicking woman's stove bake so her joy will make her kick her old man's hat off. Seems to me I've got it pretty clear now. First, make the chimney draw; second, hitch your stove up with air-tight connections; third, start your fire. And here's how she works: The air goes in among them red hot coals and with the gas starts a blue blaze across the top of the oven, and the damper being closed that hot blast goes down the side flue under the oven and makes it hot, and the swifter the old chimney pulls it down there the more likely that the blue blaze will reach clear around underneath, and if you drill a ¾-inch hole through the side of the oven into the flue you can fry ham in that oven and your neighbors won't smell your breakfast.

There is no surer sign of a bad draft than for a stove to get red hot on top when baking, for then both the fire of red hot coals shines right up there to heat it, and all the heat of that blue blaze stays right there, too, for there is nothing to pull it away, and all the round about turns to get around the flue strips and through the flues is too much for it unless there is a good strong pull. If there is no fire in the stove when you are called to see it, just take off the covers furthest from the fire and if the under side and flues have a nice covering of black wooly soot, you can go your whole pile clear to your shirt that the blue blaze has never been there and the draft wants attention.

Seems to me if I had this soliloquy written down to read once in a while it might be some good to me, for a fellow's head is like a ditch—the trash is on top, but its some trouble to catch the fish. Well, I wrote it off, and like all the fellows who write, I itched to see how it looked printed, and if you print it I reckon I'll cuss like the other fellows if it is criticised too sharp, and I'll have to own I don't know it all, either.

ODD PLATES.

AT THE ANNUAL MEETING of the stockholders of the Carton Furnace Company the following directors were re-elected: E. A. Carton, W. J. Carton, J. B. Jones and James Jones. At a subsequent meeting of the directors, E. A. Carton was elected president and general manager; W. J. Carton, vice-president and treasurer; J. B. Jones, secretary, and James Jones, superintendent of the works. The volume of business for 1892 was larger than for any previous year in the history of the company. The increase in capacity made a year ago was taxed to the utmost in meeting the demand for Carton heaters. The prospects for the year 1893 are considered very promising and the company expect to enjoy a business which will show a fair increase over the past season.

WEIR STOVE COMPANY, Taunton, Mass., are distributing a neat little folder illustrating their Glenwood stoves and ranges, which they claim to be as near perfection as highest grade material and skilled labor can make them. The covers present bright-colored landscapes with settings of heather and forget-me nots.

EUGENE MUNSELL & Co. of 218 Water street, New York City, have just issued a 12-page folder relating to their lines of Manhattan and Reliable gasoline stoves. The Manhattan Juniors are made 14 inches high and with giant burners, thus increasing the power to that of their high stoves. The company say that their line this season is more extensive than ever before, as they have added several new and elegant styles. The Reliable vapor stove, for which they are Eastern agents, embodies the modern features, and has established a wide reputation. Illustrations are given of the Reliable Generator Manhattan full flued ovens and of the Manhattan plumbers' and tinners' furnace. A feature of the circular is found on page 11, consisting of instructions for taking care of a gasoline stove.

AFTER HAVING been shut down several weeks the Bussey & McLeod Stove Company of Troy, N. Y., resumed operations Tuesday, January 14. The first casting was made the following Thursday.

A HOT-AIR FURNACE forms the basis of a patent recently issued to Thomas E. Martin of Des Moines, Iowa. The fuel magazine has an open flaring bottom, with parallel side walls that extend forward from the combustion chamber. An air distributing tube extends from the side walls at the bottom of the rear plate of the magazine, at the open bottom of which is a grate. A bridge wall,

or its equivalent, is placed at the rear edge of the grate, while an air-distributing tube extends parallel with the top of the bridge wall. A chamber is in the rear of the air-distributing tubes, into which the products of combustion pass rearward between the two parallel air tubes already mentioned. A one-half interest in the patent has been assigned to Isaac T. Martin of the same place.

THE PARIS STOVE COMPANY of Troy, N. Y., have started up again with a full force of men. Many repairs were made and inventory taken during the two weeks' shut down. About 70 men are employed and there are enough orders on hand to keep the plant busy for some time to come.

THE WORKS OF THE Walker & Pratt Mfg. Company in the block 31 and 35 Union street, Boston, Mass., were visited by a disastrous conflagration early Wednesday morning of the present week. The company's building is a four-story brick structure with granite front on Union street, and covers 5396 feet of ground. It runs back into Creek Square, which has more than half a dozen outlets on the streets surrounding the block. The flames were first discovered on the upper floors of the building, and so rapidly did they spread that it was difficult to fight them. Three alarms were sent out, and before the flames were extinguished they had communicated with a number of adjoining buildings. The Boston papers state that the company carry an insurance of $60,000 on their stock, which is thought to be ample to cover their loss.

FOR SEVERAL YEARS past retail hardware and house furnishing dealers who handle gasoline stoves, have often been unable to receive their stoves when the season opened, the reason being that they did not order until within a week or two of the time they were in need of the stoves. The Quick Meal Stove Company, St. Louis, Mo., are receiving a large number of advance orders and anticipate a heavy trade. They urge their customers to place their orders early and thus receive their stoves when needed.

ALBANY'S STOVE MEN figure prominently in the management of the city's financial institution. At the recent bank elections the following were made officers: Merchant's Bank, Jasper Van Wormer, president of J. Van Wormer & Co., elected a director; Park Bank, Grange Sard, vice president of Rathbone, Sard & Co., elected a director; National Commercial Bank, Nathan B. Perry, president of the Perry Stove Company, elected a director. Mr. Grange Sard was also named as one of the board of directors of the latter bank.

A VAPOR STOVE possessing a number of interesting features of construction forms the basis of a patent granted on January 3 of the present year to John E. Donovan of Cincinnati, Ohio. The stove is made with three burners, but is so constructed that two may be employed if desired. Each burner has an independent vapor mixing tube and a common vaporizing chamber. Each has independent valves for controlling the supply of vapor, while the branch tubes from each of the mixing tubes have nipples which are placed in close proximity to the common vaporizing chamber. The top of the stove is of ordinary construction, except the central grate opening, which is enlarged and of oval form, so that the three burners may be brought together under the grating when it is desired to concentrate the heat of all at this point.

W. B. HATHAWAY, for some time secretary of the North Dighton Co-operative Foundry Company, has associated himself with the Smith & Anthony Stove Company of Boston, Mass., and will soon visit his old friends in the trade in the interest of the Hub line of goods.

THE AMERICAN ELECTRIC HEATING COMPANY of Boston, Mass., are the assignees of a patent granted to Willis Mitchell of Malden, that State, for an electro-magnetically heated receptacle. The invention has for its object to utilize more perfectly in electrical heaters for household and other purposes the heat derived from magnetic lag in addition to that derived from resistance. The magnetism is generated in the bottom of the receptacle or vessel composed of magnetic metal. The inventor provides the bottom or body of the vessel with projecting studs or cores to which heaters including wire helices in electric circuit are applied, but the studs of the body of the vessel are of magnetic metal.

THE GIRARD STOVE WORKS, Girard, Ohio, manufacturers of Adelbert stoves and ranges, are doubling their capacity and are adding to their line of stoves for the fall trade a complete assortment of oak stoves. This concern expect to turn out during this year about 8000 stoves and ranges.

THE LIEBRANDT & MCDOWELL STOVE COMPANY, with Philadelphia office at 123 North Second street and Baltimore office at 22 South Charles street, have issued a circular under date of January 6 to the effect that they have arranged to job a full line of gasoline stoves during the coming season. Salesmen of the concern will visit the trade at an early date to take orders for these goods.

THE SCANTLIN FOUNDRY COMPANY, successors to Thomas Scantlin & Son, Evansville, Ind., send us a neat catalogue of 48 pages relating to their leading specialties. The Jewel Home cook stove for coal or wood is an entirely new construction elaborately ornamented and embodies the modern features. It is made in a variety of styles and sizes and is referred to by the makers as a splendid baker. The Grand Home and Magic, for coal or wood; the New Home, Bright Home, Denver, Nora and Toy Home, for burning wood only, are some of the other goods presented. The heaters include the Red Oak, made in seven sizes; the Lamasco, an all-cast cylinder stove for hard or soft coal; the Oriole, an attractive cannon; the Trent, shown with and without drum; the Harold, Myrtle, New Todd, Oakland and Texas. A list of stove hollow ware completes the volume.

CREA, GRAHAM & CO. of Allegheny, Pa., state that trade has opened very satisfactorily for the new year, and if it continues in the same proportion during the remaining 11 months of the year they will have no complaints to make.

AN ENTERPRISING MILKMAN in the Northern part of the Empire State has invented a novel arrangement by which he keeps his milk from freezing. He has not applied for a patent, and probably does not even contemplate doing so. In the center of his wagon he has a box, and in the box a small stove. Around the box he sets his cans of milk. His device works to his entire satisfaction.

W. W. DUNNINGTON, who for many years represented the Chicago house of the Michigan Stove Company in Kansas and other Western States and later in the Indian Territory, has recently established himself in business at Westfield, Ind. One of the features of Mr. Dunnington's store is a combination steel range with 30 gallon iron water boiler and natural-gas boiling attachment made by the company named, and which was presented by them to Mr. Dunnington as a Christmas present on the occasion of his retiring from their service. This range, we understand from a local paper, is set up in the store on exhibition until Mr. Dunnington goes to housekeeping. With the range is a letter of presentation handsomely framed, together with a splendid picture of all the traveling representatives of the Michigan Stove Company taken in a group while Mr. Dunnington was in their service.

RATHBONE SARD & CO.'s Albany, N. Y., plant has opened again, after inventory and repairs. Their traveling men are on the road and the company report that there is every prospect of a good year's business.

THE PHILLIPS & CLARK STOVE COMPANY of Geneva and Troy, N. Y., have issued a neat calendar in the shape of a combination diary and memorandum pad. It is what is known as the "daily reminder," and is intended to serve not only as a calendar for the year, but its especial use is to remind one of things to be done each day, thus filling the place of an office diary. This is mounted upon a cardboard easel which can be placed upon the desk or hung on the wall by means of a cord. It is so arranged that all the leaves but the last on the left side are folded back to the right and one leaf turned over every two weeks thereafter. A yearly calendar occupies the left-hand portion of the cardboard easel, while at the right is a calendar for 1894. Across the top of each page of the daily reminder is the month, the number of days it contains and the figures 1893. Each page is ruled off into seven spaces, there being one for each day in the week. The printing extends down the outer edges of the pages, leaving four lines for memorandum purposes. This form of calendar is proving very popular with the trade, as it serves a double purpose and is both useful and ornamental.

WE ARE INDEBTED to the Somerset Stove Foundry Company, Somerset, Mass., for an exceedingly pretty calendar for the new year. At first sight it appears to be one of those red fancy bags that are often seen about the house, but is made of cardboard and bears upon one side a panel picture in colors. The upper part of the panel carries the name and address of the company and an indication of the line of goods manufactured. Attached to the lower portion of the card are a number of white slips giving the days of the week and month for 1893, a feature of which are records of a number of Columbian events. On the last slip is a biographical sketch of Christopher Columbus. We also have from the company a poster embellished with a colored design of a striking character, and arranged for hanging upon the wall. Attention is invited to the Somerset Grand, New Grecian, Wyoming and Matron ranges, as well as to the New Somerset Arion and Cheerful cottage parlor stoves. The foundry of the company has been running steadily to meet the increasing demand for their goods and the statement is made that during the past six months their business has doubled in volume. The company are conveniently situated on the Taunton River, so that all material is loaded within 100 feet of their cupola. The present business was established 16 months ago, and at the end of ten months paid a dividend of 6 per cent. and are now about paying another of 3 per cent. They are bringing out a new range adapted to meet the requirements of the Western trade. Their interests on the road are looked after by F. E. Grinnell, who covers the New England States.

SCHWAB & SERCOMB of Milwaukee, Wis., manufacturers of the Gilt Edge furnace, take a very cheerful view of the situation. They operate a large foundry and make a number of other specialties in addition to furnaces, having full work assured for the coming 12 months. The pressure on their capacity has latterly

become so great that they contemplate extensive additions, taking in considerably more space than they at present occupy. As the tendency is persistently toward lower prices, and the margin of profit in manufacturing is steadily being reduced, they must depend on a larger output to secure satisfactory returns from their investment of capital. Their sales of the Gilt Edge furnace in 1892 were double those of 1891, making the third consecutive year in which the sales of the preceding year were doubled. E. E. Dunning will continue to manage the furnace department and attend to sales in Milwaukee and vicinity. C. H. Borradaile will represent the firm in Michigan, Wisconsin and Minnesota. W. N. Shandrew will cover Iowa, Illinois and part of Indiana. The success which has been won by the Gilt Edge furnace has not made the manufacturers satisfied with the results accomplished, but further improvements will be made in it the coming season to render it still more popular.

The Eagle Stove Foundry Company of Fall River, Mass., are enjoying a very good trade and as yet have no cause to complain. Their goods meet with a ready sale throughout the New England States, as well as some portions of the West. A feature of their business is the large demand for sinks in the home market.

Henry N. Clark, 103 – 105 Blackstone street, Boston, is sending to the trade a novelty in the shape of a diminutive calendar attached by a bit of ribbon to a neat pen piper. Printed on the outer cloth is the name and address of the donor and his trade announcement as dealer in stoves, repairs and supplies of all kinds.

The Milwaukee Gas Stove Company are now comfortably housed in their new location at 15 and 17 Erie street, Milwaukee, Wis. They occupy a building five stories high, covering a ground space of 40 x 90 feet. Although much larger than their previous quarters, the building hardly accommodates their steadily growing trade. Their new Perfection gas range has a number of interesting features. The pressure of the gas on the burners can be regulated by a set screw, which diminishes or enlarges the orifice in the feed pipe beneath the valve, so that the stove can be adapted to the use of high-pressure natural gas or manufactured gas. This enables the stove to be more efficiently operated than if the pressure were merely regulated by the usual needle valve. This set screw has its seat in the same casting as the valve. The air supply is also regulated by a wheel. A telescopic oven burner is used for lighting the oven to avoid stooping by the operator. The water-heating attachment has two cooking holes to utilize waste heat from the gas used in heating water. A separate water heater is made, which also has a telescopic arrangement for the burner. The whole burner is pulled out and lighted, then pushed back in its place. This avoids the danger of an unskillful operator turning on the gas and filling the heater with it before lighting, which causes a puff of flame and often results in accidents. An ingenious device is used for cleaning the holes in the burners. A wire frame holds a wire in place for each hole in the burner, and a touch of the hand pushes them through all the holes simultaneously, cleaning them instantly. A new range is to be brought out shortly, with a small top, for use in flats and small kitchens, in which space must be economized. A branch house has been opened in Chicago at 128 Michigan avenue.

The Central Oilgas Stove Company are pushing with a great deal of enterprise the sale of their specialties, prominent among which is the Oilgas lamp stove, made 14 inches high, 10 inches square at the base, and a top grate measuring 10 inches square. Taking in the width of the extension shelves the top measures 18 inches. Their Oilgas cook stove is provided with improved burner, the exterior wall being perforated. Improvements in the way of elevated warming shelves have been added to the stove for this season's trade.

Associate Manager Edmund Raftery, of Rathbone, Sard & Co., was in Albany, N. Y., the other day, having returned from London, where he spent the holidays with his family, who are sojourning abroad. He looks well and reports having had an enjoyable trip. He will now settle down in his busy life at Chicago, where he devotes all his efforts to furthering the interests of the Acorn stove manufacturers.

The Smith & Anthony Stove Company of 48 to 54 Union street, Boston, Mass., are making their new steel plate furnace known as the "Hub" heater in six sizes. It has a brick-lined fire pot, steel plate radiator, triangular dual grate, steel plate flues, deep ash pit, automatic damper pull and other features which go to make up a first-class construction. The patent automatic damper prevents the escape of gas into the cellar when the feed door is opened for the purpose of replenishing the fire. This is among the latest additions to the company's line of heaters and in its construction have been embodied the desirable features known to the trade. The return base flue has an air space between it and the base proper, thus allowing the air to circulate on all sides of the base flue and very largely increasing the heating power. The diameters of the casings of the various sizes range from 37 inches in the smallest to 60 inches in the largest, while the diameter of the fire surface ranges from 18 inches in the smallest size to 32 inches in the largest. We understand that the Hub heater can be furnished in portable form or adapted for brick work, as may be desired.

C. C. Drake of the Corning Stove Works, Corning, N. Y., is enjoying a vacation in Florida, and is expected to return by February 1. He is accompanied by James A. Drake, treasurer of the company, and it is confidently predicted by friends in the trade that they will probably return fully equipped with "crocodile yarns," with which to capture business.

W. F. Greene of Troy, N. Y., has just returned home from a month's business trip through the West, where he visited the leading stove concerns interested in the line of specialties he manufactures. Mr. Greene reports the results of his trip as very gratifying, and considers the outlook for the year bright and promising.

The Kernan Furnace Company of Utica, N. Y., have elected the following officers: President, Francis Kernan; vice-president, W. J. Owens; secretary, W. H. Landers; treasurer, Joseph F. Kernan.

An article having been published in a late issue of a Portland, Ore., paper to the effect that some of the Eastern stove manufacturers who had established branches in that city were about to discontinue them, the Bridge & Beach Mfg. Company and Cribben, Sexton & Co. wish to assure their friends and the trade at large throughout Oregon, Washington and the territory tributary to Portland, that the statement does not apply to them. The liberal encouragement the concerns named have received from the trade in the sections noted is sufficient evidence, says a circular letter issued under date of January 16, that the establishment of a Portland office and warehouse was not a mistake in any particular, nor has it proven a mistake "for two large stove manufacturing concerns to join together in a joint distribution and warehouse arrangement," as the companies named have done in Portland. It is stated that a large stock is carried in the Portland warehouse and that customers' orders are promptly filled.

The Perry Stove Company of Albany, N. Y., are offering the trade an interesting assortment of oil stoves made under the name Royal. These range in size from two to four boiler holes in the top and are finished in nickel in an attractive manner. The Royal lamp stoves are well made and are said to be meeting with a very gratifying reception. The construction has been improved for the season of 1893 and is now said to be strictly first-class in every particular.

Alfred Gracey of the Co operative Foundry Company, Rochester, N. Y., has gone on a Western trip as far as Denver.

The Superior Stove Company, South Superior, Wis., have issued a neat circular to the trade, illustrated by means of a diagram showing the levels of the Great Lakes. The company are situated at the head of Lake Superior in the midst of an extensive iron region and they present the diagram referred to as affording information which it is well to know. The company also state that it is a good thing to know that they manufacture a full line of stoves, ranges and furnaces.

Abram Z. Allis, Prattsburg, N. Y., has patented an oil stove, the burners of which are so constructed as to be easily accessible for lighting, cleaning, trimming and extinguishing. Simple means are also provided for directing escaping heat through draft holes located behind the main opening for cooking utensils. A one-third interest in the patent has been assigned to Henry T. Wurth and Thomas H. Flynn of the place named.

The Auburn Stove Foundry Company, Auburn, Maine, held their annual meeting a few days ago at which H. Wesley Hutchins was elected president and Thomas H. Roberts treasurer. The report of the latter showed a gain in sales over 1891 of 27 per cent. A dividend of 6 per cent. was declared, payable on or before February 1, and of the $13,000 stock remaining in the treasury $6,500 was taken at the meeting named.

The Ironton Stove & Range Company, with a capital of $50,000, have been organized at Ironton, Ohio, for the purpose of manufacturing and selling stoves, ranges and castings. The incorporators are: W. C. Amos, H. D. Newcomb, H. A. Keye, Martin Schreiber and O. R. Johnson.

The Huette-Barler Mfg. Company, 111–113 Lake street, Chicago, have issued a bright little circular entitled "Æsop Up to Date." It is an illustrated fable of the elephant and the frog, from which a moral is drawn which leans naturally and logically to a consideration of the special merits of Barler's Ideal oil heater.

The Michigan Stove Company have brought out a new fence sign for the convenience of agents in advertising in their immediate localities. It is a diamond-shaped blue and white water-proof card, 7¼ inches square, bearing an artistic reproduction of the Garland trade mark. When once in position, this device is as nearly a permanent advertisement as anything can be.

The Chicago Economic Fuel Gas Company, 148 Michigan avenue, Chicago, report that there are over 4000 gas stoves and ranges used in that city. Of this number many are supplied with natural gas. There are also over 500 furnaces and other heaters in which natural gas is used for fuel.

James B. Taplin, president of Taplin, Rice & Co., Akron, Ohio, died January 23, in his 81st year.

Stove Discounts and Terms.

The following circular, dated January 11, is sent out to the trade:

From this date and until further notice the discount from our list prices on stoves, ranges, furnaces, &c., not marked net in our catalogue, will be 30 per cent.

In addition to the above discount, all bills settled by cash payment on or before the 15th of the month *succeeding* month of shipment will be subject to a discount of 10 per cent.; all bills settled by cash payment between the said 15th and the last day of the same month will be subject to a discount of 6 per cent.; all bills settled by note due on or before 60 days from said 15th of the month will be subject to a discount of 5 per cent.

All bills remaining unsettled on the 1st day of the month after the said 15th will not be subject to any extra discount.

Accounts will not be extended beyond four months from date of shipment.

Bills of goods for spring stock shipped during February and March will be dated April 1.

Bills of goods for fall stock shipped during June, July and August will be dated one-half September 1 and one-half October 1.

Leibrandt & McDowell Stove Co.
The Reading Stove Works,
Orr, Painter & Co.
Buckwalter Stove Co.
The Danville Stove Co.
Floyd, Wells & Co.
Grander Stove Co.
Keeley Stove Co.
March-Brownback Stove Co.
Mt. Penn Stove Works.
Raymond & Campbell Mfg. Co.
Thomas-Roberts-Stevenson Co.
The Yeager-Hunter Spring City Stove Works.

Post Office Lock Repair Shop.

The item of locks is necessarily a very important one in the expenditure of the Post Office Department, and the cost of repairs forms a large proportion of the annual disbursement in this channel. We are informed by the Postmaster-General's report for the fiscal year ending June 30, 1892, that the cost of repairing post office locks averaged, until recently, $40,000 a year, and that the growth of the mail service necessitates an increase of 15 per cent. in new locks annually. According to Mr. Wanamaker's report, however, a very material saving has latterly been made in this direction through the Government having undertaken the trade of repairing the post office locks in their own repair shop. The result has been satisfactory in every way, and it is stated that a sum of $45,000, which had been specially appropriated by Congress for the purchase of new locks, was in 1891 returned into the Treasury as a result of the saving effected by the new system.

It appears that formerly the practice in the Post Office Department was "to buy new locks and keep them in order by contract, one concern practically monopolizing the contract for new and the repairing of those already in use. The same concern for ten years as well controlled the Government's requirements in the way of keys, chains and cord fasteners. The tendency could not be otherwise than to encourage the purchase of new locks as well as other equipment." The natural inference is that it was to the interest of the contractor to do the repairs lightly, so as to have the locks come back oftener to his shop, also to shorten the life of the locks, condemning them as unfit for repair in order to supply new locks.

It is stated that the Government, under the contract, agreed to dispose of 200,000 locks so condemned as scrap at the rate of 20 cents for 300, these same articles having been purchased for 57 cents each. They were, however, turned into the Government repair shop, and at a cost of 6 cents each have been made equal to new. The contract having expired it was determined to undertake the work under the direct supervision of the Department; and the report states that "four years of trial has demonstrated—first, that where the average cost per lock by contract was 34 cents the work has been done at less than 10 cents each, and it is believed that the duration of the contract work was not half as long as that done under the Department's direction. That is to say, a lock repaired by contract was liable to be shopped twice in the same time it is shopped once under the present arrangement."

Flat keys, too, for which the Government was paying from 15 to 20 cents each, are now being turned out of the repair shop at a cost of less than 3 cents, and the character of the work is said to have greatly improved in both locks and keys, while the cost is steadily declining.

The Postmaster General says the Government repair shop is now in good shape for doing its own lock making as well as repairing, and he strongly deprecates any return to the old contract system.

An Experiment in Heating and Ventilating.

An interesting experiment in heating and ventilating a private house is described in the *Popular Science*. In a house built on marsh land, with a river on either side, and surrounded by houses, some of them stained with damp to the hight of 6 feet or 7 feet, this house of 14 rooms was kept both warm and dry by the use of "10 tons of English household coals per annum." Indeed, so extreme was the dryness that it became necessary to place a large number of plants in different parts of the house to afford moisture and prevent the furniture from cracking. The entire house was so thoroughly warmed that doors and windows were constantly opened, "and this in spite of the exceptionally cold and damp nature of the surrounding soil and the exposed condition of the house." The walls of the house are made of porous bricks, and these walls are double, with a space between them, "like one box inside another box, with a space of 4 to 5 inches between the two boxes." The furnace is placed outside the cellar, at the back of the house, and the heat and smoke from it "pass into a chamber built in the cellar." "From this cellar and going all round the outer walls of it there is an inclosed passage," in the center of which is suspended a "metallic flue" that answers as a chimney and warms the air in the passage. In order to retain the heat the walls of the passage are covered with "sluck wood," which is well known as a non-conductor. The ten inlets for fresh air are covered with "metallic gauze." The air warmed in the passage described, which is kept at a temperature of between 114° and 122° F., rises between the openings in the wall and comes out in the large attic under the roof of the house. The success of this system of ventillation is dependent in a large measure on the porousness of the walls, and for this reason they are neither papered, painted nor plastered, but hung with woolen tapeatries tacked on wooden frames. It is claimed that such covering maintains the warmth of the walls, and that the disagreeable sensations we sometimes experience when it rains are the result of moisture "blocking up the pores of the walls." Contrary to the usual theory that worsted wall coverings are a menace to health, M. Somesco, the owner of the house, calls them his "microbe traps," and adds: "If I have any reason to believe that injurious microbes have been introduced into my house, I know pretty well where to find them. It would take but little time or trouble to unhook all this drapery, and put it into the disinfecting oven; and there superheated steam under pressure, without injuring the cloth, would assuredly kill the microbes."

We regret to announce the death at his residence in New York City of Henry E. Russell, president of the Russell and Erwin Mfg. Company of this city. Mr. Russell, who had reached an advanced age, had suffered from ill health for many years, and had practically relinquished active work in connection with the concern. The end came, however, somewhat unexpectedly, from sudden heart failure, on the night of Thursday, the 26th inst.

The Relations of Chemistry to Foundry Practice.—I.*

by Clemens Jones, M.E., Easton, Pa.

Chemical analysis has for its objects the detection and estimation of the constituent parts of material substances. That it proceeds upon an original separation of compound substances into the elementary substances composing them, and upon a positive identification of these, is an inference readily derived. This process began in an original way, and then became selective. The metals were early discovered to be elementary. As far as our present purpose is concerned, from the nucleus of metals—gold, silver, copper and iron—sprung the long list of elements we now have—64. In later years this has been still further increased. The prolonged, arduous work that established the identity of a single element would make a history of experiments. It would likewise be a history of the patience, skill and devotion to science of a class of men—theorists—who spent their lives in a tireless search after truth, and in its demonstration. From the nature of things, chemistry is an experimental science. An experiment has been aptly defined as a question addressed to nature. Chemistry demonstrated by just such inquiries the broad theorem that matter is indestructible. So grand a principle as this applied to all manner of substances—solid, liquid and gaseous. But this principle demanded that the chemical action of one substance upon another should be accompanied by a change of state, in which the weight of the substance changed should remain unaltered. Therefore, the quantity of the substance changed could be accurately determined, because the existence of fixed laws governed every change. Quantitative analysis became a possibility. By it a substance in whatever state of change or combination could be identified, extracted, exactly weighed and then resolved into its former condition without loss. Water could be split up into its component gases—hydrogen and oxygen. These gases could be separated, weighed, found to exist in the proportion of two parts of hydrogen to one part of oxygen, reunited, chemically combined by a spark and then give precisely the weight of water first taken, and possessing all of its original properties. All material substances, whether in the earth, the sea or the air, could be isolated and their quantities determined with an unfailing accuracy. The

* An address before the Foundryman's Association of Philadelphia.

proofs surround us. The products of a hundred industries; the forces at work in operating them—iron and copper; heat, power and light. Indeed, in this our day we are aware that the truths of chemistry and its great principle, developed by means so simple as analysis, expand with the growth of knowledge, and extend from the earth to the limits of the celestial system. Certain of the elements so far found in the earth have been discovered in the sun, and even in the remote planets. How much do we owe to this mistress of our civilization—the benefactress of art, philosophy and religion?

The elements, for which we are thus indebted to the researches of chemistry are accordingly the total number of separate indivisible substances found to have entered into the composition of every known body. A compound body may consist of only two elements, as water, for instance, or it may contain more, as sugar, composed of three elements, hydrogen, oxygen, and the third, carbon, or limestone, oxygen, carbon and calcium. Consider that the same principle of chemical constituency holds good for every material body in the organic or inorganic kingdoms. Sugar can be artificially made. Limestone is found to be a proportionate relation of oxygen, carbon and calcium. These elements, then, brought together in the same association produce limestone, or calcium carbonate, which artificial product has properties similar to the naturally occurring substance. The list of elements which concerns the limits of this discussion is as follows: Iron, carbon, silicon, phosphorus, manganese, sulphur, aluminum, arsenic, titanium, copper, calcium, magnesium, and allusion will be made to a few of the more rarely occurring elements—nickel, chromium, tungsten, vanadium and uranium.

Iron.—Chemically pure iron—that is, iron as pure as it can be made—is silver-white in color, soft, ductile, malleable, and rapidly attacked by oxygen. It forms two principal oxides—ferrous oxide, or iron protoxide, of which the salts are green in color, and ferric oxide, or iron sesquioxide, of which the salts are yellow. There is a black oxide also, which is a combination of these two oxides. When oxidation of metallic iron takes place rust is formed. There are two kinds of rust. One is yellowish brown, inclining to a reddish hue; the other is black and tends to form the magnetic oxide. In impure iron the agency of moisture, even in moderately dry air, facilitates this rusting action. The reason of this is that iron decomposes water, which, as you are aware, is composed of the two gases hydrogen and oxygen. The strong attraction or affinity of iron for oxygen splits up the water into its elements; the oxide of iron, or rust, is formed, and hydrogen is liberated. A clean nail placed in a tumbler of water will show this reaction in a few minutes. Iron may be obtained in a state of purity by reducing the oxide in a current of hydrogen. That is, the oxide is heated to facilitate the action, while a current of pure hydrogen gas is passed over it. Aided by the heat, the hydrogen seizes upon the oxygen, metallic iron is left behind, with water as a by-product. Under these conditions it is in a finely divided state, and must be kept from contact with the air, as it is so eager for oxygen that the air acts fire to it, a brilliant flash takes place, and the black magnetic oxide is formed. This phenomenon is familiar about the runners of a blast furnace, or in filling a ladle from a cupola, and frequently on pouring into a mold. The tiny sparks that fly about like little meteors are minute detached particles of iron thrown into the air, which are burned by the oxygen of the air. Iron is not found in the native state on the earth. It is found in meteorites, those peculiar structures which fall to the earth from masses revolving through space, when they pass through the field of the earth's attraction. Nickel is always conspicuously associated with it. In some places, notably Greenland, these masses of meteoric iron are of great size. From the readiness with which it is oxidized, dissolved and reduced, iron forms a great variety of compounds or salts with other chemical reagents. It is indispensable in the arts, in medicine and in the vegetable world.

Carbon.—Carbon is one of the most remarkable elements which we will discuss. As a solid, it occurs in three distinct forms, bearing no resemblance whatever to each other in outward appearance or physical properties. Color, specific gravity, hardness, crystalline character, all differ to such an extent as to have no apparent relations. The first form is the diamond. This, the most valuable and beautiful gem in the mineral kingdom, is pure carbon. It is the hardest of all known bodies; is employed for cutting glass, and will scratch the hardest substance. It can only be cut by means of its own dust, and then it has a high refractive power, a ray of light causing it to gleam with brilliant luster. When burned in oxygen it is found to consist entirely of carbon. The second form of carbon is graphite or plumbago. This is greasy to the touch, so soft that it can be cut by the finger nail, and is very light. Drawn across paper it leaves a black mark, and is hence made into lead pencils. It is also used for lubricating machine bearings and to protect the surface of coarse grains of gunpowder. Pig iron on cooling throws off flakes of graphite, the so called "kish." The third form of carbon is charcoal. Its purest form is lampblack. When animal or vegetable matter is heated to redness in a closed vessel charcoal is produced. Charcoal carbon also exists as coal, coke and animal charcoal. It is still lighter than either of the two foregoing forms of carbon, and, unlike them, does not crystallize. It has a high absorbing power, which is utilized for the purpose of refining raw sugar, and is valuable as a disinfectant. The wide disparity between these three forms of carbon is evident from the description. Yet on combustion with oxygen each of these yield the same weight of the same substance, namely, carbon. That is, 12 parts by weight of each of these substances yield 44 parts by weight of the resulting compound of carbon with oxygen, carbon dioxide, or, as commonly known, carbonic acid. This metalloid, as we shall see, has a department with iron which cannot be supplied to metallurgy by any other element. Its rank in the physical world, animal and vegetable, is so vital that neither plant nor man could exist without it. We burn it in our stoves to get physical heat, and consume it in our bodies to supply the waste of tissue. For the purposes of the metallurgy of iron we win carbon from the earth, where its geological position proclaims it to have been buried for ages.

Silicon.—Silicon is the next element to be considered. After oxygen, silicon is the most abundant element in nature.

It has never been discovered in the free or native state, but by means of a powerful electric arc current it has been reduced from its oxide. Heat more intense than the blast furnace gives, aided by the electrolytic action of the current in the presence of powerful reducing agents, is required to do this. Silicon may be crystalline or amorphous. In nature it occurs as the oxide, or silica, as in quartz, which is crystalline, or as flint, which is dense and hard and sometimes black in color. Both varieties are sometimes hard enough to scratch glass. Silica is a predominant constituent of all rocks; hence it is found in all kinds of ores, either as silica compounds or as an impurity. In the materials out of which iron is made—ores, fuel and limestone—it is the largest impurity. The slag which comes from the furnace in the manufacture of iron is therefore a compound of silica; that is, it is a silicate. In consequence of the heat and intense reducing power and volume of the blast furnace small quantities of silicon are produced, which, in contact with melted iron, combine with it and make a more fusible alloy.

Phosphorus.—As an element, this metalloid enters into the composition of many important bodies. It has been found wherever organic life exists. The oldest rock formations also contain it, usually associated with iron.

Soil, which is produced by the disintegration of rocks, derives in turn its phosphorus from them. Water, air, and the sun decompose even granite rocks, by the familiar action known as "weathering." Plants, and hence their seeds, take up the phosphorus from the soil, and by this process are said to impoverish it. Animals and man absorb from vegetable matter the phosphorus which enters into the composition of their tissues and bones. Phosphorus does not occur in a free state in nature, but in combination with oxygen and calcium. As the former, which is called phosphoric acid or the pentoxide, we thus see that it existed first in the rocks, then by the economy of nature in the soil. Entering the plants, on which animal life subsists, it is transformed into bones, &c., by uniting with calcium oxide, or lime; on burning these it is obtained as calcium phosphate, or phosphate of lime. We are aware that soils are enriched by the use of artificial, and naturally occurring phosphates. Phosphorus is a soft, yellowish, semi-transparent, waxy solid. It absorbs oxygen rapidly, and hence is easily inflammable on exposure to the air. It burns to phosphoric acid, or the pentoxide. It is largely used to make a composition for friction matches, and gives to them the "phosphorescence" visible in the dark and a disagreeable suffocating odor, caused by slow oxidation. Phosphorus is the most persistent element in its association with iron. Apatite and phosphorite are two of its principal forms, which are often separated from the raw ores to purify them for metallurgical purposes. As affecting iron, the greatest ingenuity has been exercised in the control or elimination of phosphorus, since it imparts properties of varying character, which will be described further on in our discussion.

Manganese.—Manganese is a true metal, reddish white in color, so brittle that it can be readily powdered and is so hard that it will scratch glass. It is slightly heavier than iron, and like that metal decomposes water at ordinary temperatures, with evolution of hydrogen. It is widely distributed in the mineral kingdom, and is found almost as diversely as iron. It is a common ingredient of iron ores. Metallic manganese is said to be slightly magnetic, but owing to the difficulty of making it chemically pure, this property may be due to presence of iron in minute quantity. It has a strong affinity for oxygen, which it is capable of retaining to such an extent that in the arts its oxides are invaluable. It is not found as a native metal, owing to this susceptibility, but occurs as the various oxides, chiefly as the black dioxide or pyrolusite. This substance when heated alone gives up oxygen, and is hence largely used in making oxygen gas. Manganese forms highly colored salts, which are not only useful in making colored tints in the manufacture of glass, but in making valuable reagents for the chemical laboratory. When manganese is reduced from its ores in a blast furnace it is found to unite with carbon and silicon in much the same manner as iron, and can be made into a product containing

iron, called spiegeleisen or "spiegel," or a variety called ferromanganese, which may contain 80 per cent. by weight of metallic manganese. These two alloys are used in the manufacture of steel by the Bessemer process. Manganese is an extremely useful element and, as we shall see, has important effects upon the properties of cast iron.

Sulphur.—Sulphur occurs as free or native sulphur in yellow finely shaped crystals, and is found abundantly in volcanic regions. It takes fire easily and burns with a bluish flame to sulphur dioxide, giving off offensive odors. It is used in making matches. Sulphur is plentifully distributed among the minerals and ores of the whole globe. The extent to which it became associated with all metallic groups is indicated by the amount of sulphur-containing ores used in smelting the rarest metals—gold, platinum, silver and a number of others. As examples of this widespread distribution, copper, lead, zinc and even iron are metals smelted from sulphurous ores. To the early workers at metallurgy sulphur was a much dreaded ingredient, and even with modern chemical knowledge and mechanical appliances it is a baneful and capricious element. To the old iron workers it was one of the "devils." Combined with iron, a common and abundant mineral called pyrite (sometimes "iron pyrites") furnishes the material for making one of the most important acids in use—sulphuric acid, commonly called vitriol. The by-product from this process, so-called "purple ore," is considered by some misinformed persons to be a suitable substance for making into pig iron. This same mineral, pyrite, is found in limestone, in anthracite coal, in bituminous coal and hence in coke, and is termed by miners "coal brasses" and "sulphur." It can be easily understood in consequence why, with ores comparatively free from sulphur, this unfaltering companion finds its way into pig iron or any kind of iron or steel produced therefrom. Together with its occurrence with the ores of iron another mineral containing copper is also found. We will endeavor to point out to what extent sulphur is harmful in cast iron.

Aluminum.—Aluminum is the next element to which our attention is directed. This metal, through the publicity given to recent modes of cheap extraction, is tolerably well known. It is a silver white soft metal, capable of being hammered to the thinness of gold foil or drawn into the finest wire. It is but little over twice as heavy as water and three times lighter than iron. Weight for weight it has nearly the strength of iron, but of course its increased bulk and higher cost operate against any immediate prospects it may have of superseding iron for general use. Aluminum takes a high polish like silver, but, unlike that metal, will stand long exposure to corrosive gases without being tarnished. It can be worked cold and hot, and is in use to day for making surgical instruments, cooking utensils, roofing plate, and a class of like articles. In the year 1891 the United States alone produced 150,000 pounds of aluminum. Its oxide is a common ingredient of soils and clays, such as fire clay, or kaolin, marls, slates, &c. Other forms of the pure oxide of aluminum are to be found in the precious gems, ruby and sapphire, the native crystalline occurrence, and in the less valuable varieties, corundum and emery. In hardness the latter varieties stand next to the diamond. In the metallic state, or as the oxide, aluminum forms the base of a number of useful alloys and salts. Porcelain, earthenware and glass are some of the products in which the oxide is an ingredient. This oxide, or alumina, is the only oxide of aluminum. As such, it is a common constituent of nearly all iron ores, and is hence introduced into the blast furnace, where under certain conditions minute quantities of metallic aluminum are reduced and combine with the alloy of pig iron. The tenacity with which aluminum holds to its combined oxygen makes it exceedingly difficult of reduction, and recourse is had in modern times to the more intense heat and reducing power of the electric current. The exact influence of aluminum upon iron is not yet decided, and its employment to advantage is still the subject of experiment. As far as possible we will treat of the facts in this connection.

Arsenic.—Arsenic is a metal having pronounced peculiarities. It is brittle, of a bright grayish color, and almost as heavy as iron. It will not fuse except under certain conditions, owing to its highly volatile character. Heated to dull redness with exclusion of air, it disappears as a perfectly colorless vapor, which has a penetrating garlic-like odor. In the metallic state this peculiarity serves for its detection, since the smallest quantity burned in the air takes fire with a bluish flame, and while it is thus chiefly converted into the trioxide the heat is sufficient to volatilize some of the metal, which gives off its characteristic smell. It is very readily reduced to the metallic state. The trioxide, arsenious oxide, acid so-called, is a white powder, and in soluble compounds is a dreadful poison. Arsenic occurs in the free state. It occurs combined with sulphur compounds generally, and in this state is associated often with nickel in the ores of iron. Although so highly volatile and having properties opposed to the conditions which would bring it into the hearth of a blast furnace, yet it frequently enters pig iron and in any appreciable quantity is productive of injurious effects. From its association with sulphur, arsenic is sometimes found in fuels. I have taken crystals of arsenic trioxide from the crucible lining in a blast furnace which had used materials in which arsenic was never suspected.

Titanium.—Titanium is a metal strongly resembling tin. While it is a rare metal, its dioxide, called titanic acid, is a frequent impurity in the ores of iron, notably the magnetic ores, and accordingly the metal is usually met with combined in pig iron. In the blast furnace titanium has a tendency to accumulate, and is nearly always to be found in the hearth after blowing out a furnace. It is in the shape of beautiful copper-colored cubes and octahedrons, and is combined in this state with certain other elements. P. W. Shimer has found that titanium exists in pig iron, combined with carbon, and has succeeded in separating the compound in the state of minute symmetrical crystals.

Copper.—Copper is one of the metals of antiquity. The art of tempering or hardening it has been lost, although recovered by the newspapers at stated intervals. Its usefulness in the arts has been the means of making its properties widely known. It is perhaps familiar knowledge that it is compounded into a great variety of alloys, such as brass, bronze, bell metal, &c., all of which are hard and brittle when cooled slowly, but become soft upon being heated and then suddenly chilled. Copper is found as native or free copper, and as such, or combined with other elements, is abundant in nearly all countries. It has a deep red color, is ductile and malleable. For electrical purposes its usefulness is well known. Found in pig iron it may have been derived from any of the materials used in a blast furnace.

Calcium.—Calcium is a light yellowish colored metal. There are several modes of producing it, among which the electric current is employed with success. It is very oxidizable and burns with a bright flame in the air, forming calcium monoxide or lime. Limestone is, therefore, the kind of rock having calcium as a base. Geologically, limestone occurs among the oldest rock formations, and occupies vast areas of the earth's crust. In the great valley of Pennsylvania, along the banks of the Lehigh River, it lies in all possible positions, and covers thousands of acres in an unbroken field. Calcium is also combined in a different state in chalk and gypsum, and is present as a mineral constituent in a majority of formations. Marble is a variety of limestone. When marble or common limestone is heated the carbonic acid with which the calcium is combined is driven off and a white infusible substance called caustic or quicklime remains. This is the calcium monoxide, which combines with water with generation of great heat, forming calcium hydroxide, or slaked lime. Either slaked lime or lime dissolved in water have a strong affinity for carbonic acid, which they absorb rapidly from the air, reproducing calcium carbonate. We utilize this property in mortars and cements, to which they owe the hardening or setting. As lime calcium finds a hundredfold uses. In the blast furnace and cupola it is employed as the vehicle for carrying off undesirable impurities. Lime and silica alone are infusible compounds. United they fuse readily, combining to form various silicates of lime, &c., and in addition to this they open up to the action of the gases the finer particles that would otherwise be deleterious to the final products. Calcium carbonate crystallizes in two distinct forms; the commoner form is named calcite.

Magnesium.—Magnesium is a metal distinguished in its occurrence by being closely related to calcium. Like calcium it has but one oxide, called magnesia, the monoxide. It exists in the crystalline and massive state, as dolomite, analogous to calcite. From the nature of the oxides lime and magnesia, the metals calcium and magnesium may be said to replace each other interchangeably. There are few limestones which are non-crystalline that do not contain magnesia in small quantity. In the metallic state magnesium is silver white, oxidizes but slowly, and fuses at a low red heat. It can be cast, is soft, very light and ductile, though usually it is pressed into wire. In the form of ribbon magnesium can be ignited with a match, and burns with a dazzling light, which is white but very rich in chemically active rays. On this account it is employed as a substitute for sunlight in photography. The magnesium flash light is produced by the combustion of the metal finely powdered. The white substance found on these lamps is the resulting oxide—magnesia. Associated with lime, it finds its way into the blast furnace, but is often specially used as dolomite alone to obtain certain results in fluxing. Both magnesium and calcium are common ingredients of iron ores, more particularly hematites, and although so easily oxidized and extremely hard to reduce are considered by some authorities to become incorporated in pig irons.

We have now come to the more rarely occurring elements, nickel, chromium, tungsten, vanadium and uranium. Suffice it for our present purpose to state that they are all metals, as we have at this point learned to consider such, and although differing radically in chemical and physical aspects they appear to give but one property to iron and steel in the quantities in which they have so far been introduced. We have to deal with them only as they may be present in cast iron, but since their occurrence in nature is in minerals nearly altogether associated with iron ores, we may have future occasion to refer the peculiar behavior of a casting to the indication of one or more of these elements, and we are then prepared to know at least that these metals are accompanied by given effects.

PRIZE COMPETITIONS.

WE HEREBY ANNOUNCE a series of six prize competitions relating to trade matters in which our readers are interested. Four prizes of $50, $25, $15 and $10 will be awarded in each competition.

The competitions are open to all and a general participation on the part of the trade is invited.

We shall have the privilege of publishing any or all of the contributions received.

The committee of award in assigning prizes will take into account the merit of the different contributions and their suitability for publication.

PRIZE COMPETITION No. 6.

How Retailers Can Best Advertise and Extend Their Business.

The object of this competition is to obtain practical suggestions as to the methods which the retail dealer in Hardware, Stoves, Tinware, &c., can advantageously adopt in building up his business, and is intended to cover such points as the following:

Advertising in the local papers, with suggestions as to how such advertising should be done and to what extent;
The manner in which circulars and other printed matter may be used;
A description of any special or unusual methods of attracting and holding trade; and
General suggestions in regard to ways in which the bnsiness can be extended.

An account of any methods which have been found useful in building up trade will be suitable under this competition.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 6.

PRIZE COMPETITION No. 7.

Travelers' Yarns.

The traveling salesman is proverbially happy in the stories which he narrates, and this competition is for the purpose of calling out a collection of good yarns for publication. While the attention of travelers is specially invited to this competition, it is open to all. Stories relating more or less closely to trade or business matters will be preferred.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams 96–102 Reade street, New York, and marked Prize Competition No. 7.

PRIZE COMPETITION No. 8.

How to Treat Clerks.

Under this competition, beside a general discussion of the subject, such questions as the following may be considered:

The extent to which clerks should be given an opportunity of obtaining a knowledge of the business, and of price-lists, prices, &c.;
Whether it is desirable to have formal rules for the regulation of employees and for the management of the store. If so, a set of rules should be submitted;
To what extent clerks should be held responsible for their mistakes;
Suggestions as to how clerks should be treated in order to secure their most intelligent and efficient work;
Mistakes made in the treatment of clerks.

This competition opens an important subject and it is hoped that it will be discussed fully by merchants and by their clerks from their different points of view.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 8.

PRIZE COMPETITION No. 9.

Shop System of Keeping Track of Jobs.

This competition is intended to call out information in regard to methods of keeping account of the cost of labor and material on tin-shop work, repairing and new work, inside and outside. In connection with the general subject such points as the following may be touched upon:

Whether blanks or forms are used in connection with such work. (If so, samples should be submitted);
What record is kept of orders, costs of jobs, charges, &c.;
How time occupied in going to and from the job is covered;
Suggestions in regard to the profitable conduct of the shop.

To illustrate the system it is desirable that a specific job (as for example, repairing down spouting and eave trough, or other job of repairing in which new material is used) be referred to and the method of keeping track of the costs in such job fully explained.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be add ressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 9.

PRIZE COMPETITION No. 10.

Business Maxims—At Least 10.

Those entering this competition will send at least ten maxims relating to the conduct of business, presenting in a brief and pithy manner practical suggestions which may advantageously be followed.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 10.

PRIZE COMPETITION No. 11.

How Small Retailers May Keep a Record of Prices.

The object of this competition is to call out information or suggestions in regard to the best methods to be adopted in keeping a record of prices, showing cost or selling prices, or both cost and selling prices, of Hardware, Stoves, Tinware, &c., in a small retail store employing not more than four persons in the selling and bookkeeping departments, including the proprietors. Those entering the competition are expected to give a concise and clear explanation of their system, and if a price book is used, to submit as illustrating the system at least three specimen pages. If a price book is referred to it may be of any design or arrangement best adapted to the purpose, and may be original with the contributor or may be one of the different price books on the market. Fictitious names should be used instead of the real names of jobbers and manufactnrers.

The committee in awarding prizes will take into account the merit of the different systems described, the character of the descriptions given, and the general utility and interest of the contribution.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business, February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 11.

Noiseless Store Ladder and Track.

M. Croissant, 202½-204 Washington avenue, Albany, N. Y., is introducing this ladder and track, as shown in the accompanying illustrations. The ladder is shown in working position in Fig. 1, mounted on two 5-inch vulcanized rubber-tired wheels. At the top the sliding hanger or car is

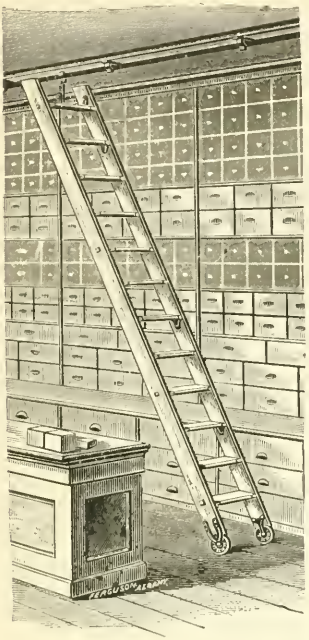


Fig. 1.—Noiseless Store Ladder and Track.

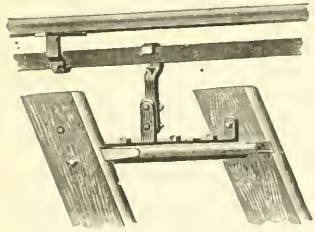


Fig. 2.—Sliding Car and Track.

boxed with hardwood boiled in tallow, to prevent friction and to insure a noiseless movement. The track is of 1¼ x ¼ spring steel set on edge and fastened to neat,

Fig 3.—Wheels and the Manner in which they are Applied.

strong brackets, imparting to the whole a neat and attractive appearance. Enlarged views of the sliding bar and track, also of the wheels, are given in Figs. 2 and 3. The adaptability of this form of hanger to go around curves, as in Fig. 4, on this

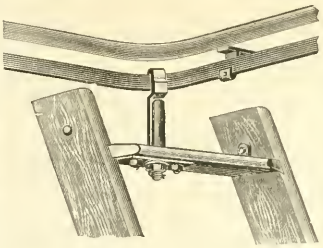
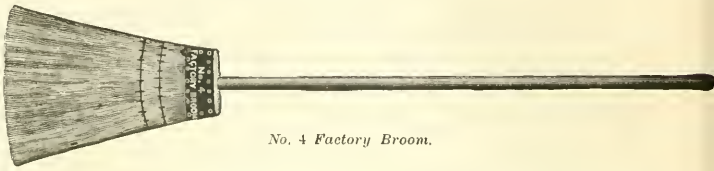


Fig. 4.—Swivel Car and Curve for Turning Corners.

track is an interesting feature and opens up possibilities in store arrangement which have heretofore been impracticable.

No. 4 Factory Broom.

Jos. Lay & Co., Ridgeville, Ind., is offering a rattan mixed broom, as herewith shown. The broom is made of broom corn and rattan mixed together, flat in shape, with an iron band, making, it is claimed, a broom solid, substantial and stiff for handling the heaviest dirt, including in its make up lightness and strength.



No. 4 Factory Broom.

The Champion Adjustable and Reversible Spokeshave.

The Champion Safety Lock Company, 74 Frankfort street, Cleveland, Ohio, are manufacturing this tool, as shown in Figs. 1 and 2. The front view is given in Fig. 1

Fig. 1.—Champion Adjustable and Reversible Spokeshave.

and the back in Fig. 2. The manufacturers explain that the blade can be easily adjusted, that it will cut on a flat surface,

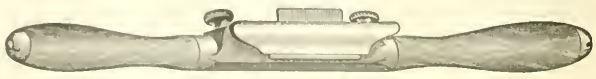


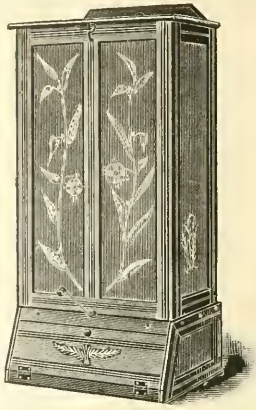
Fig. 2.—Back View of Champion Spokeshave.

and when it is reversed from one side to the other will cut on a small curve; that it is simple, made of the best material, highly finished, set ready for use, and every one guaranteed to be perfect in every respect.

The enforced idleness of workmen in the building trades during the last two weeks of cold weather, together with the loss of trade sustained by dealers in materials, means that the "snap" has cost a great deal of money.

Cook Flour Bin and Sieve.

Cook Flour Bin Company, Homer, Mich., have recently put this article on the market, as herewith illustrated. It



Cook Flour Bin and Sieve.

consists of a wood cabinet, made to contain 25, 50 or 100 pounds of flour, and finished in walnut, cherry or natural wood. A curved perforated tin sheet forms the sieve and is secured at the top of the base. The upper portion contains the flour, which is introduced by opening a lid at the top of the bin. The door in the base also opens for removing the sifted flour, a tin scoop being provided for this purpose. A large wood screw accompanies the bin for hanging it against the wall. The manufacturers claim that the bin is hung out of the way, that it is made of the best seasoned timber, that it is unnecessary to stoop to reach the flour, that all the flour is well sifted, that all the flour goes through the sieve, and that there are no soldered joints to give out.

The amenities of seafaring life are exemplified in the case of the steamship "Huron," whose owners accepted $60,000 for towing the disabled steamship "Spree" into port instead of double that amount, the sum demanded before going into court. Usually it is a question whether to abandon the property or to accept assistance on the terms offered.

The Emons Wagon Jack.

The Covert Mfg. Company, West Troy, N. Y., have just placed on the market the Emons patent wagon jack, as herewith illustrated, Figs. 1 and 2. The jack, with late improvements, is superior in construction, and cheap as a first-class wagon jack, Its lifting capacity is over 1800 pounds,

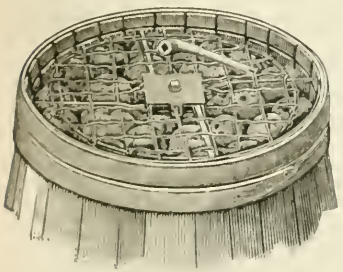
Fig. 1.—The Emons Wagon Jack.

Fig. 2.—Emons Jack Raised.

and all its parts being made of iron it is indestructible. Weighing only 7½ pounds it is easily handled and adjusted, and is a general favorite with those using it. The flat solid base is referred to as a great improvement over jacks having a ring or rim base, as it cannot settle in the ground when in use or tip when lifting a heavy load. These jacks are guaranteed by the makers to give perfect satisfaction.

Phelps Anti-Pilferer.

Phelps Anti-Pilferer, manufactured at Leavenworth, Kan., is being introduced to the trade by Joseph Bogardus, 167 Chambers street, New York, and is shown in the accompanying illustration. It consists of a circular frame of heavy ire, suitable in size to fit the top of a barrel.



Phelps Anti-Pilferer.

In the center of the frame is a cast-iron case or lock, from which radiate four iron rods, pointed at their outer ends. These pointed rods are at right angles to the lock, the latter being provided with a wrench-shaped key. This key fits a hub in the center of the lock; by turning the hub the rods are thrust outward, each about 2 inches, and thus hold the Anti Pilferer at the top of the barrel. The pointed rods cannot be drawn back without the aid of a wrench. The device is designed for use on barrels containing vegetables, nuts, &c., to prevent pilfering by the passers-by. These goods are also made in shape suitable for use on berry crates.

Starrett's Calipers.

L. S. Starrett, Athol, Mass., is putting on the market a line of calipers, as represented in the accompanying cuts. Figs.

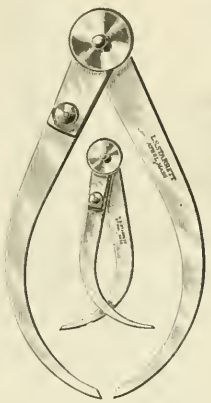


Fig. 1.—No. 38 Lock-Joint Calipers.

1 and 2 show lock joint calipers, which are made in sizes from 4 to 24 inches. In the under side of the short arm is a slot containing a stiff spring. Riveted into the middle leg and projecting through an opening in the arm is a threaded stud, on which is a knurled nut having a beveled hub; this bears against a cone in the arm and the action of the spring holds them together. Turning the nut presses them apart and adjusts the leg while the joint is locked. The spring takes up all back lash, so that the legs are firm. The calipers are referred to as being simple, light, low priced and reliable, of wide scope for both inside and outside work, and can be instantly adjusted to their full extent and as quickly locked firm in the joint and yet provided with a sensitive adjustment. They are made to supersede the old style firm joint, also the lock joint with split leg adjustment formerly made by him. The improvement consists in a socket joint made tapering and locked or released by a partial turn of the knurled disk drawing it together. A spring washer under the disk maintains an easy friction in the joint when unlocked.

The caliper shown in Fig. 3 not only has the excellent features of Nos. 38 and 39, but in addition to common use may be used inside of chambered cavities, over flanges, &c., removed and replaced without losing the size calipered. This is done by loosening the nut binding one arm to the auxiliary leaf and swinging it out or in, while the joint is locked, to clear the obstruction, then moving it back against a stop, where it will show the exact size measured. A lock-joint caliper is also made in form similar to that shown in Fig. 1. The hermaphrodite caliper. Fig. 4, has a lock-joint attachment and sensitive adjustment. It is light and stiff, with large capacity, instantly opened, closed and locked. The points are nicely tempered. This is also made with one sharp point and one curved point, as in Fig. 3.

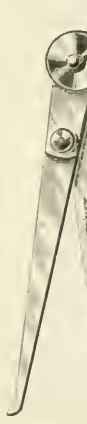


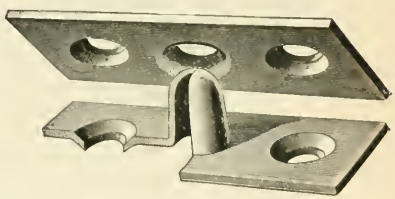
Fig. 2.—No. 39 Lock-Joint Calipers.

Fig. 3.—No. 37 Lock-Joint Transfer Caliper.

Fig. 4.—No. 43 Hermaphrodite Caliper.

Brass Dowel.

Timmis & Clissold, Bound Brook, N. J., are offering brass dowels, as shown herewith. These are stamped from sufficiently



Brass Dowel.

heavy sheet brass for use by pattern makers, cabinet makers and others. The manufacturers claim that in this way a perfect fitting pin is provided that does not swell with water or shrink from heat, thus insuring ease in molding and true castings, with no overlap; that they save time and expense in the pattern room and foundry, as they are let in quickly; that they do not clog with varnish; that they do not have to be cut to make them work, and that they may be used any number of times, as they are interchangeable and durable. The point is made that because of their peculiar shape they are strong, but not heavy, and that they are inexpensive.

The Gate City Filtering Block.

The accompanying illustrations represent the Gate City natural porous filtering stone, made from the solid rock into a hollow block 5 inches high by 4 inches in diameter, and the uses to which such hollow block is put as a filter. It is manufactured by the Gate City Stone Filter Company, 25 Murray street, New York. Emphasis is laid on the fact that it is made of natural rock and not of artificial stone. The filtering block is shown in Fig. 1, and the attachments and

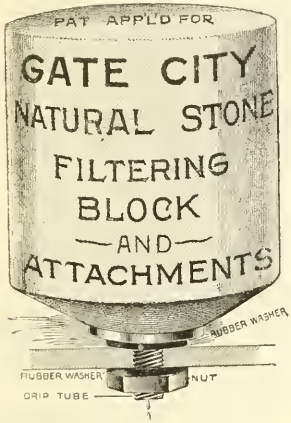


Fig. 1.—The Gate City Filter.

methods of use in Figs. 2, 3 4 and 5. A rubber bushing or ring is cemented into the bottom of the block, and fits watertight on a drip tube fitted into the bottom of a water reservoir. A detailed view of the position of the filter, also of the manner of fastening the rubber bushing and

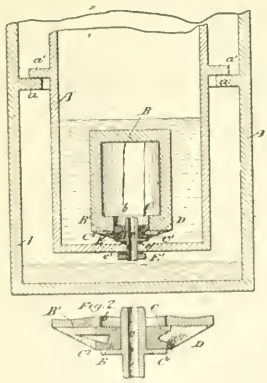


Fig. 2—Detailed View of the Filter.

drip tube into the filter, is given in Fig. 2. As shown in Fig. 3, the water is poured around the filter and passes through the porous sides of the stone block to its interior, and thence down through the drip tube to the receptacle below, leaving on the outside surface of the filter block the foul properties of the water, including, it is claimed, disease germs, decayed vegetable and animal matter, as well as miscellaneous filth found in city and in most spring water. An advantage of this construction is that the filtering block can be easily and quickly removed from the drip tube for cleaning, which the manufacturers advise should be done daily or oftener, according to the condition of the water, as an inspection of the block will determine, by rinsing and brushing the surface of the stone with the brush provided until all the foul accumulations are removed. The point is made that in brushing the block an imperceptible amount of the surface of the stone is removed with the filth. Thus the surface is constantly renewed and the pores opened for continued filtration. It is stated that one of the peculiar properties of the Gate City stone is that all matter is excluded and goes no further than the surface, and that the interior will, after years of use, be found as pure and white as at first. Each block will yield from 4 to 5 gallons of filtered water daily, if kept clean and

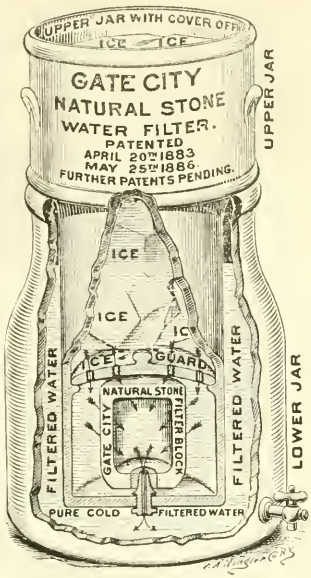


Fig. 3.—Filter and Earthen Jar.

Fig. 4.—Filter in Use.

the jar filled with water to keep up the pressure, but much depends upon the kind of water, if foul, turbid or otherwise. The outside jar, Fig. 3, is made both in porcelain and stone ware, and is also made without the ice guard. In Fig. 4 is shown an arrangement of wooden tubs or pails for those who prefer a less expensive filter. Fig. 5 represents the filter reversed in an ordinary water pail and used in connection with a syphon, and in this way, we are advised, it will filter 4 gallons of water daily. Several blocks can be used at the same time if large quantities of water are required. The Gate City filtering stone has been in use in various forms for the past 12 years, and with a view of introducing the filter more universally the manufacturers have placed it at a price within the reach of all. Thus the filtering block is sold for $2, with attachments as shown, Fig. 1.

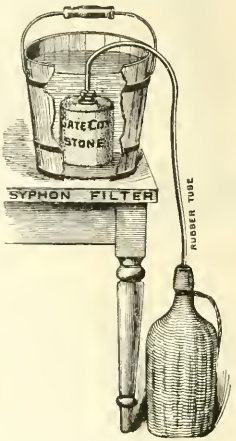


Fig. 5.—As Used with a Syphon.

The company emphasize the importance of having pure water and the efficiency of the Gate City filtering stone in securing it.

The following recipe for coloring brass is contributed by O. Pfeiffer to a recent number of a German exchange: The solution of 1 part of nitrate of copper in 2 parts of ammonia may be used for coloring brass to various shades from light brown to dark black. The brass must be thoroughly cleaned before placing it in the bath in which it must be allowed to remain until the desired color is reached. By burnishing the colored brass with wax a good luster may be produced. Any desired lighter shade may be obtained by dipping the blackened brass into dilute hydrochloric acid, which dissolves the black oxide of copper deposited on the brass. The action of the acid must be gauged by the color desired.

Geo. W. Beck, who is well known to the trade in Pennsylvania, Delaware, Maryland and adjoining territory, has accepted a position with Haslet, Flanagen & Co. of Philadelphia, and will enter upon his duties January 25.

The Wilmot & Hobbs Mfg. Company of Bridgeport, Conn., are the assignees of a patent for a frying pan, recently granted to Samuel R. Wilmot of that place. The lid of the frying pan is controlled entirely by the movement of the ball or handle, the construction being such that the lid may be locked in a raised position by means of the handle only, and when the lid is in this position the pan may be tilted by the handle without touching it with the hand.

TRADE REPORT.

The Iron Market.

The demand for Pig Iron during the past week has not reached the volume desired, and while prices remain unchanged in some sections, at other points they have receded. There is not as pronounced a feeling of buoyancy in the market, and large sales have been effected in some cases by making concessions of some sort. The recent cold weather, which has extended over the past three or four weeks, has largely interfered with business and places the advantages of the market on the side of buyers. Prospects are no less encouraging than they were a week ago, but the business looked for is still in the future. There are certain contracts for large quantities of material which have just been closed, and contracts have been signed to build ships which will require 30,000 to 40,000 tons of material. There are also various projects in view which will require large quantities of material, and structural mills are understood to have already a good deal more work on their books than they have had for years past. These are all encouraging features, providing as they do for consumption of both Raw and Finished Material. As soon as buyers regain confidence in the market and commence to anticipate their wants an improvement in the present condition of affairs will take place. The peculiarity of the situation in the West just now is that sellers appear to be somewhat at sea regarding prices, as competition has developed from unexpected sources, and it is difficult to say how low a level has been reached on some of the largest orders. New York quotations remain unchanged, as follows: Northern brands at $14.75 @ $15.25 for No. 1; $14 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 75 @ $15 for No. 1; $13.75 @ $14 for No. 2 and No. 1 Soft; $13.25 @ $13.50 for No. 2 Soft.

The Philadelphia market is characterized by spurts of activity and indications of strength followed by dullness and irregularity. Buyers could be found for large blocks of Iron at a slight shading from quoted rates, particularly on the lower grades, but owing to light offerings from the South, prices for this class of Iron are firmer than they have been for some time past. American Scotch Iron is quoted as follows:

American Scotch, No. 1X.....	$17.00	@	$17.25
American Scotch, No. 2X.....	16.00	@	16 25

In Pittsburgh the cause for accepting large orders for Bessemer Pig at shaded prices is a matter of comment upon which opinions differ. It is claimed by some that it was brought about by pressure on the part of furnaces to unload surplus stock, while others claim that the break was made voluntarily by furnaces with the object of influencing prices for this year's supply of ore. It is not unreasonable to suppose that both of the causes noted had considerable to do with bringing about the decline. Only a moderate amount of Foundry is selling on a basis of $14 for No. 1 and $13 for No. 2. Market prices are quoted as follows:

No. 1 Foundry	14.00	@	14.10.	cash
No. 2 Foundry	12.00	@	13.00	"
Charcoal Foundry No. 1....	19.00	@	20.00,	"
Charcoal Foundry No. 2 ..	18.50	@	19.00,	"

Chicago manufacturers have taken the bulk of large orders during the past week, leaving only the trade in small lots for quick delivery to the sellers of Southern Iron. The latter report that a very good demand exists for such quantities, but as soon as they figure on large lots they come in almost hopeless competition with Chicago producers. The sales made last week cover Bessemer Iron as well as Foundry, and quotations are as follows, cash, f.o.b. Chicago:

Local Coke Foundry, No. 1... . ..	$13.75	@	$14.25
Local Coke Foundry, No. 2.....	13.25	@	13.75
Local Coke Foundry, No. 3 ..	13.00	@	13.25
Local Scotch...	14.25	@	14.75

In Southern markets there has been no large buying for forward delivery during the week, but there is some enlargement in the order demand, which more frequently runs to several carloads instead of being restricted to one, and there are inquiries for larger lots which may culimate in a much larger business in the near future. Standard furnaces and Iron companies appear to have confidence in the future, as they are refusing to entertain bids which are not at full prices. For ordinary quantities we quote as follows, for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry,	$14.25	@	$14.50
Southern Coke, No. 2 Foundry,	13.00	@	13.50
Southern Coke, No. 3 Foundry,	12.50	@	12.75

Billets and Rods.—The market has been quiet, although there have been sales of round blocks to a New Jersey Wire mill at slight concessions in price, the seller being an Eastern Pennsylvania works.

Steel Rails.—The market is quiet, no sales of any magnitude having been reported by American mills during the last week. One of the points which are holding back transactions is that the railroads demand terms of payment unusually onerous.

Manufactured Iron and Steel.—The movement is improving, quite a number of contracts having been placed during the week. The impression is gaining ground that the volume of business will be very heavy.

Metal Market.

Copper.—Business has been almost at a standstill during the week under review, and nothing has transpired in the way of new demand or offering calculated to enliven the market. In other words, home trade buying is still extremely conservative, export demand for both fine Copper and Furnace Material drags somewhat wearily, and evidence is not wanting that the "agreement between gentlemen" has thus far failed to bring about desired results, although still looked upon as an effective agency in preventing demoralization of the market. European advices indicate that consumption thus far this year has been somewhat disappointing, there as well as on this side of the Atlantic and that conservative policy on the part of consumers still acts as an offset to the restriction of output here and abroad.

Pig Tin.—The speculative interest has again played the game with which dealers and consumers have become somewhat familiar latterly, moving prices around somewhat here and in London, yet accomplishing nothing that would throw light upon interior workings or motives. The matter of American tariff seems to have lost force as a cue to operations, temporarily at least, and the strongest points in the statistical position are less effective than they were a short time ago. In fact, it looks very much as though the manipulations of the leading foreign speculators still govern prices in a great degree. The movement of stock into the channels of consumption has, to all accounts, been somewhat above the January average thus far.

Pig Lead.—A very few hundred tons will cover the record of sales for the week under review. Demand is slow at the moment and not without evidence that leading consumers are practically a unit in avoiding competitive buying likely to give producers any decided advantage. Latest accounts go to show that the January output at leading points has been moderate, however, and that fact alone serves to keep prices firm.

Spelter.—There is no perceptible improvement in the Eastern demand and offerings from the primary sources of supply indicate that the buying elsewhere is on a moderate scale. Production is going ahead on a liberal scale, and the offering of surplus supplies continues sufficient to keep prices rather weak.

Tin Plate.—Very fair sales have been made of spot goods. In some instances the prices were in line with those that have been quoted for some time past, but concessions have not been purely excep-

tional, and the market is at present looking a trifle weak. Future deliveries have been taken hold of in an indifferent way and prices for these, as well as for prompts, are a trifle easy, although without decided change. In a retail way business is quiet, the extreme cold weather accompanied by snow and ice having put a stop to outside work. The snow and ice, however, are likely to discover weak places in roofs and to be destructive to gutters and spouting, which will result in a good repair business for tinners in the spring, for which they will require Solder and Tin.

Financial.

The transportation of merchandise has been much interrupted by the ice embargo, but bank clearances do not indicate a decline in the aggregate of business transactions, partly due, no doubt, to the recent renewed activity in stock speculation, although clearances outside of New York have surpassed those for the corresponding period last year, which was the largest on record. During the past week, aside from weather conditions, there were no distinctly unfortunate occurrences affecting trade, unless we except the renewed shipments of gold on a large scale, amounting to $4,300,000.

Apropos of the silver question is the annual statement of the production of silver mines in the United States and Mexico, as given in the Wells-Fargo report. According to this authority the mines in the country in 1892 produced in value only $50,607,501, against $60,614,004 in 1891. It is also shown that Mexico produced last year 56,480,000 ounces, or an excess of about $10,000,000 compared with 1891. It is therefore calculated that, altogether, the quantity produced was about 118,950,000 ounces, or not far from 6,000,000 ounces more than in 1891—serving to indicate that the decline in value that has taken place is only in obedience to the law of supply and demand.

The stock market was active and prices touched in several instances the highest point reached for more than a year. The abundance of money is reflected in the weekly statement of the Associated Banks, there being an average gain in cash of $11,192,500. The result of all the changes was a gain in the surplus reserve of $6,919,150, and the banks now hold in excess of legal requirements $22,529,600, against $33,002,900 in the corresponding week a year ago, and $24,089,775 in the preceding year. Loans were expanded over $7,000,000.

In the merchandise markets there is no special change. Cotton declined a fraction, but recovered. Wheat was nearly 2¢ lower, Western receipts continuing large. Exports in three weeks from both coasts have been 9,954,607 bushels, flour included, against 14,026,840 bushels for the same weeks last year. *Bradstreet's* calculates that the quantity remaining in farmers' hands March 1 will be 104,000,000 bushels, and the stock now in sight in this country is 99,631,000 bushels, against 64,085,000 at that date last year.

Chicago Report.

Scrap.—Although a few large consumers have bought a considerable quantity of wrought the past week, there has not been a general revival in the demand and this locality is not in good condition to absorb much of a supply from outside localities. Dealers continue the following nominal schedule of buying prices:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12.50	....
Machinery Cast	10.00	....
Malleable Cast	8.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.50	....
Sheet Iron and Hoops	4 00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single	....	....
Sheets and Rings	11.50	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	7.00	....
Horseshoes	14.00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9¾¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3⅜¢
Tea Lead	....	3 ¢
Zinc	....	3 ¢
Rubber	....	2¾¢

Anthracite.—Stocks here are being heavily drawn upon, owing partly to the protracted cold spell and partly to deficiency in the supply of Bituminous, which causes numerous consumers to turn to Anthracite. The conditions seem unusually propitious for an advance in prices, but merchants continue old quotations on carloads of 12 net tons as follows:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

CONDITION OF THE

Hardware Trade.

The week's business shows a marked improvement over that of the preceding one, and it is obvious that trade is beginning to move with more freedom, though it is unquestionably restrained somewhat by the continuance of severe weather. The large houses are actively completing their preparations for the season's trade and getting their stocks in condition for the demands which will soon be made upon them. They are, however, purchasing carefully, there being an increasing disposition to order frequently, letting the manufacturers as far as possible carry the stocks. The prospect for business during the next few months is regarded as excellent. In the matter of prices there is little of importance to note. In some special lines slightly higher quotations are made, but on many staple goods the market is weak and prices are somewhat lower. In this state of things it is obviously the part of wisdom for large purchasers to watch the market closely, as it is likely that some of the staple goods which are exceptionally low may recover strength and somewhat higher prices prevail.

From Chicago we learn that the severity of the weather has seriously interfered with the movements of salesmen, but under the circumstances trade is better than might be expected, although it can hardly be called active. Orders are now being taken for future shipment of Wire Cloth, Poultry Netting, Screen Doors, Refrigerators, Steel Goods, &c., but there is some stocking up in the general line of Hardware by those who found their assortments broken after inventorying. Collections are a little better than they have been, as there is always a great deal of prodding done at the beginning of the year. The improvement, however, is only regarded as temporary, the prospects indicating a tighter money market as the year advances. Country bankers are complaining of the scarcity of funds, caused by the farmers still carrying a large part of their crops which they have been holding for higher prices. This is the most discouraging feature of the present situation. Heavy Hardware jobbers report a moderate volume of business the past week, with competition very keen on any business coming forward in Iron or Steel and consequent weakness in prices.

Notes on Prices.

Cut Nails.—A good many inquiries are being made for quotations on Cut Nails and the volume of business is fair, though not especially heavy. The Eastern mills which have been shut down for a while are beginning to start up, but thus far there has not been any important accumulation of stock. Small lots from store in New York are held at $1.75 to $1.80, figures which are sometimes slightly shaded, and carload lots on dock on a 40-cent average are quoted at $1.60. The question as to the advisability of revising the Nail card is being considered by the manufacturers, and on the 31st inst. a meeting of the representatives of the Eastern and Western mills will be held to discuss the subject and prepare a new card if the way is clear. There are, however, a good many diverse views, and it is not at all certain what the features of the new card will be in case it is decided to adopt one.

Advices from Chicago.—Cut Steel Nails have been in somewhat better demand from factory, and for the time being trade is very steady, with very little pressure to sell by distant makers. Jobbers are selling small lots from stock at $1.65 to $1.70, according to average.

Wire Nails.—Manufacturers have no reason for complaint in regard to the volume of business, the aggregate of sales

being large and inquiries indicating a disposition on the part of merchants to place orders. The margin of profit is, however, exceedingly narrow, if there be any profit at the low prices now ruling. Since our last report the market, instead of gaining strength, has receded slightly, and is characterized by some weakness and irregularity. Small lots from store in New York are quoted at $1.75 to $1.80.

Advices from Chicago.—Manufacturers report a good trade in Wire Nails considering the season, but prices have latterly been demoralized on anything like a good quantity or a choice specification. Manufacturers are endeavoring to check the demoralization. Agents think the chances are good of the manufacturers getting together and controlling prices, and meanwhile do not propose to fill up their order books with low contracts. Small lots from stock are quoted at $1.65 to $1.70.

Barb Wire.—As the season advances there is more inquiry and some increase in the volume of business. Small lots from store in New York are held at $3.10 for Four-Point Galvanized, with 10 cents off for carloads.

Advices from Chicago.—Only a moderate business is reported by manufacturers. Jobbers are taking control of the trade at this time, as they are selling at $2.15 and $2.60, with 5 cents advance for small lots. The Joliet Enterprise Company's stock of Barb Wire was to be sold to the highest bidder this week, but so far no particulars have been made public as to the transaction. Whoever gets it will have a cheap lot of Painted Wire to put on the market.

Lawn Mowers.—The Lawn Mower market is active, with a prospect of a large aggregate of business during the season. This is a line of goods for which there is a constantly increasing demand, and in the production of which a number of new manufacturers are engaged. The result is very active competition and comparatively low prices on many of the machines. While the leading makers who have an established reputation are holding their trade there is a large demand for cheap Mowers, on which a wide range of prices prevails.

Nuts.—Hot pressed Nuts are somewhat lower than they have been, as the weakness which has heretofore existed has been succeeded by slightly reduced quotations. The market is in an unsettled condition.

Rivets and Burrs.—The market for Iron Rivets and Burrs continues in a demoralized condition. Prices are low and irregular and do not as yet show indications of increased strength. A further weakness in this line has developed in a week or two

Cordage.—The Rope market continues without important change since our last review, there being a fair amount of business notwithstanding the fact that buyers are not generally placing orders to cover their future requirements. We are authorized by Travers Bros. Company to contradict the report that there have been recent negotiations looking toward the purchase of their Cordage interests by the National Cordage Company, a report which they state is without foundation. A similar contradiction is made in regard to John Good's Cordage interests.

Faucets.—The following revised quotations on the extensive line of Faucets manufactured by John Sommer's Son, Newark, N. J., will be of interest as representing the present prices:

	Per cent.
Peerless Best Block, Tin Key	40
IXL, first quality, Cork Lined	50
Diamond Lock Faucets	40
Perfection Fla. Red Cedar, in boxes	40
No Brand Red Cedar, in barrels	50&20
Reliable, Cork Lined	60
O. K. Western Pattern, Cork Lined	50
Western Pattern, Metal Key	40
Boss, Metal Key	50
No Brand, Metal Key	60

Cross-Cut Saws.—An effort is being made by some of the leading manufacturers of Cross-Cut Saws to discontinue the quotation and sale of these goods by the foot and to sell them by the piece. Lists are accordingly issued giving the prices on each size of Saw, as shown in the following revised list of Cross-Cuts issued by Henry Disston & Sons, Philadelphia. This list is subject to the regular discount of 40 per cent.:

	4ft.	4½ft.	5ft.	5½ft.	6ft.	6½ft.	7ft.	7½ft.	8ft.	
Great American Tooth	$2.56	2.88	3.20	3.52	3.84	4.16	4.48	4.80	5.12	each.
Lumbermen Tooth	2.56	2.88	3.20	3.52	3.84	4.16	4.48	4.80	5.12	"
Diamond Tooth	2.56	2.88	3.20	3.52	3.84	4.16	4.48	4.80	5.12	"
Fleam Tooth	2.56	2.88	3.20	3.52	3.84	4.16	4.48	4.80	5.12	"
Perforated Lance Tooth	2.72	3.06	3.40	3.74	4.08	4.42	4.76	5.10	5.44	"
Lancet Tooth	2.56	2.88	3.20	3.52	3.84	4.16	4.48	4.80	5.12	"
Electric Tooth	2.56	2.88	3.20	3.52	3.84	4.16	4.48	4.80	5.12	"
Champion Tooth	2.32	2.61	2.90	3.19	3.48	3.77	4.06	4.35	4.64	"
Champion Tooth No. 2	2.16	2.43	2.70	2.97	3.24	3.51	3.78	4.05	4.32	"
Tuttle Tooth No. 1	2.56	2.88	3.20	3.52	3.84	4.16	4.48	4.80	5.12	"
Tuttle Tooth No. 2	2.40	2.70	3.00	3.30	3.60	3.90	4.20	4.50	4.80	"
Plain Tooth No. 1	2.32	2.61	2.90	3.19	3.48	3.77	4.06	4.35	4.64	"
Plain Tooth No. 2	2.16	2.43	2.70	2.97	3.24	3.51	3.78	4.05	4.32	"
Tenon Tooth No 1	2.32	2.61	2.90	3.19	3.48	3.77	4.06	4.35	4.64	"
Tenon Tooth No. 2	2.16	2.43	2.70	2.97	3.24	3.51	3.78	4.05	4.32	"
Hook Tooth No. 2	2.16	2.43	2.70	2.97	3.24	3.51	3.78	4.05	4.32	"
Triumph Narrow without handles:										
Champion Tooth	1.44	1.62	1.80	1.98	2.16	2.34	2.52	2.70	2.88	"
Diamond or Great American Tooth	1.52	1.71	1.90	2.09	2.28	2.47	2.66	2.85	3.04	"
Humboldt, California, Toledo Blade and Sabine	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	"

Whips.—As relating to a line of goods handled by many in the trade, the quotations given below will be of interest. They represent some of the leading goods of the American Whip Company, Westfield, Mass., and 54 Warren street, New York:

IXL Whalebone Driving Whips:

4½	5	5½	6	6½	7	7½	8	feet.
$18	$20	$22	$24	$27	$30	$33	$36	per doz.

Eureka, Two-third Whalebone Whips:

5½	6	6½	7	feet.
$15	$16.50	$18	$20	per dozen.

Bull Bone, Half-length Whalebone Whips:

5½	6	6½	7	feet.
$11	$12	$13	$15	per dozen.

American Standard, Half-length Whalebone Whips:

4½	5	5½	6	6½	7	7½	8	feet.
$8	$8.50	$9.50	$10	$10.50	$12	$13.50	$15	$16.50 per doz

True Grip, Raw Hide Center Whips:

4½	5	5½	6	6½	7	feet.
$6	$6	$6.50	$7	$7.50	$9	per dozen.

New Name, Stocked Java Whips:
Black and wine colors, 6 feet, $6 per dozen.

Americans, '93 Pen Whip. A unique penholder with each Whip:
6 feet..... $6 per dozen.

Gents' Light Driving:
No. 111—6 feet..... $6 per dozen.
No. 106—6 feet..... $5 per dozen.

No. 103. Hand-made Stocked Java, black and wine colors:

5½	6	feet
$3.75	$4	per dozen.

The company also make a large variety of cheaper grades which sell from 50 cents to $3 per dozen; Team Whips, ranging from $2 to $7.50 per dozen, and Toy Whips, from $2.50 to $12 per gross. Their assortment also includes Whips, gold mounted, with ivory handles; Coach, Tandem and Tally-ho Whips, and Ladies' and Gentlemen's Riding Whips. The company are making a specialty of their new Hardware assortment, 10/American, which is composed of 75 Whips carefully selected, intended to retail at $75. It includes one Sign Whip, worth $5; 100 Rules with dealer's name on, and 100 Folders for distribution to customers, for which no charge is made. The price of this assortment to the trade is $50.

Indurated Fiber Ware.—Cordley & Hayes, 173 and 175 Duane street, New York, issue under date January 25 a list of Indurated Fiber Ware which supersedes all previous lists. They also call attention to a reduction in their Star Pails, which are now listed at $4.20 per dozen, which is subject to the regular discount of 25 per cent., f.o b. New York, cash 30 days, less 2 per cent. for cash in 10 days. On an order for not less than $100 list, all to be shipped at one time in one lot, delivery will be made at any railroad station east of the Mississippi River. They also allude to the fact that low prices are named on other articles.

Planes.—We are advised by H. Chapin's Son, Pine Meadow, Conn., that he has withdrawn the portion of his discount sheet recently issued relating to Planes, and the following revised quotations are announced, terms 30 days or 2 per cent. discount for cash in ten days:

	Discount, Per cent.
Bench Planes, Common Pearce	50
" " Extra and Premium	45
" " With English Irons instead of American	30
Ship Planes	45
Miscellaneous Planes	40
Bench Planes, Apple, Box and Rosewood	20
Carriage-Makers' Tools	20
Molding Planes	40
Grooving Plows	40

Freezers.—There is little to report this season in regard to Freezers, the line of goods put on the market by the different manufacturers being substantially the same as last year, with slight modifications and improvements suggested by experience. The competition between the manufacturers continues very active, but prices are

not materially lower than they have been, and they are referred to as leaving the manufacturers a narrow margin of profit. There is a general anticipation of an active demand during the season, partly in view of the bountiful supply of ice which is assured throughout the country, and partly in view of the fact that stocks in dealers' hands are probably lighter than for several years, so that both jobbers and retailers will enter the market with practically no old stocks carried over. In addition to this the natural increase owing to the general prosperity of the country and the constant extension in the demand for Freezers will tend to make the business large.

Enterprise Mfg. Company.—The following changes in list prices are announced, under date January 17, by Enterprise Mfg. Company, Philadelphia:

No.	Per dozen.
75, Sad Irons, either Nos. 1, 2 or 3	$4.75
76, " " "	5.00
87, Polishing Irons	6.25
77, "	5.00
105, Toy Irons	4.25
	Each.
55½, Family Outfit of Sad Irons	$3.50
1, Sad-Iron Heater	1.35
2, " "	1.85
630, Bone, Shell and Corn Mill	7.5
1, Coffee Mill	2.25
2, "	3.50
2½, "	4.50
209, "	25.00
210, "	30.00
212, "	35.00
214, "	40.00
16, "	40.00
216, "	50.00
218, "	55.00
62, Power Meat Chopper	225.00
35, Sausage Stuffer	6.50
Barrel Jack, Truck and Stand	6.00

Under date January 18, they announce the following discounts applying to their catalogue of 1892:

	Per cent.
Lawn Mowers, Lawn Mower Parts, Sad Irons, Sad Iron Handles	40
Cherry Stoners, Fruit, Wine and Jelly Presses, Hand Power Meat Choppers, Ice Shredders	30
Lawn Sprinklers, Sausage Stuffers, Sausage Stuffing Attachments, Shoe Stands and Lasts, Barrel Jacks, Beef Shavers, Bone, Shell and Corn Mills, Bung-Hole Borers, Cheese Knives, Coffee Mills, Flag Holders	25
Fruit Augers, Measuring Faucets, Molasses Gates, Power Meat Choppers, Tincture Presses, Tobacco Cutters, Barn Door Bolts, Bullfrog Door Weights, Cork Pressers, Cork Pullers	20
Mole Traps, Sad Iron Heaters, Vegetable Slicers	15
Parts, excepting Lawn Mower and Sad Iron Handles	20

Perfect Lawn Rake.—F. E. Kohler & Co., Canton, Ohio, are selling the Perfect Lawn Rake, a description of which appeared in our last issue, at the following prices:

No.	Per dozen.
1, 22-inch wide, 28 teeth and hood	$4.50
2, 22 " " 28 " without hood	3.75
3, 18 " " 22 " and hood	4.00
4, 18 " " 22 " without hood	3.50

Glass.—During the past week there have been no further developments in completion of arrangements by the National Glass Company. Demand for window Glass is still limited and American factories are doubtless accumulating stock. The market as a rule is firm, but there is noticed a disposition on the part of some manufacturers to move stock by making slight concession in prices for large lots. The outlook for the coming season is considered bright, and it is believed that present prices will be strictly adhered to, if not advanced, when spring trade opens. Business with jobbers is quiet, though prices are fairly well maintained. American Plate Glass is being quoted from Pittsburgh by D. E. Wheeler, agent, at 60 and 2½ per cent. discount to the retail trade. Jobbers are making open prices of 60 and 5 per cent. discount, and close buyers, it is understood, can buy at from 60 and 7½ per cent. discount to 60 and 10 per cent. discount. French Window Glass is not very firm at 75 and 10 and 5 per cent discount, though there is a disposition on the part of some importers to advance prices slightly in the near future. Future prices of American and Imported Window Glass will depend largely upon the demand. Present quotations on Glass are as follows: American Window Glass, 1000-box lots or more, 80 and 15 per cent. discount; carloads, 80 and 10 per cent. discount; less than carloads, 80 and 5 per cent. discount. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	....	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	....	@	.03
Large Hose, ℔ ton		@	9.00
Wringer Rolls, ℔ lb.	....	@	.04½
Wringer Wire Rolls, ℔ lb.	.01	@	.02
Syringes, ℔ lb.	....	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb		10¢
Light and Tinned Copper	℔ lb		9¢
Heavy Brass	℔ lb		7¢
Light Brass	℔ lb		6¢
Lead	℔ lb		3½¢
Tea Lead	℔ lb		3½¢
Zinc	℔ lb		2¾¢
No. 1 Pewter	℔ lb		14¢
No. 2 Pewter	℔ lb		7¢
Wrought Scrap Iron	℔ gross ton,		$17.00
Heavy Cast Scrap	℔ gross ton,		10.00
Stove Plate Scrap	℔ gross ton,		7.00
Burnt Iron	℔ gross ton,		5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags	℔ lb		4 ¢
No. 2 White Rags	℔ lb		3 ¢
Mixed Rags	℔ lb	1½ @	1¾¢
Blues and Ids	℔ lb	1¾ @	2 ¢
Hard Sized White Shavings	℔ lb	2¾ @	3 ¢
No. 1 White Book Shavings	℔ lb	2½ @	2¾¢
No. 2 White Book Shavings	℔ lb	1½ @	1¾¢
Light Book Shavings	℔ lb	¾ @	1 ¢
No. 1 Mixed Shavings	℔ lb		1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @	¾¢
No. 1 Printed Books	℔ lb	1¾ @	1¾¢
Ordinary Mixed Books	℔ lb	¾ @	¾¢
Newspapers	℔ lb		½¢
No. 1 Manila Paper	℔ lb	1¼ @	1¼¢
No. 2 Manila Paper	℔ lb	¾ @	1 ¢
Bogus Paper	℔ lb	¾ @	¾¢
Common Paper	℔ lb	½ @	¾¢
Straw Chips	℔ lb	½ @	½¢
Binders' Clippings	℔ lb	½ @	½¢
Jute Butts	℔ lb		1¼¢
No. 1 Jute Bagging	℔ lb	1¼ @	1⅝¢
Mixed Bagging	℔ lb		1 ¢
No. 2 Bagging	℔ lb		¾¢
Hemp Twine	℔ lb		2½¢
Manila Rope	℔ lb		2½¢
Jute Rope	℔ lb	1¾ @	2 ¢
Mixed Rope	℔ lb	¾ @	⅞¢

Trade Notes.

HENRY ADLER, 322 and 324 West Forty-first street, New York, favors us with a neat little catalogue of Stove and Adjustable Sheet Metal Elbows, Stove Pipe, Leader Pipe, Eave Troughs, Ventilators, Chimney Caps, Leader Pipe Hooks, Gutter Braces, Charcoal Furnaces, &c., which he manufactures. The pamphlet consists of 16 pages, bound in colored paper covers. It is profusely illustrated and contains, in addition to descriptive particulars, price-lists of the goods shown.

A FOLDER furnished by the Anthony Wayne Mfg. Company, Fort Wayne, Ind., gives some details respecting the line of Washing Machines manufactured by that concern. The figures presented show a very gratifying increase in the sales of these Machines since the year 1887. In that year 5507 were sold, and in each subsequent period of 12 months the numbers sold have increased at a rapid rate. During 1891 the sales totaled 26,842, which number had increased to 39,973 in 1892. The company inform us that they have booked orders for over 41,000 Washers for the present year, and anticipate an output of at least 50,000. They have increased their facilities largely, and have placed several new machines in their factory, which enable them to turn out 200 Washers daily with the same help that it took to make 150 formerly. The Washing Machines manufactured are No. 1 Anthony Wayne Washer, with loose crate, which lifts out of the tub; No. 2 Anthony Wayne Washer, a cheaper machine with corrugated stave and bottom, and the New Western Star Washer.

WE LEARN from the Toledo Machine & Tool Company, Toledo, Ohio, that the year past has been a very prosperous one for them and the outlook for the coming season is very encouraging. During the past few weeks the company have been running their entire force on extra time to keep up with the demands for their presses and other sheet metal machines, of which they are building a large line.

BALTIMORE CHEMICAL COMPANY, Gough and Seventh streets, Baltimore, Md., call attention, in a ten page pamphlet, to the Perfection Soldering Flux made by them. The Flux is stated to be free from all the objections that apply to muriatic acid. It is put up in concentrated liquid form, and must be diluted with about two parts of water to one of Flux before using. The advantages claimed for this preparation are that it is better and cheaper than rosin or acid, costing about 1 cent per pound; that it is free from the poisonous fumes of acid, and will not injure the health of workmen using it; also that, containing no acid, it does not discolor the tin. It is specially recommended for canners' use. Samples are sent free by mail.

MERCHANT & Co., Philadelphia, Pa., have issued this year a calendar that in many ways surpasses their previous New Year greetings. It is a card some 12 x 16 inches in size, beautifully decorated in colors and bronzes. The calendar proper is very plain, tacked to the lower part of the card, while near it are illustrations of the Star Ventilator, Tiling and boxes of Roofing Plate. The text is brief, giving the name of the company and the offices in Philadelphia, Chicago, New York and London, with the legend "Guaranteed American Roofing Plates." The feature of the decoration is the French scroll

work across the top and down the side encircling the representation of an ancient war galley with the basket of fire at the bow and masthead. Nearby, in the middle of the sheet, is a modern cruiser with a search light thrown on another ship of war, showing the contrast between the methods of illuminating in the warships of the ancient Greeks and the modern Americans. The general background is blue and purple, with green water below, and the decorations near the scrolling are of several colored bronzes. Altogether it is a very artistic production.

THE MICA MFG. COMPANY, 89 Fulton street, New York, are busy on orders for Mica used for electrical purposes. This company make a specialty of colored Mica, such as is employed in connection with heating Stoves, Mica Fire Screens, &c. John O'Neil, president, has been identified with the Mica business for something over 25 years

THE NEW YORK ELBOW COMPANY of 18 Cliff street, New York, report a good demand for their line of specialties, including Elbows and the Empire Roaster and Baker. The sales for the past season are said to have been more than double those of a year ago. Their Roaster is made in four sizes of Russia iron, the arrangement being such as to give satisfactory results in operation.

AMONG OUR SPECIAL NOTICES this week is one relating to a vacancy in a Western stove company of the position of vice-president and general manager. The particulars of the business opportunity are given in the advertisement.

IN HIS HALF-PAGE ADVERTISEMENT appearing elsewhere in this issue, John Hamilton, Pittsburgh, Pa., manufacturer of Hamilton's Best Re-dipped American Roofing Plate, announces to the trade the names of the firms from whom his goods can be procured in Buffalo, N. Y.; New Haven, Conn.; Hartford, Conn.; Syracuse, N. Y.; Cleveland, Ohio; Detroit, Mich., and Davenport, Iowa.

THE RUTLAND FIRE CLAY COMPANY, Rutland, Vt., are distributing to the trade a number of colored picture cards advertising the Rutland Improved Stove Lining which they manufacture. This material is said to be made from the very best fire-resisting substance, and the lining is claimed to fit any stove.

THE ANNUAL MEETING for the election of officers of the Youngstown Stamping Company of Youngstown, Ohio, will be held on Thursday, February 9 next.

AMONG recently authorized corporations in Illinois are the following: The James Steam Cook Stove Company at Chicago; capital stock, $150,000; for the manufacture of stoves and kitchen utensils; incorporators, Will. S. James, W. W. Watron and C. S. Neelos. The Fleming Radiator Refrigerator Company at Chicago; capital stock, $100,000; for the manufacture of refrigerating apparatus; incorporators, Mathew D. Watson, George Fleming and H. M. Boreman. The Hammond Light & Power Company at Chicago; capital stock, $50,000; to furnish light, heat and power; incorporators, Marcus M. Towle, Alonzo Stephens and Frank J. Baker. Mount Carmel Light & Water Company at Mount Carmel; capital stock, $50,000; for furnishing electric light, heat, power and water; incorporators, William S. Teed, John B. Ried and Joseph H. Reynolds. The Durand Hardware Company at Durand, Winnebago County; capital stock, $10,000; for retailing merchandise; incorporators, C. A. Norton, Frank Shelk and J. N. Geary. The Johnson Giant Grip Vise Company, Chicago; capital stock, $20,000; incorporators, William Johnson, J. Charles Moore and Edward S. Curtis. The Standard Knife Works, Chicago, capital stock, $20,000; incorporators, William George F. Griffith, Randall W. Burns and George W. Underwood. The Green & Terry Harrow Company at Chicago; capital stock, $50,000; for the manufacture of agricultural implements; incorporators, W. W. Green, Francis E. Terry and Josiah Cratty. The Chicago-Topeka Light, Heat & Power Company at Chicago; capital stock, $1,200,000; to furnish light, heat and power to be produced by fire, steam, electricity, compressed air and water; incorporators, William Bruce, John G. Campbell and Cornelius V. Smith.

THE BURN STAMPING & MFG. COMPANY, manufacturers of Dairy Supplies, Lanterns and other specialties, have just completed their new factory at Chicago Ridge, a suburb of Chicago. Their main office and salesrooms are located at 66 Lake street, Chicago. W. P. Ketcham is president, John T. Dale vice-president, W. S. Burn general manager and superintendent, W. H. Burn secretary and J. R. W. Munce treasurer. Their Lantern catalogue is in course of preparation and will shortly be issued.

TAEGE BROTHERS, Arlington Heights, Ill., have just issued a catalogue of Creamery and Dairy Supplies manufactured by them. Illustrations, descriptions and prices are given of Cream Vats, Cheese Vats, Factory Weigh Cans, Factory Cans, Cream Coolers, Separator Heating Vats, Shioping Cans, Peddling Cans, Measuring Pails, Setting Cans, Dippers, Measures, Churns, Butter Workers, &c. The catalogue comprises 48 pages, beautifully printed, handsomely illustrated, and bound in a neat paper cover.

THE CHICAGO OFFICE of the Kankakee Mfg. Company has been removed to 266-268 Wabash avenue. Lakin C. Taylor, secretary and treasurer of the company, is the manager of the branch office. The company's factory is at Kankakee, Ill., where they have recently added to their line of refrigerators the manufacture of regular sideboards in great variety, and also pillar extension tables.

THE BUSINESS heretofore conducted under the firm name of Wm. Ellemund, at Sioux City, Iowa, will hereafter be continued on a larger scale by the Sioux City Steam Plumbing & Mill Supply Company, of which C. H. C. Moller is president, C. F. Rock is manager and E. P. Alford mechanical engineer.

THE LIGHTNING ICE CREAM FREEZERS, manufactured by Shepard Hardware Company, Buffalo, N. Y., will be made this year with inside parts coated with pure Block Tin, and will be supplied with their new Automatic Scraper, which was first brought out in 1892.

IN AN illustrated work devoted to the business and manufacturing interests of Syracuse, N. Y., is given a view of the works of E. C. Stearns & Co. The plant covers an area of about 3½ acres, upon which are a four-story factory 60 x 253 feet; foundry 150 x 242 feet; wood-working department 60 x 92 feet; screen frame factory 60 x 104 feet; japanning building 40 x 50 feet; pattern store house, dry lumber store house, painting department and a number of other buildings. Reference is made to their line of bicycles, which have been further perfected for 1893.

JACOB BROMBACHER'S SONS, of 30 Cliff street, New York, announce that they are now in a position to do cutting off of iron and steel in rounds and squares up to 4½ inches in diameter, and of other shapes up to 4½ x 6 inches. They are also in a position to do annealing of the most even kind for die blocks, &c., up to 24 x 14 x 8 inches.

THE YOUNGSTOWN STAMPING COMPANY, Youngstown, Ohio, call attention to the Friend Glass Oil Can, by an illustration of the Can on a card, inclosed in a neat case. The Can is referred to as one of the best, and the statement made that they also manufacture several other styles and grades. An accompanying circular illustrates their Blue Band Oil Can, made in 1, 2, 3 and 5 gallon sizes.

REFERRING TO THE CIRCULAR issued by Lalance & Grosjean Mfg. Company and St. Louis Stamping Company in regard to Onyx Ware, Hermann Aich, 43 Murray street, New York, has issued a circular under date January 16, in which he states that all Onyx Ware now being handled by him is sold in infringement of their rights by one either under assignment of these parties or otherwise. Mr. Aich adds that he carries a full line of Onyx and Blue and White Ware, and also the well-known fancy Marble Tea and Coffee Pots, with nickel trimmings. Of all these goods Mr. Aich advises us that he has a large stock.

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Metal and Miscellaneous Prices.

See Standard Lists on Following Pages.

CHICAGO, JANUARY 26, 1893.

Tin—

Straits pigs.....22½@22¾¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland and Melyn Grade	IC, 10 x 14	@ $7.00
	IC, 12 x 12	@ 7.00
	IC, 14 x 20	@ 7.00
	IC, 20 x 28	@ 14.00
	IX, 10 x 14	@ 9.00
	IX, 12 x 12	@ 9.00
	IX, 14 x 20	@ 9.00
	IX, 20 x 28	@ 18.00
	DC, 12½ x 17	@ 8.75
	DX, 12½ x 17	@ 8.75
Allaway Grade,	IC, 10 x 14	@ 6.50
"	IC, 12 x 12	@ 6.50
"	IC, 14 x 20	@ 6.50
"	IC, 20 x 28	@ 13.00
"	IX, 14 x 20	@ 8.00
"	IX, 20 x 28	@ 16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14, 14x20	@$6.00
IC, 14x20, 90 lb	@ 5.75
IC, 14x20, 100 lb	@ 5.85
10 x 20	@ 9.00
20 x 28	@12.00
IX, 10x 14, 14 x 20	@ 7.50
BV Grade.—IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—

IC, 14 x 20	@ $5.62½
20 x 28	@ 11.25
IX, 20 x 28	@ 14.25

Worcester Brand and equal.—

IC, 14 x 20	@ 6.12½@ .....
IC, 20 x 28, 12.25	@ .....
IX, 14 x 20	7.62½@@ .....
20 x 28, 15.25	@ .....

American Tin Plates

Charcoal Plates.—Bright.

Irondale, A, A.—	IC, 14 x 20	$7.00
" "	IX, 14 x 20	8.75
" "	IXX, 14 x 20	10.50
" "	IC, 20 x 28	14.00
" "	IX, 20 x 28	17.50
" "	IXX, 20 x 28	21.00

Florence.—

IC, 10 x 14, 12 x 12, 14 x 20..$7.00
IX, 10 x 14, 12 x 12, 14 x 20.. 9.00

Palma.—

IC, 10 x 14, 12 x 12, 14 x 20..$7.50
IX, 10 x 14, 12 x 12, 14 x 20.. 9.50

Each extra rose $2.00 and 20 x 28 double these prices.

Brilliant, IC, 14 x 20	$9.25
Royal, extra, IC, 14 x 20	7.25
Merion, IC, 14 x 20	6.75
Almond, IC, 14 x 20	6.50

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$9.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (No. 205), 20 x 28	@$11.50
Crescent, IC, 20 x 28	@ 12.00
" IX, 20 x 28	@ 15.00
Hickory, IC, 20 x 28	@ 13.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20 x 28	@14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.50
" IX, 20 x 28	@ 18.50
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@$21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	@23.60
Irondale A:	
IC, 14 x 20	$6.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Kensington:	
IC, 14 x 20	6.62½
IX, 14 x 20	8.12½
IC, 20 x 28	13.25
IX, 20 x 28	16.25
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
Globe, IC, 14 x 20	5.75
" IC, 20 x 28	11.50

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50
	Per box of 56 sheets.	
X, 14 x 56	29.50	16.50
XX, 14 x 56	32.50	18.20
X, 14 x 60	31.50	17.05
XX, 14 x 60	35.50	20.90

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 16	₱ lb 2 7-10¢	3 3-10¢
17 to 20	₱ lb 2 8-10¢	3 4-10¢
21 to 24	₱ lb 2 9-10¢	3½¢
25 and 26	₱ lb 3¢	3 6-10¢
27	₱ lb 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers.....13¢ net.
Patent Planished.....₱ lb A, 10¼¢; B, 9½¢ dis. 5%
Craig Polished Sheet Steel.....₱ lb 8½¢

Galvanized.

List on following page.
Juniata, or first quality.....dis. 70%

Copper—

Ingot.

Lake.....13¢ @ 13¼¢
Casting Brands.....12¢ @ 12¾¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ₱ lb additional.

Brazed Brass Tubing.

(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ₱ 100 lb.

Above 5-16 inch to 3 inch inclu	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ¼ inch	60¢
Plain, 3-16 inch	$1.00
Plain, ⅛ inch	$1.50
Fancy Tubing, Brass, to No. 20 incl	43¢ ₱ lb
Bronze Tubing, 3¢ ₱ lb more than Brass	

35 @ 40%

Roll and Sheet Brass.

List on following pages. 35 @ 40%.

Speiter—

Western Speiter.....5¢

Zinc—

600 lb casks.....6¼¢
Less than Casks, ₱ lb.....7¢

Lead—

Soft Pig Lead.....4¢
Bar.....4½@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10%

Solder—

½@½.....13¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....13¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

¼ and under, Plain	55&5@55&10%
¼ and under, Galv	45&5@45&10%
½ and over, Plain	05&5@55&10%
½ and over, Galv	55&5@55&10%

Boiler Tubes, list Oct. 24, 1892.....65%
Casing, list Nov. 16, 1892.....52½%
Inserted Joints Casing, list Nov. 16, 1892.....47½%
Steel Boiler Tubes.....27½%
Cold Drawn Seamless Steel Tubing...50%

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv'd Spiral Riveted.....55%
Austin's Corrugated.....60%
Gordon & Gilbert's Corrugated.....55%
Ritchie's (Galv. Iron only) Cor'd.....55%
Ritchie's Spiral Lock Seam, Galv'd..50%
Austin's Spiral Ribbed Pipe.....55%
Plain Adjustable Elbows.....55%
James A. Miller Bros. (Galv'd Iron only) Corrugated.....55%

Steel Roofing—

Perfection.....$3.75 square
Climax.....$3.50 square

Metallic Shingles—

Cushman's.....$1.25 squar

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	₱ lb, 2 ¢
" " Brown	₱ lb, 1½¢
" " Purple	₱ lb, 2½¢
" " Ground in oil, B. Red	₱ lb, 6½¢
" " Ground in oil, Red	₱ lb, 6½¢
" " Ground in oil, Brown	₱ lb, 5½¢
" " Ground in oil, Purple	₱ lb, 6 ¢
Linseed Oil, Boiled, in bbls	51¢
Linseed Oil, Raw, in bbls	48¢
Mineral Paints	2@4¢
Orange Mineral	10½¢
Pure White Lead in Oil	6½@7½¢
Dry White Lead in bbls	6¼@6½¢
Red Lead, American	7@7½¢
Red Venetian, English, dry	$1.60@$1.70
Red Venetian in oil; asst'd cans, 8½¢; kegs	7½¢
Spe's Japan Oil, in bbls, ₱ gal	34¢
Spirits Turpentine, in bbls., ₱ gal	37½¢
Asphaltum, Trinidad Refined, ₱ ton	$45
Coal Tar, Felt, 1 Ply, ₱ 100 lb	$1.25
Coal Tar, Felt, 2 Ply, ₱ roll 108 sq. feet	$1.50
Coal Tar, Felt, 3 Ply, ₱ roll of 108 sq. feet	$2.00
Roofing Pitch, ₱ bbl. of 300 lb	$3.25

NEW YORK, JANUARY 27, 1893.

Aluminum—

Guaranteed over 98½% pure.....₱ lb .75
Guaranteed 94@98½% pure.....₱ lb .65
Lots under 100 lb 5¢ ₱ lb additional.

Antimony—

Cookson.....₱ lb, 12¼¢
Hallett's.....₱ lb, 10¼@11¢

Brass—

Planished—

List on following page.....net

Roll and Sheet—

List on following page.....35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per lb.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above 3 inch	45
Plain, 5-16 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu	43

35&40%

Copper and Bronze Tubing—

3¢ ₱ lb more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c.

Over ¼ to 3¼ inches inclusive.....17¢ ₱ lb
Over 3¼ to 5 inches inclusive.....18¢ ₱ lb

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3¼ inches inclusive.....18¢ ₱ lb
Over 3¼ to 5 inches inclusive.....19¢ ₱ lb

Conductors—

Corrugated. Round or Square—

Lists on following page.
Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—

List on following page.
Galvanized.....50%

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.

List on following page.....10¢ 0%

Ingot.

Lake.....13¢
Ansonia Grade Arbuona.....12¼¢
Ansonia Grade Casting.....11¾

Planished.

List on following page.....net

Sheet and Bolt.

List on following page.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

Soldering Coppers.....₱ lb, 18¢@21¢
Covert's Adjustable, list Jan. 1, 1893.....30&2%

Eave Troughs—

List on following page.
Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

List on following page.
Lap or Slip Joint.....list, net

Elbows—

List on following page.

Flain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing.

Re-Tinned or Galvanized.....35%

Elbows and Shoes—

List on following page.

Flat Crimp.

Tin.....35%
Galvanized.....25%

Corrugated.

Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—

Black.

	Common American.	R. G. Cleaned American.
Nos. 10 to 16	₱ lb, 2¾¢	3¾¢
Nos. 17 to 20	₱ lb, 3 ¢	3¾¢
Nos. 21 to 24	₱ lb, 3½¢	3¾¢
Nos. 25 and 26	₱ lb, 3¾¢	3¾¢
No. 27	₱ lb, 3¾¢	3¾¢
No. 28	₱ lb, 3¾¢	4¢
American B. B	₱ lb, 4¢@4¼¢	

Russia, Planished, &c.

Genuine Russia, assortment.....₱ lb, 12@13¢
Patent Planished.....₱ lb, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....₱ lb, 8¾¢

Galvanized.

	B. B.
Nos. 10 to 16	₱ lb, 4 2-10¢
Nos. 17 to 22	₱ lb, 4¼¢
Nos. 23 to 24	₱ lb, 4¾¢
Nos. 25 to 26	₱ lb, 5¢
No. 27	₱ lb, 5¼¢
No. 28	₱ lb, 5¾¢
Nos. 29 and 30	₱ lb, 6½¢

Lead—

American Pig.....4½¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....16¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....27¢, 20%
Old Lead in exchange, 3¾¢ ₱ lb.

Pittsburgh Prices.

Lead Pipe in whole coils, ₱ lb, 05¢, 10&5%
Sheet Lead in whole coils, ₱ lb, 05½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Door Mats, Galvanized	25%
Window Guards, Paneled	15%
Tree Guards, Paneled	15%

Mitres, Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.—

Dry Yellow Ochre	1¾@3
Dry Venetian Red	1¾@3
Linseed Oil, Boiled, in bbls	48¢
Linseed Oil, Raw, in bbls	51¢
Brown Metallic Paint	1¾@3
Red Lead, American	7½¢
Pure White Lead in Oil	7½¢
Red Venetian, English, dry	$1.65@$1.70
Red " in oil, ass'd cans, 11¢; kegs, 8¢	
Spirits Turpentine, ₱ bbl	30¢
Asphaltum, Trinidad Refined, ₱ ton	$30.00@$35.00
Asphaltum, Rock, ₱ ton	$14.00
Coal Tar Felt, 1 Ply, ₱ lb	2¢
Coal Tar Felt, 2 Ply, ₱ roll 108 sq. ft	$1.42½
Coal Tar Felt, 3 Ply, ₱ roll 108 sq. ft	$1.85
Roofing Pitch, ₱ bbl	$3.24
Plumbago, E. L., Po., ₱ lb	4@6¢
Plumbago, Turkeyfoot, ₱ lb	6@10¢
Plumbago, Gunpowder Glazing, ₱ lb	10¢
Plumbago, Shot Polish, ₱ lb	10¢

Pipe, Drain—

List on following page.....50%

Pipe and Fittings, Cast Iron Soil—

List on following page.
Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive.....60@60&10%
Other sizes.....55@55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 inches.....60@60&10%
Other sizes.....55@55&10%

Pipe, Spiral—

List on following page.

Galvanized	60%
Tin	60%

Pipe, Wrought Iron—

List on following page.

¼ and under, Plain	55&"@55&10%
¼ and under, Galv	45&5@45&10%
⅜ and over, Plain	05&5@65&10%
⅜ and over, Galv	55&5@55&10%

Boiler Tubes, list Oct. 24, 1892.....65%
Casing, list Nov. 16, 1892.....52½%
Inserted Joints Casing, list Nov. 16, 1892.....47½%
Steel Boiler Tubes.....27½%
Cold Drawn Seamless Steel Tubing...50%

THE METAL WORKER.

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Pipes in Buildings.

In a building recently inspected, every pipe, whether for steam, water or gas, was entirely uncovered, and every part of every pipe was accessible for examination or repair without disturbing a wall, floor or ceiling. The pipes did not look badly either; nor were they apparently at all in the way of furnishing, or calculated to interfere with any of the purposes for which the building was erected—namely, for stores in basement and in first floor and offices in the stories above. The treatment of these pipes in finishing them had entered into the general design of decoration, and the effect, though perhaps a little odd at first, like that of a new style of hat, was really quite good when one got a little used to it. There appears to be a growing tendency, at least in buildings erected for business purposes, to render pipes more accessible from the interior of the structure than was formerly the practice, and there are several very good reasons for adopting this method. A pipe may spring a leak. If in plain view the leak is likely to be discovered before any very serious damage results, whereas, if concealed, water may be discharged in quantity sufficient to do considerable mischief before it is known that a leak has occurred. Long channels formed in brickwork in which riser pipes are placed and then covered over, form flues through which foul gases, if any escape in the cellar, rise at once to permeate all parts of the building. If the pipes be cold, as for conveying water or gas, this action may be slow, being effected by diffusion only, but if steam pipes are placed in such channels an immediate circulation upward is set up, the heated air rising and escaping through spaces around radiator connections, &c., and this action constantly carries up any escaping gases from the cellar with the utmost neatness and dispatch. Pipes have hitherto been hidden, for the most part, because they are unsightly things, but if it be really better from a sanitary or an economic point of view that they should be exposed, architects must grapple with the problem of making them tolerable to refined taste, as has been done with gas fixtures and electric lighting appliances.

Heating Greenhouses.

No observing person who has traveled much in this country during the past 10 or 15 years can have failed to note the rapid increase in the number of greenhouses. He might very naturally attribute this to improvement of the general financial condition of the country and the accumulation of wealth that enables more people to gratify their individual tastes than was possible in the earlier history of our country, and, doubtless, this is one cause. But another more potent influence upon the erection of such structures is that they have been found very profitable when applied to the cultivation of plants, fruits and vegetables for market. The old saying that "money makes the mare go" applies to the business of building and heating greenhouses, the large majority of which are wealth accumulators, instead of simply means for spending surplus funds. The growing of grapes under glass has become a large and profitable industry. Tomatoes in considerable quantities raised in greenhouses begin to reach the New York market in midwinter, and sell here at prices per pound that could not be obtained for half a bushel of them raised in the open air in summer and marketed in autumn. The same holds good for rare flowers and early vegetables. The large prices paid are not always merely fancy prices. Some fruits and vegetables are improved by growing them in this manner, as notably tomatoes, which acquire a peculiarly fine flavor by this treatment. It has been well recognized by those who build and heat greenhouses, as well as those who carry them on for business purposes, that their profits have been rendered possible by improved systems of heating, wherein portable, automatically regulating heaters, carrying sufficient fuel to maintain their action during any interval of time likely to be required, maintain a uniform temperature; and also by improvements in the construction of buildings themselves, notably consisting in the use of lighter framing, larger glass, and lower, flatter roofs than were formerly in vogue. Specialists have given the subject great attention, and there are now architects who confine themselves almost wholly to this branch of building. The more extended employment of steam for heating greenhouses, due to the supply of boilers with ample fuel-carrying capacity and automatic regulation, has possibilities now that did not exist 20 years ago; and the use of small wrought iron piping has much cheapened the cost of heating apparatus for this use.

Patents in Great Britain.

The record of applications for patents in Great Britain and Ireland during the year 1892 shows that the progress of invention in that country, noted annually since 1883, still continues. The number of applications in the past year was 24,166, a total much exceeding that of any previous year, and greater by 1278 than that of 1891. This constant advance shows a remarkably healthy enterprise among British inventors. In commenting on these figures the London *Times* makes the following remarks: "It is evident that inventive energy is in no danger of decay, and there is no indication that a maximum in the number of a year's applications has been reached." The chief event of 1892, in connection with patent work in England, was the reduction granted by the Board of Trade in the sums payable for renewal of patents. This gave material relief to many patentees, and still left to the Patent Office a handsome surplus of receipts over expenditure, amounting to over $500,000. In noting the above totals we should be curious to know how far the increase may be due to applications from American inventors. This must be a very material factor nowadays, when so many of our patentees register their inventions in Great Britain and other foreign countries.

American Inventors.

In turning to the figures presented by our own Patent Office for the year 1891—the latest for which we have a report—we find that the condition of invention in the United States compares very advantageously, as regards the number of applications for patents, with that of Great Britain. The number of applications recorded for the year in question was 40,552, or more than 60 per cent. larger than the British total for the later year. This is only what might be expected. Conditions and circumstances in this country are much more favorable to the inventor than is the case in the older and calmer atmosphere of Europe. Invention and adaptation are among the leading characteristics of the average American, the striving after better methods in manufacture, labor-saving devices, and every means which shall add to the comfort of every-day life and to the celerity of business. He is un-

trammeled by precedent, and generally possesses a nimbler brain than his fellows in the old world, although perhaps he may, with some notable exceptions, be somewhat lacking in the patient research and plodding application which lead to great discoveries. The limitless scope possessed by Americans in the region of invention, and the results already achieved, are, however, fully appreciated across the water. "An American invention" has become the household word for anything novel or ingenious, whether it be really so or not. The term has an irresistible attraction for the European mind, and people the world over are beginning to look upon the United States as the natural home and stronghold of inventive genius. From the Patent Office reports it would appear that American inventors are determined to hold the pre-eminence which they long since achieved.

The Panama Canal Failure.

The daily press has lately devoted much space in its foreign news columns to the affairs of the ill fated Panama Canal and those connected with it. An investigation into the disposal of funds intrusted to the company which promoted the work has been followed by the arrest and imprisonment of the directors and others interested in the enterprise—including several world-renowned names—and their arraignment on criminal charges. Facts have been unearthed by the Committee of Inquiry charged with this duty, which throw light on a wholesale system of bribery and corruption, and a scandalous waste of treasure which accompanied the entire proceedings from first to last. The revelations made and the voluntary confession of one or two of the principal actors necessitated the dismissal of a number of members of the French Government, who are said to have been implicated in or cognizant of the crooked methods of the company. Numbers of members of the French Senate and Chamber of Deputies are accused of receiving bribes and will be tried for that offense. In fine, France—and, indirectly, all Europe—has been stirred to its depths. The failure of the gigantic undertaking of the great engineer, to whom the world owes the Suez Canal, has brought ruin and misery upon tens of thousands of French homes—for the money was mainly procured in that country. Funds to meet the heavy expenses of the work were raised by every conceivable means, including a great lottery scheme. Shares in the enterprise were subscribed for mainly by the middle classes and the less wealthy portion of the French people. Thrifty agriculturists, small traders and petty capitalists invested the savings of years—often literally hoarded in a stocking—in what they believed to be a certain method of fortune making.

Disposal of the Funds.

The money was fooled away in the purchase of costly machinery of all kinds, most of which is now lying rusty and useless on the Isthmus of Panama—squandered in ridiculously expensive contracts, paid out in bribes and commissions, and expended on labor which was never performed. Thousands of lives were wasted, and after eight years of work the company found themselves with barely half the work accomplished and their coffers drained empty. Some $300,000,000 had been expended between 1881 and 1889, when operations were suspended; and it was calculated that as much again, or more, would be required to carry the canal to completion. This there was no possibility of obtaining, and now all the treasure and loss of life has gone for nothing. For four years the works have been idle, machinery and material spoiling in the moist, hot climate of the Isthmus, and much of the work that was accomplished is being undone by nature. The canal was planned to be 46½ miles long, straight across the Isthmus of Panama, having a depth of 25 feet and a width, at the surface of the water, of 124 feet. The plan necessitated the construction of eight immense locks to obviate the difficulty of a higher sea-level on the Pacific side. It is difficult to see how this factor could have been overlooked—as it was overlooked—by the engineers charged with the task of prospecting. This failure on their part involved entire change of plans and a consequent heavy expense. The whole tale is one of foolish carelessness of consequences and want of proper caution and control on the part of M. de Lesseps, and of gross mismanagement, corruption and duplicity on the part of the other managers of the enterprise which is not pleasant to contemplate.

Flue-Devils.

No, it is not a mistake of the printer; it is *flue*-devils, not *blue*-devils, that have prompted this present writing. Surely of them it may be said, quoting from Poe:

> They are neither man nor woman,
> They are neither brute nor human;
> They are ghouls—

those beings who go about the earth and through apparent malice aforethought throw fiendish obstacles in the way of the contractor for the erection of heating apparatus. For really it stretches charity to its limit of elasticity to attribute some things found in the construction of flues to ignorance. Yet some say it is want of knowledge which underlies the construction of chimney flues, of ventilating flues, of warm air ducts, &c., that so frequently bring the heating engineer to the verge of insanity, not to say profanity; the first being a misfortune which, if peculiar to business of a harassing kind, ought to be prevalent in the heating trade; the second being a vice which only the inherent virtue of stovemen and the heating fraternity generally could hold in check under the vexations and exasperations that beset them. Could it be ignorance, or was it not rather malignity that constructed a chimney flue 16 x 16 inches at the top, and for 10 or 12 feet from the bottom contracted it to a 4 x 16 inch flue? Yet this was actually done. Is it want of sense or want of conscience that leads an architect to provide a couple of 8 x 8 inch flues for a building that needs 2800 square feet of low pressure steam radiating surface to warm it in zero weather? Yet this was done and the building, a handsome structure, was erected to the pinnacle, and great was the disappointment of the owners thereof when decorated walls and floors and ceilings had to be mutilated to supply what they had guaranteed to furnish the heating contractor—good and efficient chimney flues. Their architect had assured them the flues were sufficient and he stuck to the assertion, though no honest man in the heating trade could be found who would confirm it. Why, even the colored boy blacking stoves on the second floor back of the shop knew those flues were not large enough. Could it be want of brains, want of thought, or want of an immortal soul that led another architect, when a chimney flue of 196 inches area was required, to cunningly make this flue 6 x 36 inches so that it would not interfere with some features of his design (save the mark, unless his design was to make all the trouble he could to those who employed him, and all others employed upon the structure)? Yes, this was done; it almost staggers belief, but it's a cold fact all the same. We could tell, also, of other misconstructions that would seem incredible to intelligent men who have not had their faith yet shattered all to bits by experience in the heating business; but this will do for one dose. Some time, when the reader gets to feeling too confident in his bright future as a heating engineer, and is feeding his self-esteem a little too fat over a successful job, thinking that after such a piece of work he never need fear any more trouble, another potion of the same sort of emetic may be good to administer for his health.

Shop Stories.

IN THE POETRY LINE.

Our kids felt so highly elated over their enlarged week's earnings last Saturday night, they decided to go and hear Bill Nye. The effect on Frank and Bill is almost startling. Apparently they think everything should serve some good purpose, and after listening to Bill Nye's famous poetry, "Autumn Leaves," and believing it worthy of imitation, have handed in the following sample of winter poetry. Here it is *verbatim spell-at-im*:

THE PLUMBER.

A la Bill Nye.

Tune, "Autumn Leaves."

The water pipes is freezin',
Freezin' mighty tight;
Freezin' in the day time,
Also after night.

The water pipes is bustin'
Bustin' all around,
Bustin' in the kitchen,
Also underground.

The plumber he is happy,
Happy all the day,
Mending pipes by candle light,
Also the other way.

The cook is happy too,
Happy now for aye;
The water back, it busted,
And she has gone to stay.

Bill thinks the last verse should read:

The cook is happy now,
Happy, too, forever more;
The water back exploding,
Blew her out the door.

Mr. Editor, do you think there is anything seriously the matter with either of these boys?

SWIPED JOINT.

COPPERSMITHING.

ART OF COPPERSMITHING.

XXXIX.*

BREWING COPPERS OR KETTLES.

Large brewing coppers are made in several different ways; the accompanying illustrations give three of the styles most per proper to hold 50 and the light course to hold 50 barrels also. The coppers may be made in any proportions to suit the place they are to occupy; that is, they can be tall or squat, as the room can be spared, because the copper, in consequence of its bulk, together with the brick work necessary for the furnace, takes up considerable room, and therefore is usually the dimensions required for the sides and bottom. Then the top diameter of a 106-gallon kettle measures 38 inches, and $\sqrt[3]{38} = 54{,}872$ inches, and as a barrel (English) contains 36 gallons, therefore 50 barrels contain 1800 gallons, and $1800 \div 106 = 16.981$, or the number of times 106 gallons is contained in 50 barrels. We now

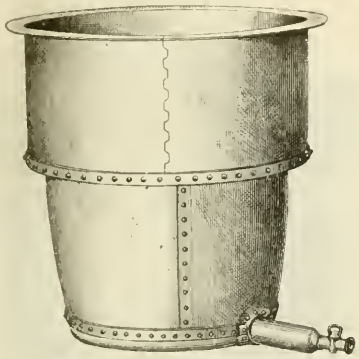


Fig. 444.—Open Copper, with Light Course.

Fig. 445.—Sketch Illustrating Shape of Coppers.

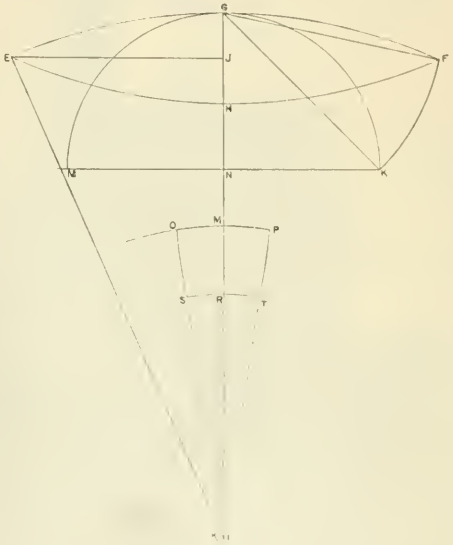


Fig. 446.—Diagram Used in Calculating Patterns.

Fig. 447.—Hollowing Tub.

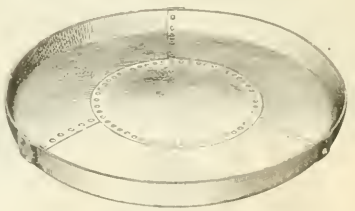


Fig. 448.—Four-Piece Bottom.

in use, and will, I think, be sufficient for our purpose.

Fig. 444 is an open copper with a light course; that is, an addition to the copper proper, to enlarge its capacity and lessen the cost, the light course being made of lighter material than the copper proper, and yet of sufficient strength, as it is usually supported by brick work built around the course nearly or up to the brim. Let us build one of these large coppers with a light course, and let it hold, say, 50 barrels in each course; that is, the copplaced in some convenient position, as much out of the way as possible.

In an early chapter it was shown that the usual proportion for a copper to hold 106 gallons is, top 38, bottom 33½ and depth 28, so we will make our proposed 50 barrel kettle in the same proportion, and then add the light course to it. Now all vessels of capacity are in the triplicate ratio; that is, comprise length, breadth and thickness, or their capacity is found by multiplying these three dimensions together.

Therefore we will take the diameter at the top as the basis by which to obtain multiply the cube of 38, or 54,872, by 16.981, the number of times 1800 gallons contain 106 gallons, which gives us 930,781.432, and then extracting the cube root of this last result we get 97.63, or the top diameter of a copper to hold 50 barrels, which, in practice, we should call 8 feet 2 inches. Here then we have the first dimension of our proposed copper, 8 feet 2 inches. We will now proceed to obtain the other two dimensions by proportion, thus: Taking the dimensions of our 106-gallon vessel, as stated, top 38, bottom 33.5, and depth 28 inches; then 38 : 33.5 :: 97.63 : 86. Again, 38 : 28 :: 97.63 : 71.938. From

* Copyrighted, 1889, by John Fuller, Sr.

this, then, we find the three dimensions of a 50-barrel copper to be: Top, 97.63; bottom, 86.068, and depth, 71.938, which we should call 8 feet 2 inches top, 7 feet 2 inches bottom and 6 feet deep. We must now have the pattern for the sides, which we will proceed to get. By referring to Fig. 445, it will be seen that a copper is a part of the middle zone of a circular spindle; that is to say, the body of which it is a part is generated by the revolution of the segment of a circle, and up of a number of pieces, as in the case of large coppers. Then as stated: The depth of the copper is one-half the chord of the arc AB, and is 71.938 inches, and the versed sine of the arc AB is one-half the difference between the diameter of the top and bottom, which is $\frac{11.57}{2}$ or 5.785.

$$\frac{71.938^2}{5.785} + 5.785 = 450.176,$$

the radius E I, 203.611, or E J, which is one-half the length of the spindle, and

$$\sqrt[2]{851.538 \times 48.815 + 48.815^2}$$

$= 209.586$, or G F.

But G F = G K, therefore

$$\frac{\sqrt[2]{851.538 \times 48.815 + 48.815^2}}{2}$$

$= 144.91$, or K N the radius the inside

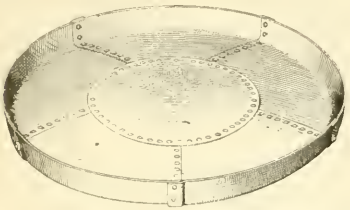


Fig. 449.—Six-Piece Bottom.

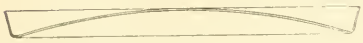


Fig. 450.—Sectional View of the Bottom Crown, Shaped Ready for Sides.

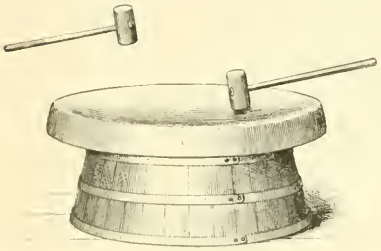


Fig. 451.—Sinking Bottom in Hollowing Tub.

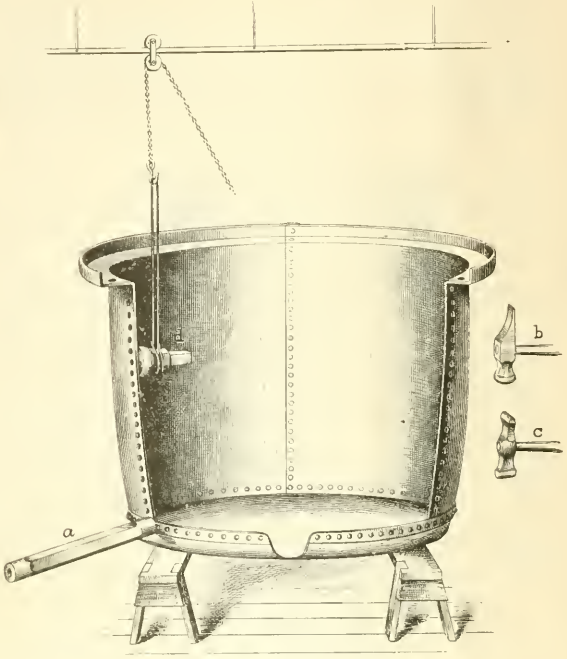


Fig. 453.—Copper on Trestles.

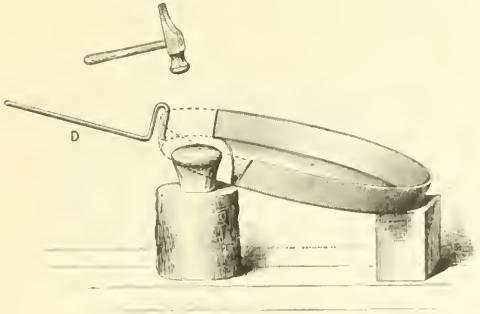


Fig. 452.—Planishing Bottom.

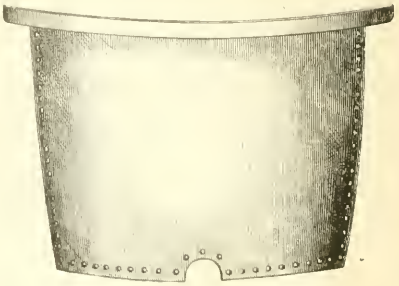


Fig. 454.—Side Ready for Riveting.

ART OF COPPERSMITHING.

the versed sine of the segment is one-half the diameter of the copper at the brim. Without a knowledge of the properties of the circular spindle, we can at best only make a good guess at what the pattern should be.

The illustration here given shows two coppers with their brims placed together, and then the outline of the spindle completed. This when carefully and intelligently performed gives the key for cutting the sides of all bellied vessels which are built

Fig. 446, of the circle of which the curve of the spindle (that is, the sides of the coppers from top to bottom, or from A to B) E A B F is a part. The diameter G H at the center of the spindle is 97.63; then one-half G H, or $\frac{97.63}{2} = 48.815$ or the versed sine G J of the arc E G F, Fig. 446, and $450.176 \times 2 - 48.815 = 851.538$; then $\sqrt[2]{851.538 \times 48.815} =$

M G K; whence K M is 144.91×2, or 289.82; that is, 24.15 feet is the radius of the curve at the brim edge of the pattern, and $289.82 - 71.93 = 217.89$, or 18.157 feet, is the radius for the arc S T at the bottom edge. Again: $\frac{97.63 \times 3.1416}{6}$ $= 51.1424$, or the versed sine of the arc of the circle of which curve the side edges must be cut before hollowing in the hollowing tub, Fig. 447, ready for placing in position for riveting—that is, when the

$\frac{2}{203.611}$ sides are in three pieces. Then $\frac{}{51.1424} +$ 51.1424 = 812.78, or the diameter in inches of the circle of which the curve of the two edges are a part or must be cut before hollowing.

Therefore $\frac{812.78}{2} = 406.39$, or 33.8658 feet, for the radius of the two side edges of the pattern. Here, then, we have three pieces or sides in the small sketch, Fig. 446, 102.2383 from O to P, 71.93 from M to R, and 90.059 from S to T, with a radius of 33.8658 feet for the curve of the side seam edges, and a radius of 24.15 feet for the curve at brim, and 18.157 the radius of the curve at the bottom.

These dimensions are, of course, all bare —that is, nothing allowed for the seams or the brim which must be left on to suit the rivets which are to be used in the side seams and the width of the brim required for the light course, a part of which would be taken from the depth, as the side would not reach the lag of the bottom by some 2 or 3 inches, for which allowance must also be made. We now come to the bottom. To-day they may be had already milled up in one piece at any size or strength up to 15 feet in diameter. But when I was a boy there was no machinery then in existence of such capacity; hence it was necessary to make large bottoms by hand in four, five and sometimes more pieces, Figs. 448 and 449. But we will suppose that we have the bottom supplied to us in one piece, and let it be 7 inches deep. Now, the first thing is to put the bottom in shape for planishing—that is, form the crown, as shown in Fig. 450, by hollowing in the hollowing tub. This hollowing tub, Fig. 447, as we call it, is a wooden ring like a washtub without a bottom, made of oak staves about 2½ inches thick, about 2 feet high and from 3 to 4 feet in diameter, taper, and supported by three stout hoops, which are bolted to their places after the wood has shrunk sufficiently. The bottom is laid over the tub bottom side up, Fig. 451, and two men with large mauls or hammers sink the bottom in the tub, while another man guides the bottom on the tub with the iron dog D, shown in Fig. 452. When the bottom fits the template it is turned the right side up and the planishing is begun, which is done as shown in Fig. 452. A suitable large head is placed in a block and the bottom is then smeared all over on the outside with wet plumbago, also the surface of the block on which the bottom rests, so that the bottom will slide about with ease while the planishing is going on. The inside is rubbed all over with either wet or dry Spanish brown, so that the blows may be plainly seen. When the planishing has been completed, the bottom is placed on two or more suitable trestles, Fig. 453, and after marking the holes the proper distance apart, the rivet holes are punched in the bottom with a punch placed in a chisel rod and the hammer *b*, while a man holds a bolster *a* on the outside (the bolster *a* explains itself). Then all three sides, which have been previously prepared—that is, bellied or hollowed and planished, Fig. 454—are placed in position and secured with bolts. Then the head is taken out of the block and put into a sling *d*, Fig. 453, and one man holds the head in position inside while two others, opposite each other outside, work in the rivets, first with long handled cross-peined hammers *c*, and finishing with hammer *b*. The light course is now prepared, the sides of which may be brazed or riveted together, as desired, when, after planishing, the holes are punched in the bottom edge, and then the course is set in its place on the copper brim and the rivet holes punched through the riveting edge into a small bolster and the rivets worked in with short-handle hand hammers. The pipe or outlet is next worked in and all finished up complete.

The same methods which are here described may be used for building a vessel of any number of pieces in the side or of any shape. In Fig. 455 is shown a large open copper, with a light course, completed ready for use, and about to be set in its future resting place. This vessel was built in 1891 by Messrs. Shears & Co. of Bank-side, London, and is said to be the largest copper ever built in England. It has a capacity of 36,000 English gallons. This large vessel was built for Ind, Coope & Co. The reader can get an excellent idea of its construction, as well as its immense size. The size of the rivets should be noticed, the proportion of the copper proper to the light course, and then the three iron bands placed around the light course to strengthen it. This is a very interesting and instructive illustration for those engaged in this kind of work.

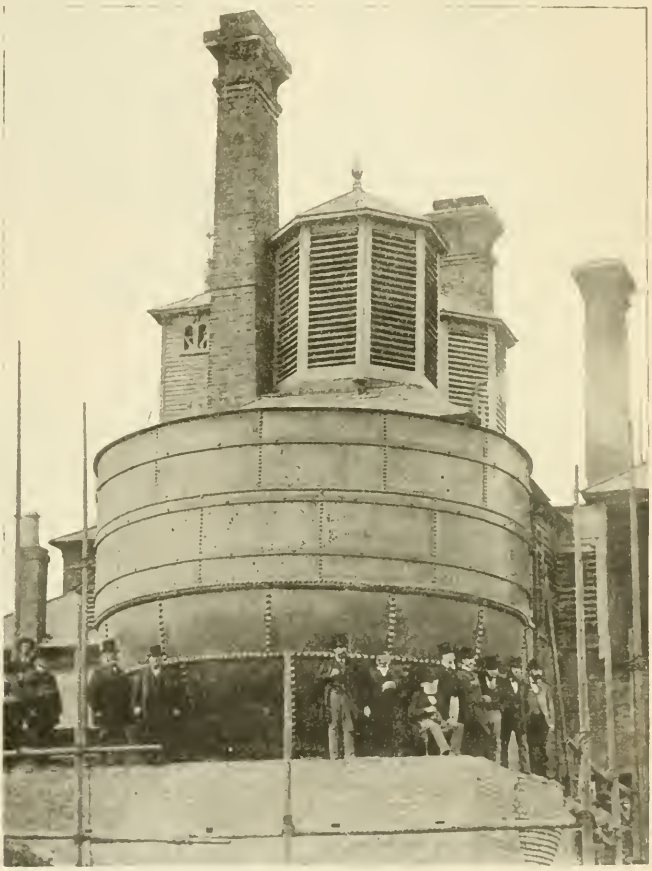


Fig. 455.—Large Open Copper with Light Course.

ART OF COPPERSMITHING.

It is not disputed that New York is a growing city. In the building line there were upward of 100 plans filed at the Building Department each of which involved an expenditure of $100,000 or over; there were three where the expenditure was $700,000, and in 14 instances the amount was not less than $300,000. Lofty dwellings and flats were a leading feature. The total cost of new buildings projected in 1892 was $59,000,000 as compared with $56,000,000 the year before, and the number of buildings was nearly 3000, a moderate increase over 1891. Among structures completed the Havemeyer building, fifteen stories high, is the giant. Among those who have engaged suites for terms of years in the latter are the Consolidated Wire Works Company, the National Tube Works Company, the Delamater Iron Works and the Westinghouse Air Brake Company.

The foreign trade of the United Kingdom in 1892 shows very unfavorable changes when placed in comparison with the figures for the previous year. The imports of merchandise show a decrease of $57,420,325. In the exports of British goods there is also a very large decrease, amounting to $98,181,277, but the re-exports of foreign goods display an increase of $12,671,324. In the total values handled there is a reduction of no less than $142,930,078. The excess of imports of merchandise has risen to $644,478,061, an increase of $28,089,428.

THE LETTER BOX.

Lengths of Wrought-Iron Pipe.

From A. J. J, *Trout Creek, N. Y.*—I wish to ask if it is possible to have wrought iron gas or water pipe made of a standard length? As it is now, in having different lengths, a great deal of extra work is made for one that retails pipe.

Answer.—From the needs of manufacture, wrought-iron pipe is not made in exact lengths. A margin of from 12 to 18 inches is usually given to a rolling mill on which to work the skelp. Should an exact length be desired, the loss on account of crop ends and scrap would considerably increase the cost of the pipe. Moreover, consumers prefer random lengths, as being more convenient for general purposes. Sometimes a buyer wants 120 feet of pipe, and at another he may wish for only 18 or 16 feet, and is better pleased if he can obtain a length that practically meets his requirements. We are informed, too, by one of the largest concerns manufacturing this material that in various sections of the country different lengths are preferred. Throughout the Middle, Western and Southern States, for instance, purchasers take as long lengths as possible in order to avoid a multiplicity of connections, while the Eastern trade, who are obliged to handle their pipe on trucks in the narrow streets of the cities, refuse to receive it beyond a certain length. Consequently, no arbitrary standard has ever been adopted, although manufacturers are always ready to furnish pipe in exact lengths at an advance of about 5 per cent. on the price of random lengths in order to cover the loss in scrap. The lengths which obtain in the various kinds of wrought iron pipe are: For butt weld, which includes the smaller sizes, from ⅛ inch up to 1¼ inches, 13 to 16 feet, and lap weld, from 1½ inches upward, 18 to 20 feet, although special furnaces can turn out the latter variety as long as 26 feet.

Pin-Holed Copper.

From T. F. M, *Coteau Landing, Quebec, Canada.*—I send you a piece of pin-holed copper which I took off a drainer that had been used to catch drippings under a beer pump for about five years.

Note.—In *The Metal Worker* of April 16, 1892, we printed some remarks on the question of pin holes in copper, in reply to two correspondents who had written to us on the subject; but no conclusion was reachable in the matter at that time, nor has any adequate explanation of the phenomenon been received since then.

The piece of metal forwarded by our correspondent is a circular disc of 14 or 16 ounces copper, 5½ inches in diameter, containing five ¼-inch holes, for drainage, in the center. The whole of the under side, except the small space surrounded by the drainage holes, is more or less pitted, and perforated in about 40 places with pin holes, varying in size from ¼ inch to a mere speck. A general corrosion of the surface would, in this case, be naturally attributable—especially after five years' use—to the action of the beer. But this would not satisfactorily account for the manner in which this specimen has been become pin-holed.

As we pointed out in our former notes, one theory which has been advanced to account for the appearance of pin holes, is that in rolling the copper it was not kept perfectly clean, and small specks of oxide got into the surface, which became eventually centers of corrosion on being acted upon by acids or gases existing in the liquid or air with which the metal comes in contact. This is the most plausible explanation in the present case. Another theory was that acid was left on the sheet before tinning; but this reason will not apply here, as the perforations occur on an untinned surface.

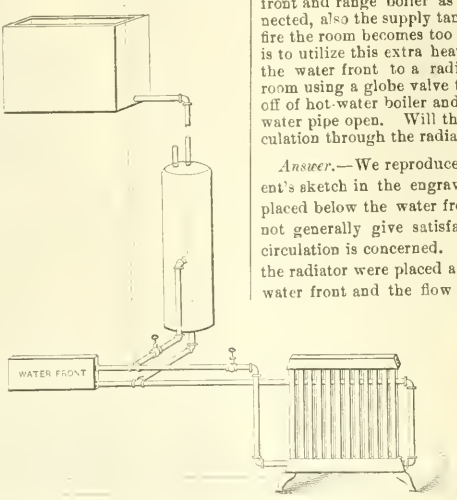
Material for Gutter.

From E. F. B., *Greenville, Pa.*—I saw in *The Metal Worker* of January 7 a request from "W. D. M." for the best method for lining gutters. Having used all the materials now made except aluminum, 35 years' experience has convinced me that a good quality of IX bright tin, locked together and well soldered with strictly half and half solder, is the best. There should be three coats of paint on the underside of the tin, and the tin should be put in without any buckles and laid with good drainage. The front of the gutter should be fastened with nails and an edge turned on the back and held on flat cleats. The seam should be flattened down to allow for expansion and the gutter given three coats of good paint.

Radiator Below Water Front.

From S. H. J., *Sumner, Iowa.*—I wish to ask through the columns of *The Metal Worker* if the proposed plan, as shown in the inclosed drawing, would prove a success. The drawing represents the water front and range boiler as I have it connected, also the supply tank. With heavy fire the room becomes too warm. My idea is to utilize this extra heat by connecting the water front to a radiator in another room using a globe valve to shut the water off of hot-water boiler and leave the cold water pipe open. Will this give me circulation through the radiator?

Answer.—We reproduce our correspondent's sketch in the engraving. Radiators placed below the water front as shown do not generally give satisfaction so far as circulation is concerned. If the bottom of the radiator were placed above the top of water front and the flow and return pipe between back and radiator connected up without traps, satisfactory circulation will be attained. The valves may be placed as shown by our correspondent, but care should be taken not to leave the two valves shut at the same time, because such an occurrence would cause steam and water to be blown into the supply tank or steam might be produced in water front to the extent of allowing it to become overheated.



Radiator Below Water Front.

A Word for the Hot-Air Furnace.

From W. F., *Pennsylvania.*—There is no subject that needs to be brought before the people more constantly than ventilation, and it is marvelous that so little attention is given to it. It seems to me that every effort should be used to educate the public in this direction. In my opinion the furnace is a much-abused article. If properly put up and of greater capacity than is ordinarily needed, so as to insure a surface moderately heated, together with an abundant supply of outside air through

a clean channel and the house in which it is placed properly ventilated, I believe it will give results as near perfection as possible. Of course these same ends may be reached by indirect water or steam heating, but I think a furnace, especially for private dwellings, is the best.

Note.—It is not very often that any of our readers furnish us their ideas on the relative merits of the different systems of heating. There is a great deal to be said in favor of the hot-air furnace, and we wish that other of its advocates would send us their ideas. At the same time, if any of the adherents of steam and hot-water boilers are radically opposed to the furnace principle we would like to have their reasons. In other words, a discussion of the relative merits of the different systems of heating would be both interesting and instructive.

Painting Conductor Pipe.

From I. F. G., *Lebanon, Pa* —In reply to the communication of "G. R. C.," Mansfield, Pa., on painting conductor pipe, that appeared in *The Metal Worker* January 21, I will describe the plan I have followed the past few years. I paint one side of the sheets before cutting, using the painted side for the inside. To a gallon of raw linseed oil (never use boiled oil) I add ½ pint each of the best japan dryer and turpentine, mixing with the finest brown metallic paint dry, and paint the sheet very carefully. After the paint is thoroughly dry I make up the pipe; and the only objection I find to this way of painting (and which I would like to overcome) is the fact that where the joint is soldered together the paint is partially burnt off.

From J. H., *Richmond, Ohio.*—In *The Metal Worker* of January 21 "G. R. C.," Mansfield, Pa., wants the experience of tinners as to the best way of painting conductor spouting on the inside. His method is to tie a cloth on the end of a wire to swab out the pipe. I found a sponge on the end of a suitable handle or stick better than the rag process; but the trouble was to keep the sponge in order when not in use. I then found that this way was better —namely, to pour paint into the conductor pipe at one end with a small vessel, and to have a larger vessel at the other end to catch any paint that might run out. Bring the conductor to a level and then run it around until the paint covers all the inside. Then elevate the conductor and let the paint run back into the can.

A Movement in Shopkeepers.

From D. Ust, *Dryden, Tenn.*—The novelty of *The Metal Worker* in a fine new rig will make any tinker stare, and while scanning the eyecatchers I hit on friend "M. U. D.'s" account of stock in the January 14 number and read it, then laid down the paper and quietly whistled and thought; read it again and took a stroll among my old settlers. After the stroll, which showed similar assets, I read it again and wondered how in the fire "M. U. D." got on to my case so well, for I hadn't seen any one around since the snow. Then, as I had journeyed rather widely before starting a shop, I concluded that "M. U. D." had hit pretty much all over and many another fellow as hard as himself and me. I noted he wasn't making any resolutions, but his invitation to call later was a lively hint that if the rest of us wanted to be in the hunt we had better raise the dust. Right there I took another tour of inspection and found a heap of repairs—grates, bricks, &c.—that had accumulated and a lot of old stoves that were in pretty bad shape. Well, an idea struck me there that in this cold weather many people would want a stove if it could be had cheap enough and right away. So I called my jour and two boys and said, "You see that pile of old grates and bricks, and that pile of old stoves." They took it, and I told them that I wanted every one of the stoves rigged up some way so a fire could be run in it before Saturday, and that if anybody wanted anything done that would interfere they were to be put off and told that we were getting ready for a big bargain sale in stoves, and to spread that news everywhere; and I wanted them to do a good job of hustling and make them look first rate. Our paper comes out on Thursday, and I went to see the printer and found him shivering with a little stove, and told him I would give him a stove that would make it hot for him if he would do some advertising for me, and he jumped at the bait, and I told him I wanted some posters and a big space in his newspaper with this in it:

A NEW WRINKLE IN OLD STOVES.

NO TRASH. CHEAP FOR CASH.

NEXT SATURDAY.

SELL THEY MUST.

D. UST,
DRYDEN.

I swopped another stove with the painter, to put the same on a big banner like the campaign banners, and hung it across the street. Then I dusted and cleaned up the store, made it look as if a new man had come to town, and had everything looking first class, fresh, new and clean, and made room for the old settlers to be shown up to their best advantage, and early Saturday morning had the sidewalk in front of my store, my show windows and the front of the store full of them, all with big placards with the price in big figures and a lot of suggestions like "Give the stock a warm feed," "First rate for a wash-day stove," "You work better when you are warm," "Bakes a beautiful brown," "You can heat water on the top," "Apples can be dried with this stove," "Just the thing for heating sad irons," "Grocer, don't let things freeze in your cellar," "This won't kill things in the hot house." Well, that Saturday nearly killed us all. We sold all the stoves we had ready, and some that were not, and heaps of tinware, stove pipe, took orders for roofs, spouts, gutters, heater work, repairs, and were hustled every way; and now that I've got into it I'm going to keep having some sort of a scheme every month this year, and if they go I'll report the result for the benefit of the other fellows, the same as "M. U. D." did, for it's due to his report that I scooped in a good many dollars in cash, had some bills paid, and have a lot of orders ahead.

Cement for Glass and Metal.

From G. A., *Akron, Pa.*—Can you give me a receipt to cement glass in kettles and tanks for dairy use that gets harder quicker and is better than linseed-oil putty, which I have been employing?

Answer.—The following recipe may be of use to our correspondent: Take finely powdered litharge, fine white dry sand with plaster of paris, each three parts by measure; finely pulverized rosin, one part. Mix thoroughly and make into a paste with boiled linseed oil to which dryer has been added. Beat the mixture well, and let it stand four or five hours before using. After standing 15 hours it loses its strength. This cement, it is said, when well made of good materials, will unite glass and iron so firmly that the iron will often split rather than part from the cement. It is said to be good for either fresh or salt water, and has been used with great success.

Trouble with Gas Range.

From W. M. A., *Watertown, Mass.*—I am much interested in your explanation of the trouble experienced by "G. R.," Mansfield, Pa., with his gas range causing moisture to gather, which was noted in *The Metal Worker* of January 28. I have experienced exactly the same trouble, except that it has been caused by an oil-heating stove and occurred in two different instances. The same theory could hardly hold good, I should suppose, and would like an explanation.

Note.—We do not wonder that our correspondent questions our explanation as being applicable to the case of the oil heater. Nevertheless, we think that it is not altogether unreasonable. The oil in burning will likewise give off water, though we should think to a much less degree than the natural gas. Wherever hydrogen is present in the fuel and burns, moisture is the result. We do not know just what the proportion of moisture would be from burning oil, but in an unventilated room, with the products of combustion emptying into the room itself, it is not unlikely that such a result would follow. The remedy in this case is the same as in that of the gas range. We should advise in this and in every case where combustion takes place that a pipe be carried to the chimney or in some way out of doors. In a living room, where there is lots of ventilation, the doors being constantly opened and perhaps air coming in through a register, and in which the occupants do not stay for many hours together, there is not so much need of ventilation and the carrying off of these gases. In a sleeping room, however, the stove should be connected with a flue. We consider it a most fortunate thing that these stoves do produce dampness in unventilated rooms, for the discomfort of having damp walls will lead to a remedy where the occupants might not be aware of the vitiated air.

Statistics of the coal trade published in Philadelphia show a wonderful increase in the production of anthracite and bituminous coal in this country of late years. Here is a summary:

	Short tons—	
	Anthracite.	Bituminous.
1880	28,043,812	42,831,758
1890	45,600,487	95,629,026
1891	49,500,000	100,000,000
1892	52,000,000	110,000,000

Representative Harter of Ohio has offered a bill which provides that in case any monopoly or trust exists, contrary to the public interest, and it is found by the Secretary of the Treasury upon investigation that such monopoly or combination to maintain artificial prices is aided by any duty imposed upon foreign imports, or by any patent granted by the United States, it shall be within the power of the Secretary to abolish such a duty on imports or such a patent.

THE TIN SHOP.

Triangulation in Pattern Cutting.—XIX.

By Triangle.

PATTERN FOR THE FRUSTUM OF A PYRAMID DIAMOND SHAPE IN PLAN.

In Fig. 143 is shown in perspective the article for which the pattern is to be constructed. In Fig. 144, let B C D E represent the side elevation, H K M N the corresponding plan of base, and P R S T the plan of top. N″ T″ R″ K″ is the end elevation, under and in line with which is drawn the corresponding plan, in which the miter lines are shown by N′ T′, H′ P′, R′ K′ and S′ M′. In the side elevation B C gives the length from H in the base to P in the top, and in the end elevation N″ T″ is the distance from N′ in the base to T′ in the top. We will describe the pattern for one of the sides by the aid of these distances. Place the T-square at right angles to N M in plan and drop line indefinitely from the points N T S M, as shown. At a convenient distance from N M, and parallel with it, draw the line *n m*, cutting the lines drawn at right angles to N M, as shown. With *m* of pattern as center, and B C or D E of elevation as radius, describe an arc cutting the line S *s*. With *n* of pattern as center, and N″ T″ or R″ K″ of end elevation as radius, describe another arc, cutting the line T *t*. Lines drawn through the points thus obtained will form the pattern for one side, as shown by *n t s m*. Another way of describing the pattern would be by constructing a triangle that would show the slant hight of the article. To do this, draw any line, as G′ F′, in length equal to the straight hight of the article, as shown by G F or M″ S″ of elevations. At right angles to F′ G′ set off G′ J, equal to the distance between the base and top in plan, as shown by L J. By connecting J F′ we have the distance from the point L in the base to J in the top. At right angles to *n m* of pattern set off the distance J F′, equal to J F′ of triangle, and draw *t s* parallel with *n m*, cutting the point F′ and the lines T *t* S *s*.

The straight hight of the article being known, the pattern could be described from the plan and a diagram of triangles, the base lines of which can be found or drawn on the plan, their altitudes being the straight hight of the article and their hypotenuses giving the distances from points in the base to points in the top as if measured on the finished article. To construct this diagram of triangles, draw the right angle M G F in Fig. 145, making G F equal to the straight hight of the article. From G set off the lengths of the solid or miter lines in plan necessary for describing the pattern. The letters under the line M G indicate the corresponding line in plan, as N T-G is the length of N T of plan, as is M S-G the length of S M in plan. By connecting the points in M G with the apex F we have the length or distance from points in the base of article to points in the top. In Fig. 146 is shown a duplicate of the plan, upon which are drawn the triangles in Fig. 145. To describe the pattern it will be necessary to obtain the distance from N in base to S in top. In the diagram we set off from G the distance N S of plan and connect N S-F. On the plan we draw N S, as shown, and draw S *s*′ at right angles to N S, in length equal to the straight hight of the article, and connect N *s*′, as shown. The triangle M R *r* of plan, or G M R F of diagram, is constructed in a similar manner.

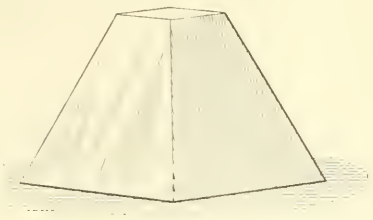


Fig. 143.—View of Finished Article.

Fig. 145.—Diagram of Triangles whose Bases Represent the Miter and Diagonal Lines in Plan.

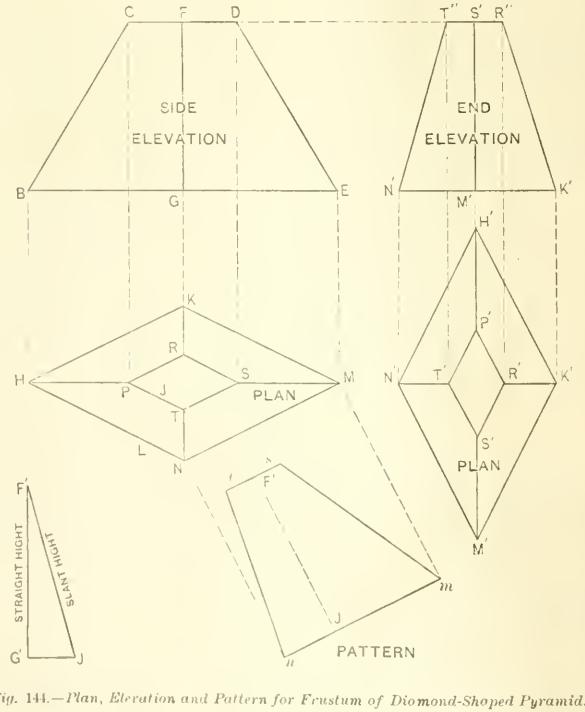


Fig. 144.—Plan, Elevation and Pattern for Frustum of Diomond-Shoped Pyramid.

PATTERN FOR FRUSTUM OF PYRAMID DIAMOND SHAPE IN PLAN.

For the pattern shown in Fig. 147, the triangles in the diagram or those on plan can be used, as may be desired. The object in showing a variety of methods for describing the same pattern is to allow the reader to determine which is the best adapted to his requirements. For the pattern shown in Fig. 147 proceed as follows: Draw the line N″ *t*″, in length equal to the hypotenuse N *t* of plan, or N T F of diagram. With *t*″ as center, and T S of plan as radius, describe an arc, *s*″, which intersect with one struck from N″ of pattern as center, and N *s*′ of plan as radius, thus establishing the point *s*″ of pattern. With N″ of pattern as center, and N M of plan as radius, describe an arc, M″, which intersect with one struck from *s*″ as center, and M *s* of plan or M S-F of diagram as radius, thus establishing the

point M″ of pattern. Lines traced through the points thus obtained will give the pattern for one of the sides, and similar to the one in Fig. 144. The pattern for the next side can be obtained in a similar manner; or, with S″ of pattern as center, and S R of plan as radius, describe an arc, r°, which intersect with one struck from M″ as center, and radius M r of plan, which establishes the point r° of pattern. The point K° represents the distances M K of plan and N t of triangle or N T-F of diagram. H K r° p° of pattern can be obtained in a similar manner if desired. Lines drawn through these points will give the desired pattern, as shown by K° M″ N″ H″ K″ r p' t'' s' r°. A model similar to the view in Fig. 143 can be made by forming a duplicate of the pattern in the required shape. For a model

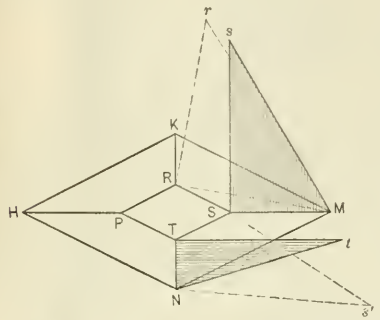


Fig. 146.—Triangles Drawn on Miter and Diagonal Lines in Plan.

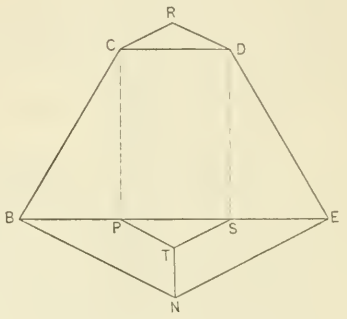


Fig. 148.—Pattern for Model.

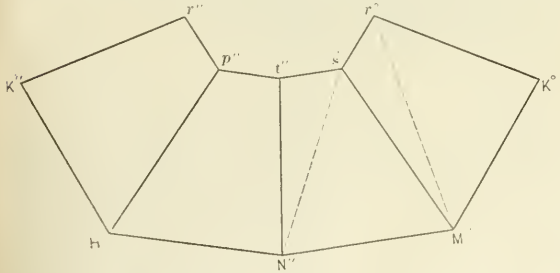


Fig. 147.—Pattern for Frustum of Pyramid Diamond Shape in Plan.

Fig. 149.—The Model.

PATTERN FOR FRUSTUM OF PYRAMID DIAMOND SHAPE IN PLAN.

showing the angle lines, or of the half article, draw the elevation B C D E, as in Fig. 148, below which lay out the half plan, as shown by B N E P T S. On C D draw the half plan of top, as shown by C R D. After having cut out the pattern and formed it at right angles on B E and C D, a triangle similar to G′ F′ J in Fig. 144 can be attached to the model with its base on T N and its apex at R. The dotted line from N in base to D in top, representing N S s' of plan, or N″ s'' of pattern, can be shown by means of colored thread. The finished model is shown in Fig. 149.

Starting in Business.

From VETERAN, *Brooklyn, N. Y.*—I presume that among your readers there are hundreds of young men, journeymen, tinsmiths particularly, who are inwardly debating the question whether or not they could successfully enter into business for themselves. It seems to me quite possible that one who has had 40 years of experience in the stove and tin trade might offer some advice that would tend to answer the doubts and fears as well as the over-confidence of these persons In naming the requisites for a start I would put capability first, then locality, and then capital as least of the three requirements for a small beginning, and it is of small establishments that I am to offer my advice, and in which advice is most needed. The one thing paramount is to let inclination have a good part in the matter. Men are so differently constituted that some never can or will work for another contentedly, no matter how pleasant or profitable their positions may be, and it was to this class that I belonged in early manhood and am still with. We live for happiness, and even though it may be an imaginary delight to be one's own boss and see one's own name over the door it is a reality to some. I and he must do it with his own hands, and do it well, too, so that each job will be a leader for another. If he finds it impossible to get along alone he can put on a good-sized, intelligent boy and take the trouble to show the boy that he can do lots of small jobs, and that he must keep his eyes open and his mind on the work, and that it is not such a wonderful thing after all to make a piece of pipe or mend leaky vessels. I will leave the man now where he is with his little chap. If he drinks and loafs he will fail, and if he deserves success he will find it. Little by little he will put up shelves and stock them with articles made in dull days or purchased with money saved, a dollar at a time, when he needed a new hat or coat, but all will come right in the end. If he puts the right spirit into his enterprise he will have some advice that would tend to answer the doubts and fears as well as the over-confidence of these persons In naming the requisites for a start I would put capability first, then locality, and then capital as least of the three requirements for a small beginning, and it is of small establishments that I am to offer my advice, and in which advice is most needed. The one thing paramount is to let inclination have a good part in the matter. Men are so differently constituted that some never can or will work for another contentedly, no matter how pleasant or profitable their positions may be, and it was to this class that I belonged in early manhood and am still with. We live for happiness, and even though it may be an imaginary delight to be one's own boss and see one's own name over the door it is a reality to some. I and he must do it with his own hands, and do it well, too, so that each job will be a leader for another. If he finds it impossible to get along alone he can put on a good-sized, intelligent boy and take the trouble to show the boy that he can do lots of small jobs, and that he must keep his eyes open and his mind on the work, and that it is not such a wonderful thing after all to make a piece of pipe or mend leaky vessels. I will leave the man now where he is with his little chap. If he drinks and loafs he will fail, and if he deserves success he will find it. Little by little he will put up shelves and stock them with articles made in dull days or purchased with money saved, a dollar at a time, when he needed a new hat or coat, but all will come right in the end. If he puts the right spirit into his enterprise he will have

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think the general tendency in cities is toward small shops, depending on near-by local trade, and that a workman of fair ability can safely start in any location not already overstocked and can be as certain of success as it is possible to be in any new enterprise, and more so than in most small concerns, as his labor is a large factor. Work means success where the expenses are not too great. *Bradstreet's* reports that the failures among tinners are less than in most of the other lines of business.

My reason for naming capital as a secondary requisite is that but few men can lay by much from day's work and would never get into business if they thought capital of the first necessity. We will say that for a small beginning the workman has saved $200 and is anxious to open a store. Let him rent a small place—a basement will do for the first—but the rent must not exceed $25 per month. He can put half of his capital in tools, benches and fixtures, and buy stock as needed with the balance. Starting in March or April, he will find employment from the first day, some stoves in the fall, and people who have seen his efforts will go out of their way to trade with him. He has entered on a road where no one can limit his possibilities.

A statement of the commerce of the Argentine Republic for the year 1892, furnished by the consul in New York, shows that the exports thence amounted to $5,278,240 and the imports by direct trade were $1,819,600. Exports from New York comprised upward of $2,000,000 in agricultural machinery and implements, and something like $200,000 in hardware miscellanies, $10,000 in fire-arms, &c.

For the six months ended on December 31 the total exports of the Dominion were $74,258,707, an increase of $2,520,658. For the same period the imports were $60,272,922, an increase of $3,688,604, showing a total increase in trade of $6,209,262.

PLUMBING AND GAS FITTING.

A Re-election in the New York Master Plumbers' Association.

From G. T. M., *New York City.*—I notice there is published in *The Metal Worker* of January 28 a list of officers of the New York Master Plumbers' Association for the year 1893. That list is no longer correct, a new election having taken place under the following circumstances: Henry G. Gabay had been president for two successive terms, and at the beginning of the present year, in the face of some factional opposition, had been re-elected for a third term. The opposition ticket won two or three offices, but missed the presidency, and, smarting under the disappointment, the defeated party at once raised the cry that "the election was illegal and should not be allowed to stand." President Gabay called a special meeting of the association to consider the charges and take such action as a close investigation would demonstrate to be necessary. This special meeting, which was an exceptionally large one, was held in Jaeger's Hall, at East Fifty-ninth street and Madison avenue, on the evening of January 24, and the opposition ticket was so badly beaten that they lost whatever offices the previous election had secured for them. The following is the new and corrected list: President, Henry G. Gabay; vice-president, Thos. J. Toumey; recording secretary, Henry J. Pattison; financial secretary, Thos. J. Cummins; treasurer, Jas. N. Knight; marshal, Thos. F. Gaynor; sergeant-at-arms, Charles Schlosser. Was not this a regular case of "the dog and the shadow?"

Answer.—This action of both sides in the controversy shows that the members of the New York Master Plumbers' Association set some value on the fact of holding office in the organization. The recipient of the "third-term" election is to be congratulated on his popularity, even though public sentiment is opposed to such renewal of trust.

"Dog's Teeth" in Plumbing Work.

From P. H., *Stamford, Conn.*—Can you tell me what is meant by "dog's teeth" in the trade? I went to look up a job in a shop a few days ago, and the boss asked me how much I knew about wiping joints. I got on well enough until he asked me if I knew what "dog's teeth" were. I didn't know, and then he fired me. None of the fellows around here can tell me, and I have to ask *The Metal Worker* for the information.

Answer.—Our correspondent evidently has no knowledge of some of the phraseology of the trade, and probably considered that "dog's teeth" had only one meaning—that which is best expressed by the servant girl setting the house dog on the offending plumber who leaves a mess of dirt after him on completion of his job. That would not explain anything, however, beyond the possible rent in the overalls. "Dog's teeth," in a trade sense, are the little lumps of solder which sometimes run through a lead joint when it is being carelessly made and which are injurious in lead bends or traps as helping to retain some fragment of cloth, lint, &c., so as to cause the syphonage of traps by capillary attraction. They are only to be found in careless work, and where they exist there is certain to be considerable dissatisfaction some time or another when the seal of the trap happens to be broken.

Passage of Sewer Gas Through Traps.

From W. F. S., *Bayfield, Wis.*—I put a running earthen trap on a clean water waste pipe outside a building, thinking that would make it proof against sewer gas. The proprietor now tells me that if fresh water is not discharged through the trap for three or four days there is a smell of sewer gas in the office, and he says that a sanitary engineer told him that if the water in the trap is not renewed every two days it becomes porous and the trap will not be gas proof. Please advise me if this explanation is correct.

Answer.—Either the sanitary engineer did not thoroughly explain himself or used the word "porous" to denote the tendency of water to absorb gases. It is well known that water is not compressible, whereas if it partook in any degree of the character of porosity, the inference is that it *could* be compressed. As a barrier against the entrance of sewer gas the water seal of a trap may or may not be effective for a longer or shorter time, according to the conditions under which the trap is placed in position. If it (the trap) is not vented the chances are that the seal may be broken by syphonage, in which case there is no protection against the entrance of sewer gas. But as a safeguard no trap should be left unvented, because, independent of the danger of syphonage, there is the danger of saturation by sewer gas, and this is probably the cause of the trouble of which our correspondent complains. If he has neglected to vent the earthen trap he has provided no outlet for the dangerous gases from the sewer, and experiments made both in England and America have demonstrated beyond a doubt that the water seal in an unvented trap cannot remain pure for many hours. It begins to absorb the sewer gas at once, and if there is no other outlet, such as the vent pipe from the crown of the trap, when the point of saturation is reached it begins to give off on the house side the gas it takes in on the sewer side. The oftener traps are replenished, whether they are vented or not, the better. Returning once more to our correspondent's question, we have to say that though not "porous," water has a ready facility for "absorbing" gases, and in that sense alone he may accept the explanation of the sanitary engineer as to the necessity of renewing the water in the trap at least once every two days. We would also suggest that he should relieve the water contained in the trap from the pressure of the sewer gas at the sewer side by venting the trap in the usual manner at the crown.

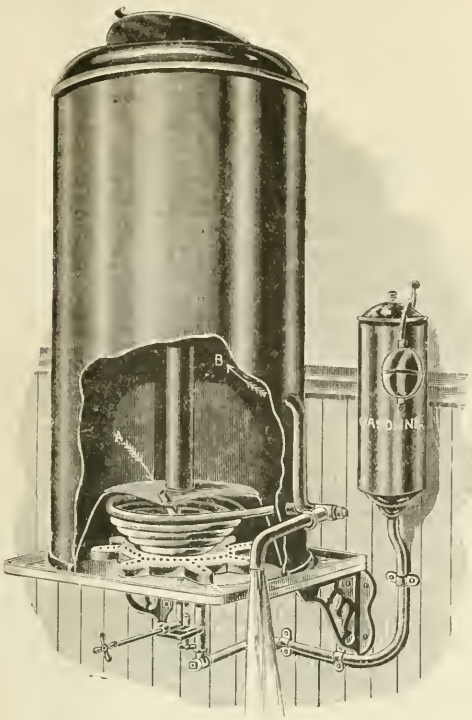
Plumbing Examining Boards.

From J. R. R., *Ogdensburg, N. Y.*—Noticing some reference in a recent issue of *The Metal Worker* to the law of last year relating to the creation of plumbers' examining boards throughout the State, I desire to ask if you can inform me if any definite steps are being taken to carry the law into effect. Has the Master Plumbers' Association of New York City any authority in the matter? Does the bill outline any fixed mode of procedure?

Answer.—The Plumbing law (chap. 620, Laws of 1892) has been put in operation in some of the cities of the State, notably in Rochester, Poughkeepsie, Yonkers and Utica. The Rochester board has adopted rules and placed the business on a working footing. The meetings are to be held on the first and third Mondays of each month at 8 p.m, at which applications for examinations of candidates for license will be received and dates for making the examinations fixed upon and notice thereof sent to applicants. No one will be allowed to be present at the examinations but the Board of Examiners and the applicants. The fee for examination (as fixed by law) is $5, and the applicant must state on oath and in his own handwriting his name and residence, how long resident in the city, his citizenship, names of former employers, his occupation during the five years preceding date of application, as well as the number of years he has been at his trade. The applicant must be vouched for by three reputable citizens, and of the maximum questions propounded 75 per cent. must be satisfactorily answered, and if not, a month must elapse before a fresh examination of the rejected applicant can be held. The Master Plumbers' Association of New York has no voice in the work throughout the State outside this city. The New York State Association, however, will hold its annual convention on March 2, at which a code of rules for all the cities in the State, except New York and Brooklyn, will, it is expected, be formulated, and the line of examination of candidates be marked out. The president and secretary of the New York State Association are members of the New York City Association; beyond that there is no connection between the two associations.

The Moseley Bathtub and Water Heater.

In the accompanying illustrations we show the Moseley improved heater and also the Moseley folding bathtubs with the heater attached, made by the Moseley Folding Bath Tub Company, 181 South Canal street, Chicago. A chief advantage to which the manufacturers allude is that the apparatus does away with the necessity of hot fires in summer for providing warm baths. It also takes up but little room, is attractive in appearance, and does not require any cutting of the carpets or fastening. The heater, as shown in Fig. 1, comprises a tank to hold 20 gallons, made of No. 28 galvanized iron with cast top and concave bottom of heavy pressed galvanized steel. The exterior is enameled and the whole finished with nickel trimmings. Another form of heater is made of 14 ounce copper, nickel plated with nickel-plated bracket and fittings. At the bottom, as shown in Fig. 1, is a 12-foot coil of ¾ inch copper pipe in the form of an inverted cone resting upon the center of the burner, so that the flame covers the entire surface. A 1¼-inch tube extends vertically through the tank and gives ventilation, at the same time facilitating combustion and increasing the heating power of the burner. The water enters the tank at the point A, passes to the lower section following the course of the spiral coil in contact with the flame. As it becomes rapidly heated it rises through the stand pipe outside and is delivered back into the tank at B, the heated water passing to the surface and the cooler downward into the coil, where it is further heated and a continuous circulation maintained. The hot water is drawn directly from the coil. Besides being adapted to the Moseley self-heating folding bathtubs, it is also useful for stationary bathtubs, for kitchens, laundry use, &c. Special sizes are made to order if required. The Moseley self-heating folding bathtub is shown in Fig. 2. The manufacturers mention its handsome finish, and point out that it gives a full equivalent of the modern bathroom, so far as the bath is concerned, with the advantage of quick and independent heating, it consisting of a full-sized 10 or 12 ounce zinc or 14 ounce copper-lined bathtub, water tank heater and waste water outlet. It is finished in various ways and several styles are furnished by the makers. Each tub is provided with a flexible outlet with brass couplings, one of which fastens permanently to the tub, while the other may be connected to ordinary gas or lead pipe or tubing, leading to any waste water outlet in the building, or else the contents may be emptied by means of connecting tube into any receptacle. Having a fixed journal bearing, the top has a positive action in raising and lowering, so that the use of casters and slides is avoided. The adjustable back supporting the tank forms a counterbalance to the top, rendering its manipulation very easy. The tub is made in two lengths and measures 2 feet wide, 18 inches deep and 5 feet and 5 feet 6 inches long, respectively, occupying a floor space when closed about 2 feet square. Its weight when crated for shipment is about 250 pounds.



The Moseley Bathtub and Water Heater.—Fig. 1.—Moseley Improved Water Heater No. 3.

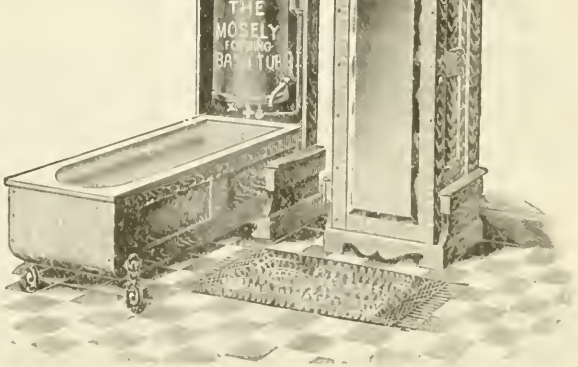


Fig. 2.—Folding Bathtub Opened and Closed.

Albany Plumbing Work.

The past year has been a very prosperous one for plumbers in this locality, says our Albany, N. Y., correspondent. There seems to be no particular reason for it, except that there has been a great deal of building, and that necessitated a great deal of plumbing. Every plumber in the city is crowded as hard as can be with what are technically known as "thawing jobs." Plumbers, however, claim that these are the most annoying and unremunerative pieces of work they have. In the first place, very little, if any, new material is used, and it is generally merely ditch digging. Plumbers have to do it, however, to oblige their customers. The men who make money out of such odd jobs are the small firms who do not pretend to do a wholesale business. Every plumber of that class is hard at work all day "thawing," and they can do it at a pretty fair profit. The unusual amount of such work has been caused by the lack of snow. This has allowed the frost to go down into the earth to a depth of more than 4 feet, and that is quite unusual. Snow protects the earth, and consequently the water pipes. Now, to get at those parts and thaw them is only manual labor and not plumbing at all. It is a mistaken idea that a freezing cold spell is the plumbers' ideal. Any one of them would rather a great deal that the building trade would have a decided and continuous boom. That is what pays, when new material and plenty of it is used. But the former impression is the one that has become broadspread and is the prevailing one. There seems to be no means of preventing this continual freezing. The idea that plumbers rejoice in cold weather origi-

nated in all probability from the fact that they are so busy at that time, and the general public believe that when a man is very busy he must necessarily be making money.

How to Set a Boiler.

From E. O. H., *Melrose, Mass.*—I see in *The Metal Worker* of January 7 a letter from "Young Mechanic" with regard to the hight of a range boiler. Does the answer, though correct in principle, correspond with the practical experience of a majority of mechanics or plumbers? I would like to relate an instance that came under my notice a short time since. The range is connected as in Fig. 2 of your illustrations, which gave trouble in supplying hot water, and also produced a hammering noise. The party selling the range claimed the trouble was with the plumbing, and that it would not work until the range boiler was raised up. I was notified to do the job and did not agree with the stove dealer—at least I thought I would put a coil of pipe in the stove in place of the water front, after which there was plenty of hot water and no hammering. I can account for the result as far as the hot water goes, for the capacity for heating in the coil was greater than in the water front, but if you follow the theory to a conclusion, ought we not to expect the hammering to increase rather than to diminish, the pipes or boiler not having been changed in the least? I would say that the water front and range connection had been thoroughly examined previous to any change being made and no obstruction was found. I would also say that at least 19 out of 20 boilers in this vicinity are lower than the ranges they are connected with.

Note.—Very likely the reason the coil gave less trouble than the water back is that there was a certain natural circulation in the coil, while in the water back (though we do not know what its construction was, we assume it was a hollow casting), there were cross currents to interfere with the proper circulation. This may explain why the coil gave better results.

Plumbers' Wiping Cloths.

From W. H. S., *Bay Shore, N. Y.*—Please inform me through the columns of *The Metal Worker* where I can get plumbers' wiping ticking for joint wiping.

Answer.—We cannot do better than refer our correspondent to any local dry goods store, for the cloth he speaks of is nothing but ordinary heavy-twilled ticking. Of course a good deal must be done to prepare it for a wiping cloth, having to be soaked in tallow and folded in a particular fashion, as described in former issues of *The Metal Worker.*

TRAPS AND VENTS.

The Oswego Indurated Fiber Company, Oswego, N. Y., with New York salesroom at 1337 Broadway, send out circular sheets presenting half-tone engravings of carved Eburite fiber bathtubs Nos. 30 and 31 of their manufacture. These goods are exceedingly attractive from the appearance of the engraving, which presents a very soft effect. The cuts show bathtubs, closets and flushing tanks.

We learn from a correspondent at Oakland, Cal., that the plumbing business is not very prosperous in that section just now. He writes: "The plumbing trade on the Pacific Coast is dull, very dull, and the immediate outlook for the plumber is very poor indeed. But we are hoping for the best. Some say the dullness is caused by the Presidential election and the World's Fair, and that things will be livelier later. But I think the real cause is that we have not enough men here who are willing to invest in and help to build up our cities. Unions cannot attempt to run capitalists, because the latter can lend their money at interest; and they find this a safer investment than speculating by investing in some business which they are liable to lose by strikes."

The Stradling Plumbing & Heating Company of Utica, N. Y., have elected: Directors, E. W. Stradling, E. J. Stradling, E. H. Bice, A. H. Dobson and John J. Droz; president, E. W. Stradling; vice president, E. H. Bice; secretary, E. J. Stradling; treasurer, A. H. Dobson.

Henry Huber & Co, New York City, have received an order for an Oswego indurated fiber bathtub for His Royal Highness the Prince of Wales. The tub is very handsomely finished, being embossed and traced in gold, and the fittings are silver-plated.

J. H. Ellenbaum, the Niagara Falls, N. Y., plumber, now located on Falls street, will erect a three-story brick building facing on Niagara street. It will be a handsome business block.

Benjamin E. Patterson, New York City, is the patentee of an improved gas governor, the invention relating to gas governors having outer and inner walls, the object being to produce a simple, compact and durable governor, which shall regulate the flow of gas and deliver it under all conditions at a steady pressure. The regulating valve and well floats for actuating it are arranged so that the movement of the valve shall be steady.

Beck Bros. & Co., manufacturers of fine brass goods for water, gas and steam, 259 Wabash avenue, Chicago, are to place a line of new water closets in their salesroom.

H. O. Canfield, Bridgeport, Conn., issues an illustrated catalogue and price-list of vulcanized rubber which he makes for mechanical and manufacturing purposes. A number of these goods have special interest for plumbers and steam and hot-water fitters. Among the articles referred to, with illustrations and price-lists, are the Eureka bibb disks, Canfield bibb disks, Canfield's pure molded flange Unions, flange rings for seating closets, rings for steam fitters' and plumbers' use, gaskets, &c. The little circular gives illustrations of the goods with prices and full lists of sizes.

The Oswego Indurated Fiber Company, Oswego, N. Y., are offering to the trade a new tub of indurated fiber lined with polished copper. The chief advantages of this article are referred to. An illustration of the tub is shown, together with price lists of the different sizes.

Henry Kerr, Cleveland, Ohio, is the patentee of a sink or basin trap, the object of which is to furnish a trap in which utility and artistic effects will be combined. Constructive features of the trap are a diaphragm and ball valve.

John Pellow, Grand Rapids, Mich., has invented a combined water heater and shower bath consisting of tubular sections of different diameters having cups at the ends and a casing surrounding the section. Also spiral coils within the section.

F. E. Myers & Bro., Ashland, Ohio, have contracted with the Crane & Ordway Company, St. Paul, successors to the Crane Company and Rogers & Ordway, for a large number of Myers' Glass Valve Seat Well and Tank Pumps. F. E. Myers & Bro. desire to refer all dealers in Minnesota and North and South Dakota to the Crane & Ordway Company as their exclusive agents, who, freights considered, are in a position to supply the trade at satisfactory prices and terms. F. E. Myers & Bro. advise us that four carloads of these goods have already been ordered by Crane & Ordway Company, who will carry a stock which will meet the large requirements of their territory.

The St. Joseph Pump Company, St. Joseph, Mo., manufacturers of the well-known Perfection Water Elevator and Purifying Pump, favor us with a copy of their calendar for 1893. The calendar proper is mounted on heavy cardboard back, the upper portion of which contains an attractive picture in light blue, showing three interesting children in the act of using one of this company's pumps. The lower part is devoted to the calendar proper, comprising 12 calendar sheets. Some advertising matter is placed on the front of the calendar, but not enough to mar its beauty. A silken cord is attached for the purpose of hanging the calendar.

Sealed proposals will be received at the office of the custodian, United States Custom House, Galveston, Texas, on February 16, for all the labor and materials required for new water closets for the new Custom House Building.

J. A. Cunningham, 217 Lake street, Chicago, agent for the Smith & Anthony Stove Company, reports that the Sanitas plumbing specialties have been used throughout in the Art Institute building.

The long-pending revolution in the Hawaiian Islands has taken place, and the Provisional Government, whose members are mostly American born citizens or their descendants, are represented in Washington city at the present time by an influential deputation instructed to urge annexation to the United States. American interests in the islands are said to equal $30,000,000—three-quarters of the entire foreign investment. One of the most prominent business men of Honolulu states that Honolulu, the capital, has a population of 23,000, while the population of the country is 90,000, and the area of the Hawaiian Archipelago is equal to that of Connecticut, Rhode Island and Delaware. During 1891 the percentage controlled by the United States of the total trade of the islands fell off 4 39 per cent., but it was still enormously in the lead. During that year the total imports of the islands were valued at $7,439,482.65, of which 71.16 per cent., or $5,294,278.57, were imported from the United States. Great Britain in the same year sold the islands $1,201,329.43 worth of goods, or 16.15 per cent. of the total imports. During the same year the total exports of the islands were $10,258,788 27, of which the United States took nearly all. Last year sugar culture in the islands is said to have been without profit.

James A. Tilden, Hyde Park, Mass., has assigned to the Percy Mfg. Company of Portland, Maine, an improvement in water meters. The invention relates to the class of meters known as disk meters and comprises various details of construction introduced with the view of obtaining greater efficiency, accuracy and durability.

The Hebrew Technical Institute in Stuyvesant street, New York, seeks to aid young men who have an aptitude for mechanics. Last year the average attendance was 138 and 32 graduated, of whom 75 per cent. obtained desirable positions.

WORLD'S FAIR NOTES.

The Work of Installation.

Preparations for putting exhibits in place are now complete. W. H. Holcomb, general manager of the little railroad in Jackson Park, has organized a force of employees for installation purposes, and is ready to handle displays as rapidly as they arrive. When these exhibits commence coming into the park Mr. Holcomb's railroad will probably do more business to the mile than any other line in the country.

It has become apparent during the week that the great volume of exhibits will pour into Jackson Park in two months, from February 15 to April 15. Isolated displays will arrive in small quantities before the middle of February and a few may be received later than April 15, but the great bulk of the displays will come to the park between the dates named. Various estimates have been made of the volume of these exhibits, the figures ranging all the way from 15,000 to 30,000 carloads. The quantity cannot be determined accurately, because many foreign countries, especially the larger powers, are extremely reticent in regard to both the character and extent of their displays.

The plan of installing exhibits brought out by the Council of Administration, after the long discussion between Director-General Davis and Chief Burnham, is working satisfactorily. Under this plan Mr. Holcomb takes charge of the displays as soon as they are switched into Jackson Park. If the exhibits have been properly passed by customs officials at ports of entry they are hauled directly to the buildings for which they are intended, otherwise they are taken to the custom house on the grounds and examined by a number of inspectors. Director-General Davis has requested, in order to simplify the work of installation, that all packages intended for a particular building be loaded in one car, in order to avoid extra handling. The forces under Colonel Davis and Mr. Holcomb are working in perfect harmony in putting exhibits in place. Mr. Holcomb has two men in each of the big buildings, one to study the assignments of space and indicate the spot where each package is to be put and the other to give a receipt for the delivery of the goods. Tracks have been laid in all the buildings from the spurs of the little railway, so that cars are pushed directly into the buildings. As soon as packages have been taken from trains and deposited on the space marked off for them on the floors Mr. Holcomb's duties end. His men withdraw and the exhibitor and department chief attend to the arrangement of displays.

Mr. Holcomb has issued instructions regarding the handling of goods that come to Jackson Park in wagons, drays or trucks instead of cars. These must be brought to the Sixty-fourth street gate. In order to preserve the boulevards and driveways which have been made at great cost, it is necessary to prescribe the width of tire for these wagons. One-horse vehicles must have tires 3 inches wide and tires of two-horse wagons must be 4 inches wide.

A toll of 6 cents per 100 pounds, with a minimum charge of 50 cents for any single shipment, is levied to pay the cost of putting exhibits in the buildings. Articles weighing more than 10,000 pounds and fragile packages are subject to additional charges. Each load of displays must be accompanied by a bill of lading, with specific information regarding the exhibitor's space number, name and weight of each article, total weight of shipment, name of building for which intended and a separate bill of lading.

The exposition terminal charge will be collected at the scale house at Sixty-fourth street by an authorized representative of the exposition, who will deliver to the person in charge of the consignment a receipt in full for the amount collected. When exhibits are delivered to the building designated the person in charge of the exhibit must surrender the bill of lading to the superintendent, who will give him a receipt for the property delivered. Any person in charge of exhibits consigned to Jackson Park delivered by wagons, drays or trucks must present for inspection at the scale house a city weigher's certificate, giving the weight of the vehicle in his charge. In no case will exhibits be received for installation unless the rates quoted are paid at Sixty-fourth street entrance.

Intending exhibitors make a mistake in not prepaying all freight charges on their exhibits. The charges do not end at Chicago, but include the switching rate to Jackson Park and the additional charge of installing the goods. Many of the exhibitors fail to prepay these latter charges and as a result their exhibits are stored in warehouses in the city and do not reach their destination. The Exposition Company pay no freight. If the charges are not prepaid by the exhibitor his goods will be left somewhere outside of Jackson Park and much difficulty will be experienced in discovering just where the railroad company have side tracked his display.

California's Enterprise.

California seems to have entered into the work of preparing an exhibit for the exposition with a resolve to outdo all competitors. With a vim and vigor characteristic of the people of that State, displays have been prepared showing the varied resources of the empire west of the Rockies. In each of the great buildings space has been assigned to California, and the State Commissioners are now preparing to begin installation.

Even in the matter of preparing an office building California has aimed to excel. And those who have seen the unique structure near the Fifty-ninth street entrance, which is now nearly complete, will admit that the aim has been realized. The building is a reproduction of one of the old Dominican Mission Chapels of Southern California. In appearance it is decidedly interesting, and so faithful has been the work of reproduction that romance seems to cling to the rough stone walls. The architect departed from the original only to interject enough of the more ornate Moorish style to relieve the somber effect. The building is a clear story with a great flat dome as a crowning feature, and the semi-tropical appearance will be hightened by roof gardens. The measurements of the structure are 500 x 110 feet, and the elevation of the dome is 80 feet. In this building Schmid's colossal figure, typical of California, will be a feature. It was recently exhibited in San Francisco, where it created much favorable comment.

While exhibits will be made in every department, California expects to make particularly fine displays in the departments of mines and mining, agricultural and horticultural. In the first will be demonstrated its mineral resources, and many relics of the days of '49 will be shown. In the department of agriculture will be shown fruit and cereals, and in the horticultural hall will be the wine exhibit.

The ladies of California have taken an active interest in the fair, and have secured the right to decorate and furnish one of the reception rooms in the Woman's Building. This will be known as the "California Room" and will be one of the most attractive departments in the entire building. The redwood lumber dealers furnished the wood for the panels, and $2,000 was raised to pay an expert for the carving and graining. The cactus was taken as the motive of the decoration, and will be shown in every feature of the room.

Myriads of Banners.

On the entire grounds of the Paris exposition there were not one-third as many flag poles as will be in use at Jackson Park this summer. In the construction of the various World's Fair buildings and in the disposition of liberty poles about the grounds, the management has afforded the widest scope for utilizing flag decoration. Since last November flag designers and makers have been at work under the general supervision of F. D. Millet, director of decorations. It is probably within the truth to say that the result by May 1 will constitute an epoch in the use of bunting. Scores of busy fingers and dozens of machines are working every day in the southwest corner of Horticultural Hall, turning out the creations of able designers in the form of flags, banners and skylight draperies. These are carefully stored away until the auspicious day arrives, when the completed buildings will burst into a kaleidoscope of color, with banners fluttering from every pole and minaret on the spacious grounds.

The national flag will predominate. But, as it is to be a cosmopolitan fair, there will be also a prodigal use of the flags of all nations. Mr. Millet and his assistants have compiled a complete code of all the nationalities that boast a national emblem. They number 46, or, with the United States, 47. Most of these nationalities are exhibitors at the Fair, but some are only nominally represented as compared with others.

But the flags will be only a small portion of the bunting decorations. Probably four-fifths of the poles on the various buildings are for banners. Here is where the inexhaustible resources of the designers come into play. Not alone are these hundreds of banners to be a symphony in color as they wave in the sunlight; they are to be something more than a creation in harmonious light and shade. They will tell an allegorical story of the progress of the world which the exposition commemorates. On each building the banners will be an artistic index of the character of the exhibits inside.

For instance, on the agricultural building every pole will bear a different design. Plows, harrows and scores of implements, ancient and modern, will be represented. On Horticultural Hall there will be floral designs on the banners. There will be roses and lilies that will apparently stand without support, rising and falling with the alternate swell and subsidence of the summer breeze. On the great Manufactures Building the number of separate designs and their beauty can only be hinted at. On the Mines Building the banners will represent in an artistic way everything produced. On the Transportation Building the banners will show the progress of transportation methods, from the earliest to the latest. On the banners of Machinery Hall there will be very few of the great developments in machinery not represented.

For the interior of the buildings there will be an enormous quantity of bunting used in the form of skylight draperies. Every building on the grounds is so well lighted that these draperies are necessary to soften and subdue the tones. Here again comes into play the general scheme of harmony of color and artistic effects. For instance, in the Manufactures Building the prevailing tints in the skylight draperies will be cream and corn; in the Agricultural Building, dark green and Nile green; Mines and Mining Building, shrimp and cream; Electricity Building, light blue and cream;

Transportation Building, Nile green and cream, and so on. In the Horticultural Building there will be so much natural coloring from plants and flowers that cream alone will be used in the draperies.

The amount of bunting necessary to make these draperies can be judged from the following figures: Manufactures Building, 148,000 square yards (1780 square yards in one skylight alone); Agricultural Building, 63,000 square yards; Mines and Mining Building, 70,000 square yards; Transportation Building, 64,000 square yards; Electricity Building, 81,000 square yards; Machinery Hall, 93,000 square yards (including annex); Horticultural Hall (including dome), about 74,000 square yards. Besides the skylight draperies, there will be an opportunity in several of the buildings for festooning with bunting between the arches. This will take a liberal supply, and the same harmonies in color will prevail.

Unique Railroad Exhibit.

Full-sized models of the first and oldest ten railroad locomotives in the world will be shown in a special exhibit to be made by the Baltimore & Ohio Railroad in the Transportation Building. J. B. Pangborn, who has charge of the display, has already begun to make arrangements for its installation, and when completed it will be one of the most unique and instructive collections at the park. From the first locomotive that was built the evolution up to the present time will be shown and 34,000 square feet of space will be occupied.

Models of three of the old George Stephenson engines will be shown—the famous Rocket (1829), the Blanche (1816), and Mercury (1830). Full sized duplicates from the working drawings of Puffing Billy (1813), the first locomotive with smooth wheels for smooth rails, and the Sans Pareil, in which the steam blast was first introduced. From drawings in the Paris Conservatoire full-size reproductions have been made of the Cugnot (1769), the oldest locomotive in existence, and the Segrim (1827), the first locomotive in the world with multi tubular boiler. Experts in Europe who have seen these reproductions pronounce them marvelous achievements and say it is hardly credible that iron, brass and copper could have been so successfully counterfeited.

The exhibit begins with the first method of steam propulsion on land—that of Sir Isaac Newton in 1680. Thence the continuous evolution is indicated to Trevithick and his initial design of the father of the locomotive (1800), and the first (1803) that ever ran on rail.

In 1830 the Cooper was tried on the Baltimore & Ohio Railroad. This was the first locomotive built in America, the first to draw a car, and the first to run more than a mile.

The Baltimore & Ohio have many venerable and valued relics of primitive construction. Four of their original grasshopper engines are still in the company's shops. These will be shown exactly as they appeared when first set to work. The Perkins ten-wheeler (1863), the earliest type of the powerful freight locomotive built for heavy grades, and the "600," the first Mogul ever constructed, and which was exhibited at the Centennial, will be shown full size and in motion. An exceptionally interesting feature will be the Peppersauce (1865), the first mountain climber and the first that ascended Mount Washington. All the old-time examples of locomotives will be mounted on the rails and roadbed of their respective periods.

Will Put 15,000 Men at Work.

Cold weather has a marked effect on the army of employees at Jackson Park. Fully half the force of laborers was retired. Only 5300 men are now at work in the park, but some time before the gates open, perhaps as soon as the ice goes out of the lagoons and the snow runs off the roofs, more than 15,000 men will be at work. The laborers have been concentrated inside the buildings during the cold weather. All the men employed in road making, landscape gardening and other out of door work will be called back to put the grounds in condition for opening day.

Thirty-five State buildings are almost done. The joint territorial clubhouse built by Arizona, New Mexico and Oklahoma is just getting under way.

Chief Skiff's tunnel, under the Mines Building, to show the interior workings of a mine and give practical illustrations of removing ore, is almost finished. Mr. Burnham's men say Machinery Hall, which it was thought would not be ready in time for the opening, will be completed by March 15.

New York Reception Committee.

Director-General Davis has named seven prominent citizens of New York City to act as a committee to receive distinguished foreign guests *en route* to the exposition. He selected Charles S. Smith, Henry W. Cannon, Cornelius N. Bliss, A. E. Orr, F. Lynde Stetson, Charles R. Flint and J. Edward Simmons, and all of them have accepted the appointment and expressed their willingness to serve as members of the committee.

Charles Stuart Smith is president of the Chamber of Commerce and a director of several banks. He is a member of the Union League, Century and Players' clubs.

Henry W. Cannon is president of the Chase National Bank and was a delegate to the recent international monetary conference at Brussels.

Cornelius N. Bliss is first vice-president of the Fourth National Bank and the head of the dry goods house of Bliss, Fabyan & Co.

Alexander E. Orr is a grain merchant, a director of four railroads, including Rock Island and Union Pacific, is interested in several national banks and trust companies and is vice-president of the Chamber of Commerce. He is also manager of the David Dows estate.

Francis Lynde Stetson is a leading lawyer of New York and a partner of President-elect Cleveland.

Charles R. Flint is a merchant and lawyer, who was formerly in partnership with ex-Mayor Grace. He is largely interested in the South American trade.

J. Edward Simmons is one of the leading financiers of New York and president of the Fourth National Bank.

Documents Proving the Danish Discovery.

Under certain rigid conditions the Danish Government has consented to lend to the exposition documents purporting to prove that America was discovered long before the man in whose honor the fair is being held landed on Watling's Island. These documents might appear out of place at the Columbian Exposition, but they are likely to be on exhibition. Clark E. Carr, Minister to Copenhagen, says that these Icelandic sagas are known as the "Codex Fluteyensis." He adds that notwithstanding the serious doubts that have arisen in Copenhagen as to the propriety of sending the manuscripts, the Government will send them on certain conditions. One of the terms is that the volumes shall be brought back at the close of the fair in a ship of war belonging to the United States Navy, and that every precaution shall be taken during the exposition to protect them from damage. It is stipulated, in a letter to Secretary of State Foster, that the volumes must be kept in an isolated place, where they will be free from danger from fire, and that in the event of their loss the United States shall indemnify Denmark to the amount of at least $20,000.

These documents are regarded by the Danish Government as furnishing conclusive proof that Columbus was not the first European to reach the shores of the new world. The papers have never been exhibited at great expositions, but as a special compliment to the United States they will be sent on the conditions named. The Government of Denmark is willing to intrust them to Commissioner Mier, who will organize a strong guard to accompany the papers.

Miscellaneous.

The long delayed steamship "Gardopee," bringing the first consignment of the Krupp gun exhibit for the World's Fair, arrived in Chesapeake Bay on the 22d ult. The vessel was 29 days coming from Hamburg. A train of 21 cars, specially constructed for the great weight they are to carry, were at the Maryland Steel Works at Sparrows' Point ready to take the guns to Chicago.

The block coal operators of the Brazil, Ind., district met on the 27th ult. in response to a request from Commissioner Havens of the World's Fair Commission, to take steps toward sending a coal and clay exhibit to the World's Fair at Chicago. It was unanimously agreed to send an exhibition and spare neither time nor money to make it a credit to the block coal district. It was agreed not to consider quantity but quality. The coal will be carefully selected and washed, when it will glisten like anthracite coal. The clay will be sent in the raw form. An architect has been employed to arrange the exhibit to the best advantage.

At a recent meeting of the Advisory Council of the World's Congress of Electricians to be held in Chicago this year it was decided that the meetings should last one week, beginning August 21. Fifty-five delegates from the leading countries of the world are expected to be in attendance.

The Inter-Continental Railway Commission have prepared a *fac-simile* in miniature of Central and South America to show the surveys of the proposed railroad intended to unite the systems of North and South America. The work was done by E. E. Court of the hydrographic office, and is a faithful representation of the topography of the countries named. It is about 25 feet long, and will be sent to the World's Fair as a part of the Government exhibit. In addition to the lines surveyed for the railroad the map also shows the routes of the present and prospective steamship lines from North to South America, with the names of their terminal ports and intermediate stopping points, if any.

Germany's $150,000 World's Fair building at Jackson Park was dedicated last Friday. It was Emperor William's thirty-fourth birthday and Herr Wermuth determined to celebrate it in America. Herr Wermuth is the Emperor's World's Fair Commissioner. He gave all the German workmen a holiday and invited exposition officials to be present at the dedicatory exercises. Herr Wermuth did not speak of it in this way. He called it a "richtfest," which translated into English is about equivalent to a "barn raising." The building is not yet completed, but the roof timbers are up and at that stage of a German building it is ready for the richtfest.

Aside from financial perplexities Argentina is prosperous. Exports are once more upon a very large scale. The agricultural classes are doing well, and railway traffic is increasing. Trade is better, too, in Uruguay; Chili is recovering from the effects of the civil war, and the Brazilian Government is adopting a wiser policy.

Steam and Hot-Water Circulation

Manufacturers of Heating Boilers.

After a brief and ineffective existence the United States Steam and Hot Water Heater Manufacturers' Association came to an end at Buffalo on January 26. The dissolution of the organization was due to the withdrawal of the American Boiler Company, the recently organized concern which bought out the boiler business of the Pierce, Butler & Pierce Mfg. Company, the Richardson & Boynton Company, and the National Hot Water Heater Company. The reason given by the American Boiler Company for withdrawing from the association was, that being organized under the laws of the State of Illinois, it was impossible for them to have any connection with an organization designed to control prices in any way, for, as is well known, the law of Illinois in such matters is very strict.

What the future of the trade will be remains to be seen—whether it will result in keener competition or whether the unsuccessful attempt to regulate prices will have an indirect influence in maintaining the market cannot yet be determined. In addition to the American Boiler Company, steps are being taken to control the sale of one other well known, and perhaps more, heating boilers. The negotiations are progressing favorably so far, and if completed the announcement will probably be given to the trade within a week or two.

A Satisfactory Heating Job.

From S. N. H., *Richmond, Maine.*—We recently put in a hot-water heater in our place of business, and perhaps the experience we had will interest your readers. The building is 60 feet long and 25 feet wide, with store 10 feet high, having 15,000 cubic feet. We used 220 feet 1¼ inch pipe and 90 feet of 1-inch pipe, arranged in coils of 4 pipes each; or, rather, we used it in pipes of different lengths with return bends, so that we got 150 feet of radiating surface, and yet we had the store heated comfortably and cheaply. Our workshop is in the basement, so that in it the heater, together with the flow and return pipe, gave all the warmth necessary. Now, what I want to call the attention of the trade to is that on like jobs are not pipes better than radiators? By placing the pipes in different parts of the room can you not with less fire and less surface do more and better heating?

Stopping Leaks in Steam Pipes.

From G. H. A., *Jersey City, N. J.*—Replying to the letter of "J. R.," Norwich, N. Y., that appeared in *The Metal Worker* of January 21, who wished to be informed how to stop leaks in steam and hot-water pipes without taking them out I would suggest that he take a strip of tinfoil and place it over the leak, using a cold chisel to calk the foil in, tapping the chisel very lightly. For all steam and hot-water work two parts sal-ammoniac, two parts sulphur are very useful. By using this preparation your correspondent will never have any trouble with his work.

HEATING NOTES.

William J. Jackson, Philadelphia, Pa., is the patentee of a radiator which consists of a closed steam space with vertical air flues, the steam entering the top, and a conical discharge nozzle leading from the steam space near the bottom into the supply pipe. A feature of the invention is the well formed in the bottom of the radiator with the conical nozzle alluded to.

We are indebted to the A. A. Griffing Iron Company, Jersey City, N. J., for a batch of circulars of some of their specialties. One circular relates to the Bundy Renaissance high art radiators and also gives information about the Bundy improved duplex radiator base and the Bundy art tile radiator. Other circulars relate to the Bundy Elite radiator and the Elite direct indirect radiator. The third directs attention, with illustrations, to the Defiance steam radiator, while another circular of interest to the trade gives samples of the Bundy radiator enamels showing specimens of a variety of colors.

The stockholders of the Harell Steam Heating Company of Dunkirk, N. Y., have voted an increase of capital stock from $40,000 to $100,000. The company will erect several new buildings equipped with machinery to manufacture cast-iron radiators. The company have not been able to fill a large number of orders on account of limited facilities During the past two years they have greatly improved their methods of manufacturing. New and valuable patents have been added to their list. The outlook for the company is a bright one.

M. E Herbert, St. Joseph, Mo., is the patentee of a new form of hot water boiler, the claim made for it being that it is simple in construction and is cheaply built, so that it comes within the reach of the average house owner. The boiler consists essentially of a hollow top forming a water chamber, a water leg depending from it, longitudinal water tubes connecting side pipes at the bottom and tubular grate bars.

The John Davis Company of Chicago have purchased a lot 297 x 100 feet on Ohio street, near Market, on which they intend to erect a large factory for the manufacture of steam-fitters' supplies.

Under date of January 31 the National Hot Water Heater Company announces the sale of their entire business to the American Boiler Company. In the announcement they give a list of the offices of the latter concern and state that the manufacture and sale of the Spence hot water heater and the Solell safety steam boiler will be vigorously prosecuted by their successors.

Under date of January 31, the American Boiler Company issue a notice to the trade announcing the purchase of the business of the Pierce, Butler & Pierce Mfg. Company, the Richardson & Boynton Company and the National Hot Water Heater Company, so far as pertains to the manufacture and sale of their extensive line of steam and hot-water boilers. They refer to their stores at 195 Fort Hill Square, Boston; 94 Centre street, New York; 34 and 36 Dearborn street, Chicago; 507 Mining Exchange, Denver; 80 Crocker Building, San Francisco, and 127 Sixth street, Portland, Ore., where they have superior facilities for meeting the wants of the trade.

E. O. Drake of Royal Steam Heater Company, Gardner, Mass., is about on the road in the interests of the heater, and incidentally putting in good words for Central Oilgas Stove Company's extensive line.

Broomell 'Schmidt & Co., Limited, York, Pa., favor us with an extensive illustrated catalogue of the Heatencook range of their manufacture; this combination apparatus for cooking and hot-water heating having been described at some length in *The Metal Worker* when it was brought out. We understand that it has had a large sale and has given satisfactory results. The catalogue, of oblong shape, contains 40 pages and presents numerous illustrations of the apparatus, both sectional and general views There are also cuts showing transverse views of houses, illustrating the installation of the Heatencook range and the method of connecting radiators. Another circular from the same concern illustrates and describes Our Own radiators for steam and hot water which they manufacture.

Gilbert T. Brewer, Hoboken, N. J., is the patentee of a hot water heater for cars. The invention combines a stove, hot-water condenser, and tank with intermediate circulating pipes, the steam heater consisting of a steam tank located within the water tank.

Miles L. Clinton, Ithaca, N. Y., has patented a steam boiler for heating purposes of the horizontal sectional type. The object of the invention is to improve the construction of the fuel magazine and means of operating the dust gates and other portions of the boiler.

Joseph E. Watts of Lawrence, Mass., is the patentee of an apparatus for regulating the temperature in combination with radiators, the apparatus consisting of a room thermostat and an upright weighted diaphragm connected with the damper; also of a valve loosely mounted upon its bearings and adapted to be opened in one direction by fluid pressure and in the other by electricity.

The import trade of the country is concentrating in New York year by year. In 1891 New York's share of the imports was 62¼ per cent.; last year it was 63¼ per cent. Exports from New York are in the same proportion for the two years, viz., 44⅞ per cent. In other words, of the total imports of the country, amounting to $915,375,377, New York received $572,613,259, and of $1,050,892,197 exports New York handled $377,722,985. In the import trade Boston and Philadelphia are next in importance, and in exports New Orleans and Baltimore are next.

ROOFING AND CORNICE.

Designs in Slate Roofing.

The variety of forms into which the slate of commerce may be cut for the purpose of producing pleasing designs in the covering of a building afford ample opportunity for the disply of artistic talent on the part of the practical roofer. That this ability is possessed to a greater or lesser degree by many engaged in the building trades is evidenced by the large number of engravings in recent issues of the *Illustrated Carpenter and Builder*.

Walking along a quiet country road some half a dozen miles from one of our largest provincial cities, the writer noticed a highly ornamental design worked out in the roof of a little roadside cottage. It was formed with light gray or greenish slates among the usual dark blue slates so commonly used. The center slates were light; some dark ones completely surmonotonous, are not brightened with a little ornament. When one considers the miles of slated roofs seen when traveling by rail, car or omnibus, what an extensive field for decoration there lies dormant! Perhaps it may be urged there is not much scope for ornamenting roofs. Well, that may be so. But has the most been made of this matter that can be made? The example already mentioned emphatically answers no; and the reader, it is hoped

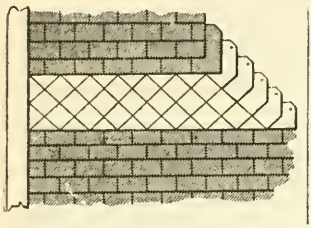


Fig. 1.—Horizontal Band of Slate with Lower Ends Pointed.

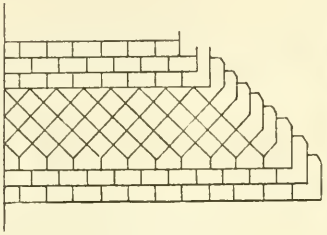


Fig. 3.—Results Obtained When Ordinary Courses of Slate are Used.

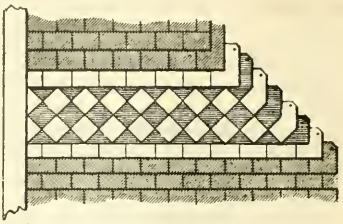


Fig. 4.—Another Combination of Same Form of Slate.

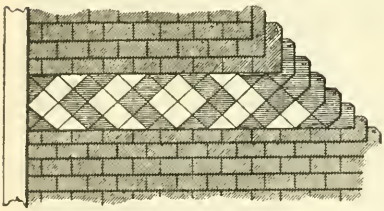


Fig. 5.—A Third Combination.

Fig. 2.—An Enlarged View of Slate Used in Fig. 1.

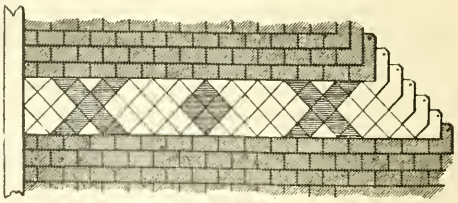


Fig. 6.—A Fourth Combination.

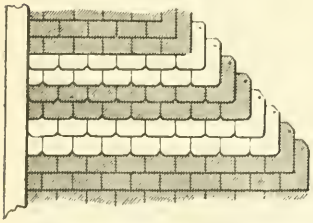


Fig. 8.—Design Obtained from Using Slate Cut, as Shown in Fig. 7.

Fig. 7.—One Form of Slate Employed.

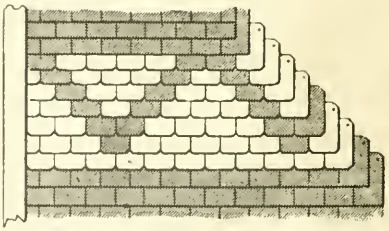


Fig. 9.—Another Design Resulting from the Use of Fig. 7.

DESIGNS IN SLATE ROOFING.

roofs which may be seen at the present day composed of slate, the patterns of which are combined in a highly ornamental manner. Those of our readers who are called upon to execute work of this character are likely to find both interest and value in the suggestive combinations of slate presented in the accompanying illustrations, even though they do represent designs of roofs covering buildings in England. The descriptive particulars which follow are from the pen of Whynn Steyne, and appeared with the rounded those, then light ones were placed outside the dark, and the main body of slates were dark also. Both colors were also shaped at certain parts. This shaping simply consisted of cutting off a corner of the slate here and there as the design required it; and, while interfering a little with the keeping out of the weather, the extent of interference is so very little that the appearance gained more than counterbalances the disadvantage. This example set the writer thinking how seldom it was that roofs, usually so dismal, dingy and ere the article is finished will be able to completely and fully substantiate this answer.

Since seeing the above example of ornamental slating, more than a year has elapsed before an opportunity has arisen for putting it on paper; and while nothing of the same kind has been observed anywhere in the course of the writer's wanderings here, there, and everywhere, other forms of ornament have been observed, and are now put on show in this article for the benefit of all whom it may concern.

The simplest and commonest deviation from an entirely plain slated roof is to have three or four courses of a different colored slate from that principally used. These form a long horizontal band, either light or dark, as the case may be, the whole length of the roof. In large roofs there may be two or three such bands, as in high-pitched church roofs.

The next most common variation is to have a horizontal band of slates shaped at the lower end, but of same color and size as the rest of the slates used. In Fig. 1 is given a general view of such a band, with the additional advantage of having all the shaped slates of a lighter color than the others. In Fig. 2 is given an enlarged sketch of one slate to show how each must be shaped. A shape or template should be prepared of tin, zinc, wood or any suitable material, and the slate cut away to that shape by means of the slate knife. This is not a difficult matter. The size of slate used is immaterial in this as well as the other illustations to be given, although, be it understood, it will be necessary sometimes to use narrower slates at certain places than the standard width. In this case of Fig. 1 all the shaped slates must be of one uniform width. Regarding length the size varies, as an extra course of slates has to be got into the space of four, so that a straight line of color may be obtained at top and bottom. If the ordinary courses be used the result will be as shown in Fig. 3. This is not objectionable at all, and as it is the easier way, it is more often executed both in one and in two colors of slates.

Other variations of color, with the same form of cutting for the slates, are given in Figs. 4, 5 and 6. The first of these three is most easily executed, but the other two will be more effective on the building. Care must be taken to mark off the centers of the design, and then the slates, being all the one width and laid from these marked centers, the design will work itself out all right.

Another form of cutting for the lower edge of the slate is shown in Fig. 7. In this case only the two corners are cut off and the appearance of the roof laid with such slates may be seen in sketch, Fig 8, where two courses of dark slates are laid between two courses of light ones, all treated as in Fig. 7 and laid between courses of ordinary dark slates. The three following Figs., 9, 10 and 11, are variations with the same shaped slate. In Fig. 12 is shown a curved edge on the lower end of the slate, and in Fig. 13 is given a sketch of its general appearance.

Figs. 14, 15 and 16 are all very bold treatments of colored slates, and to be effective should only be used in large roofs. The pattern, it need hardly be said, shown in Fig. 15, should be reversed at the opposite end of the roof.

A common and yet effective shape to cut the slate to is shown in our next illustration, Fig. 17, and its general appearance, Fig. 18, is, on the whole, very effective and highly ornamental, more so perhaps than any of the preceding shapes. Two additional methods of applying this shape are indicated in Figs. 19 and 20, the latter being perhaps the more pleasing. In it the reader may notice that the shaped slates are a considerable piece longer than the other slates used, and that there will be a stronger shadow cast down the side of the triangular portions.

A very slight variation of shape is ob-

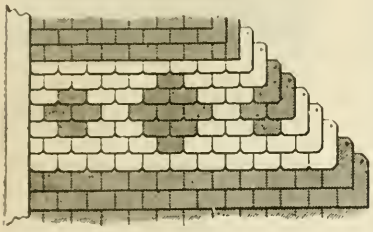


Fig. 10.—Variation of the Design.

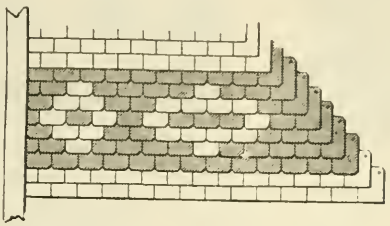


Fig. 11.—Another Combination of Slate Cut as in Fig. 7.

Fig. 12.—Slate Cut with Curved End.

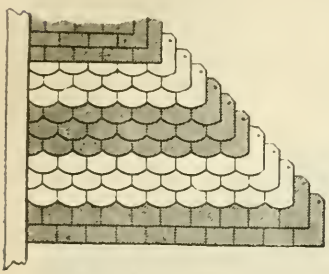


Fig. 13.—Design Obtained from Using Fig. 12.

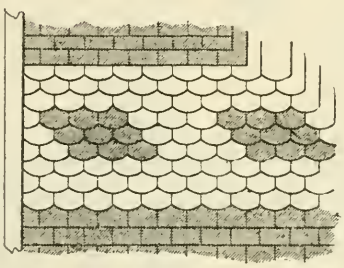


Fig. 14. A Bold Treatment of Colored Slate.

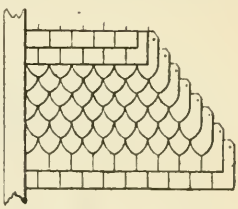


Fig. 18.—Effects Produced with Slate Cut as Shown in Fig. 7.

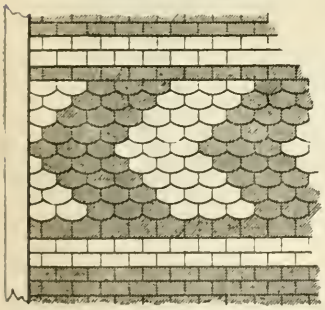


Fig. 15.—A Design Which Should be Reversed at the Opposite End of the Roof.

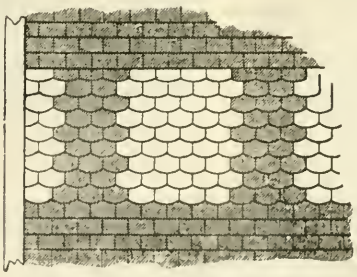


Fig. 16.—Another Combination of Slate Cut as Shown in Fig. 12.

Fig. 17.—Slate Cut with Pointed End.

DESIGNS IN SLATE ROOFING.

servable in Fig. 21, which, however, is very like the preceding examples; but in Fig. 22 is shown the most elaborate of these cut slates, and one that gives a very ornamental effect, as may be seen in Fig. 23. Such a slated roof looks exceedingly well, as the writer can personally testify. A few ordinary square slates inserted among these, as in Fig. 24, may be used to add variety.

At first sight Fig. 25 may seem rather a curious example of slating. It is, however, quite simple when it is analyzed. It consists of alternate courses of two of the shapes previously described, being Figs. 2 and 7. About as curious is the effect of Fig. 26, produced with exactly the same shapes, but with one shape cut out of larger slates than the other, and two courses of the larger slate to four courses of the smaller one. Another combination of shapes is shown in Fig. 27, formed with slates as in Figs. 2 and 12, while in Figs. 28 and 29 are given particulars of yet an-

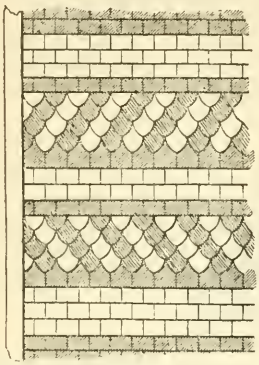


Fig. 19.—Another Design Using Fig. 17.

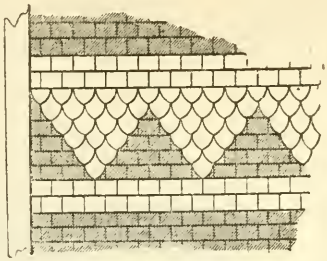


Fig. 20.—Still Another Combination.

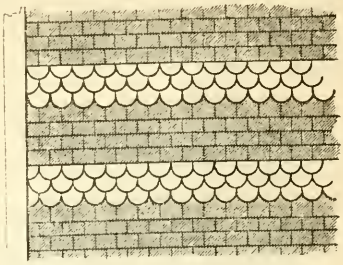


Fig. 21.—Design Employing a Modified Form of Slate.

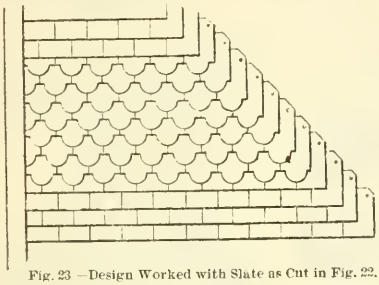


Fig. 23.—Design Worked with Slate as Cut in Fig. 22.

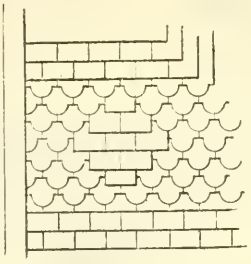


Fig. 24.—Design Varied From Fig. 23.

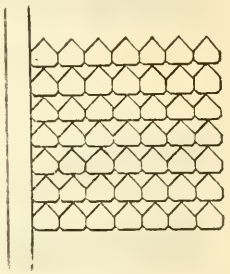


Fig. 25.—A Rather Curious Design.

Fig. 29.—Slate Cut with Half Round End.

Fig. 22.—A More Elaborately Cut Slate.

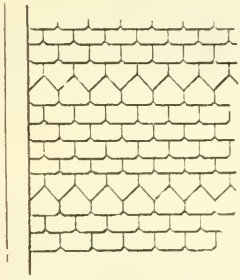


Fig. 26.—A Combination of Slate Cut as Shown in Figs. 2 and 7.

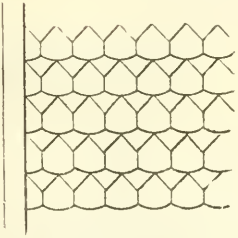


Fig. 27.—Design Formed of Slate Cut as Shown in Figs. 2 and 12.

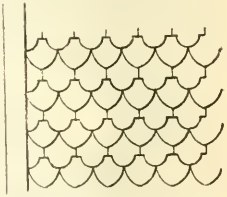


Fig. 31.—Design Composed of Forms Shown in Figs. 17 and 22.

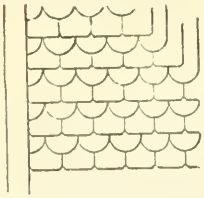


Fig. 28.—Design Formed of Slate Shown in Figs. 7 and 29.

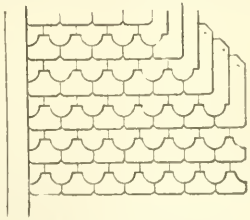


Fig. 30.—Combination of Forms Shown in Figs. 7 and 22.

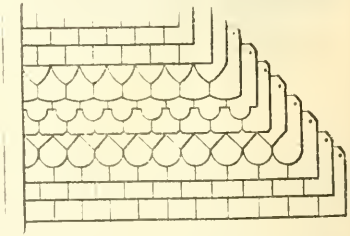


Fig. 32.—Composite Design Made Up of All the Various Forms Here Shown.

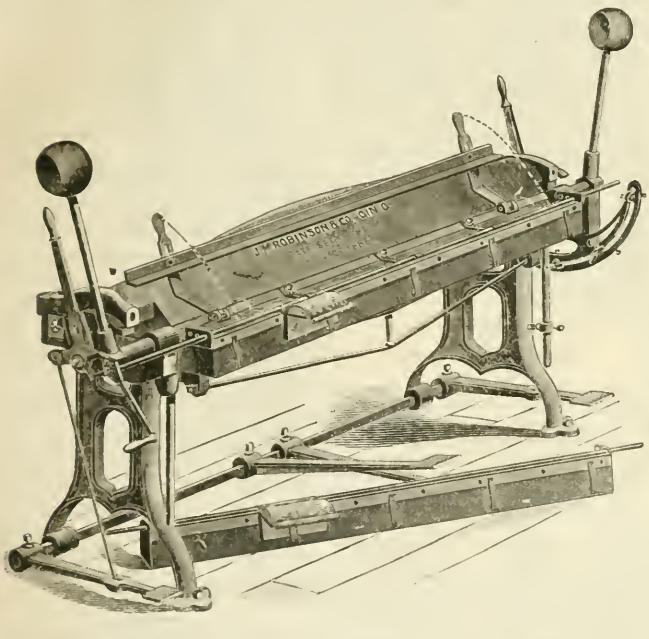
DESIGNS IN SLATE ROOFING.

other. A more ornamental arrangement is that shown in Fig. 30, with the corresponding diagrams in Figs. 7 and 22, and in Fig. 31, with its diagrams in Figs. 17 and 22. To finish up this section properly, as it were, in Fig. 32 is given a conglomeration of all these shapes together—one course of each.

This is more by way of experiment than otherwise, and it would scarcely be wise to carry out such a scheme, unless on some little odd house where quaintness and oddity prevailed throughout. In such a structure the style of slating would then be quite in keeping.

Cornice Brake, with Beader and Gutter Former Attachment.

In the accompanying illustration we present a general view of a cornice brake provided with beader and gutter former attachment, which has recently been placed upon the market by J. M. Robinson & Co. of 225 to 229 West Second street, Cincinnati, Ohio. The attachment



Cornice Brake with Beader and Gutter Former Attachment.

is secured to the bending bar of the brake and is so arranged that with one sweep of the gutter-forming bar the sheet is turned over the former the entire length with an evenness and economy of time which, it is claimed, cannot be obtained with the naked hands. The base, which is made of cast iron, runs the entire length of the bending face, and is secured to the bending bar by means of cap screws. There are three beading rods furnished with each machine, and in each is a groove running the entire length. The rods are journaled in each end of the base in holes suitably provided for each size of rod. The ends of the rods are square for the admission of cranks. There is secured to the top clamp of brake four beading rod clamps, which prevent the rod from springing while the bead is being formed. Secured to the front of the beading and gutter attachment by means of the cornice brake clamps is a wooden former of the proper size and shape required to produce the results sought. The gutter-forming bar is hinged to the base of the beader and gutter-forming attachment, thus permitting, it is claimed, a circular sweep of the gutter-forming bar, and by means of slots in the arms of the support the bar can be adjusted to a circular sweep suitable to the size of gutters being formed. The beader and gutter attachment is made in 4, 6 and 8 feet lengths.

Tarred Felt and Sheet-Lead Roofing.

A new sort of roofing has been patented in Germany and in several other countries which seems to have good qualities. The history of the invention, as related by the *American Architect*, is rather interesting. Herr Siebel of Dusseldorf remembering, what all architects know, that the best protection against damp arising from the ground into walls is a sheet of lead, and remembering also that on account of the great expense of a lead damp course of sufficient thickness to support the weight of the superstructure without tearing, it is quite common in these days to use as a substitute a sheet of tarred felt, conceived the idea that the advantages of both materials might be united by inclosing a thin sheet of lead between two thicknesses of tarred felt. In this way, while the inclosing felt protects the lead from being torn by the irregularities of the masonry and from corrosion by the lime of the mortar, the metal, although thin, interposes an impenetrable barrier against dampness, which is not liable, like the felt alone, to gradual decay. Moreover, the combined felt and lead is much cheaper than lead alone, of the thickness that it would be necessary to use, and, although patented, it is available, so far as cost is concerned, for buildings of very moderate pretension.

While engaged in perfecting this invention, it occurred to Herr Siebel that the felted lead would make a very impervious roof covering, and perhaps a durable one, and thorough tests seem to confirm this idea. The felted lead is sold in the same form as ordinary roofing felt, and applied in the same manner, receiving the usual protecting coating of tar and gravel on top; but the metal protects the felt under it so completely from the evaporation of the volatile portions of the tar, which is the principal cause of the deterioration of composition roofs, that it is said to remain tight for an indefinite period; and, even when the lead is exposed, from the decay of the felt over it, nothing is necessary but to lay over it new felt, with tar and gravel finish, to make the roof as good as ever, while an ordinary felt roof, which has once begun to rot, is not usually worth repairing. The practical man will think of other details, such as the facility with which flashings, gutters and zinc or copper edgings can be soldered to the lead of the roofing, which seem very much in favor of the new material, and it is to be hoped that it may come into use here. It is, however, difficult to roll very thin lead, and it is hard to understand how sheets, inclosed in felt, could be sold for roofing at a price to compete with a tin roof, which would be better in most respects.

Buckling of Tin Roofs.

From I. F. G., *Lebanon, Pa.*—Some time ago I noticed a question in *The Metal Worker* relative to the cause of buckling of tin on roofs. I would say on this subject that in my experience the cause has always been due to the putting of tin on sheathing boards that are not thoroughly seasoned or not entirely dry.

FLASHINGS.

Auld & Conger of Cleveland, Ohio, as the trade are doubtless aware, are the lessees of the Bangor Union Slate Quarry, located at Bangor, Pa., and which is said to be one of the largest quarries in that section. We are advised by them that the so-called Slatington Bangor Slate Syndicate has no control over any of their product, and they say it appears that a single quarry at Bangor has sold, or will sell, any of its production to the so-called syndicate. The firm named make this statement in justice to their customers and to correct any wrong impression that may exist relative to the control of the production of the Bangor quarries.

We are advised that I. N. Phillips, Nashville, Tenn., has just completed a contract for roofing the new shops of the Nashville, Chattanooga & St. Louis Railway in that city. The material used for this purpose comprised 40 cars of slate, with galvanized iron ridge rolls, gutter moldings, conductor pipe and tin lining in proportion. Mr. Phillips also undertook the supply of galvanized iron piping for heating these shops, amounting to 26,000 pounds of iron. He has now in hand a contract for the galvanized iron, tin and slate work for the Home for the Poor and the Asylum for the Insane of Davidson County, Tenn., the tin flue linings in which are nearly 3 miles long. The galvanized iron heating and ventilating pipes for these buildings are also included in the contract.

F. Vohringer, 517 Fifth street, Louisville, Ky., has been granted a patent for a device for painting the inside of tin and galvanized spouting and guttering, thus rendering it less liable to rust. This device is of a very ingenious nature and is claimed to fully meet the demand for something of the kind. Mr. Vohringer has placed his invention in the hands of tinners at various points and in each case it is reported as satisfactory.

Chas. H. Conner of Louisville, Ky., manufacturer of steel cap roofing, reports an active demand for the same, and also a very satisfactory year just closed.

The Wheeling Corrugating Company of Wheeling, W. Va., send us a pretty calendar for the first quarter of the new year. It is made up of three sheets

of cardboard, each carrying a photo-reproduction of a 6 x 8 section of steel ceiling. The printing is in colors upon tinted paper. Above the panel is the name and address of the company, while below is the calendar for the month. On the back of the sheets are the designs of stamped steel ceilings, together with directions for applying the same. For full information concerning these goods, the company refer those interested to their Ceiling Catalogue No. 170, which they state will be sent by mail to any address upon application.

Municipal Inconsistency on the Smoke Problem.

The importance of smoke prevention in large cities can hardly be overestimated, and it was due to this fact that an organized body of influential and public spirited citizens of Chicago was incorporated about a year since, with the sole object of waging a war of extermination on the smoke makers. The result of not more than nine months' systematic and determined enforcement of the city smoke ordinances is suggested in the following paragraph:

Smoke Inspector George of the city health department is at work upon his annual report. He expects to present it to Dr. Ware, city health commissioner, the last of the week. The report will make a showing as to the condition of the city in regard to smoke. In regard to railroads it will be shown that in the matter of smoke prevention their condition is 85 per cent. better than a year ago. Mr. George has compiled reports from every railroad giving the number of locomotives in use and the number equipped with smoke-preventing devices.

"An encouraging sign of the times," said Mr. George yesterday, "is that all the new buildings now in process of construction almost without exception are being equipped with smoke consumers. The railroads, too, are showing the utmost willingness to abate smoke and seem to be doing all in their power to do away with the nuisance. This shows that the public is getting hold of the idea that smoke can be abated and are desirous of taking the trouble necessary to that end.—*Chicago News Record.*

At the commencement of the crusade the public in general, and the "smoke breeders" in particular, were very skeptical as to the possibility of any really important degree of success being attained, and it was a popular belief that smoke-preventing devices were effective only when there was no fire in the furnace.

There can be no doubt that many of the proprietors of establishments whose chimneys were like young volcanoes would have been glad to avail themselves of any reasonable means of stopping their contributions to the objectionable cloud, and to this end a great deal of money has been spent on worthless devices until all further efforts were abandoned in disgust. Of course there was also a large number who took a purely selfish view of the matter and cared very little whether or not the community suffered from their smoke, their sole desire being to evade the provisions of the law so long as it was not rigidly enforced.

The function of the organization is not in any sense official—it merely exercises the right of any private citizen in calling attention of the executive branch of the city government to the continued infractions of the municipal laws, and demanding that the offenders be compelled to pay the penalty. The first batch of prosecutions—comprising a long list of manufacturers and steam users, many of whom are prominent business men—had the effect of opening the eyes of the public to the fact that the movement was in earnest, and that it behooved the offenders no longer to consider the law a dead letter. By employing a large corps of engineers, under a competent chief, the society was enabled not only to inspect the offending plants, but to suggest the necessary remedy; and the result has been, as indicated in Inspector George's report, that numerous efficient devices have been developed and applied. In most cases the prevention of smoke, instead of entailing an additional expense, is actually a source of economy, owing to the more perfect combustion of the fuel, and this fact once realized will be an important factor in the ultimate outcome of the movement.

There is, however, a striking anomaly in the situation. While the city government is, at short intervals, imposing fines upon long lists of violators of the smoke ordinance, the city itself is unquestionably the worst of the offenders. It is a fact patent to any observer that the chimneys of the public schools and other city institutions emit the densest clouds of the blackest smoke to be found within the corporate limits of Chicago, and have done so unmolested (apparently) during the entire period in which private citizens have been punished for the same offense, though committed in a lesser degree. There is neither consistency nor fair play in this. If a city official in an official report can state that the necessary means for smoke prevention are available and in use by private citizens and corporations, it logically follows that the same devices are available for the use of the city. It is rather a parody on justice for the lawmaker to punish the individual for violations of the law which itself violates. The nuisance of school-house chimneys is aggravated by the fact that they are situated, almost exclusively, in residence neighborhoods where one would naturally expect immunity from nuisances which might be considered excusable in a manufacturing district.

The Rights of Labor.

The labor troubles of the past year have probably excited more discussion of the relations between capital and labor than any previous occurrences of the kind. So much has been printed upon this subject that one would imagine the public thoroughly wearied and ready to say to employers and wage-earners "a plague o' both your houses." But this is not the case. The matter is of too important a nature to be dismissed. Until some effective plan is evolved for settling labor disputes men will continue to discuss the relations of capital and labor and to propound their theories upon the question of the rights of both parties. It is interesting to note that a change has taken place in the manner in which the rights of workingmen are regarded. The Homestead trouble was the occasion of a sudden outburst of rampant socialism from unexpected sources. For a time it seemed that the weight of public opinion was being exerted more and more strongly against individual property interests and in favor of the recognition of some sort of a right in mankind to other people's property. This doctrine was so manifestly absurd that public opinion soon corrected itself, and of late there has been a decided tendency among public speakers and writers to take the anti socialistic side of the discussion.

One of the most forcible, logical and thoroughly sensible contributions to this discussion is an address recently made before the Sunset Club by Z. S. Holbrook of Chicago and now issued in pamphlet form. Mr. Holbrook sets forth the circumstances surrounding the outbreak at Homestead in a calm, dispassionate manner, perfectly free from prejudice and then proceeds to define the rights of the company and their workmen without regard to any other considerations than those of natural rights as laid down by accepted authorities. He denounces demagogism as the underlying cause of the latter day mystification of the true relations of employers and employed. With caustic irony he thus sets forth the demagogic view:

Capital is denounced as a criminal acquisition. The successful merchant or manufacturer is the real criminal of to-day. The way to heaven is by the poorhouse. The hero is the tramp. Poverty has become a virtue. Muscular labor and not brain labor is the highest goal of manhood, and all such talk because the men who use their muscles cast a larger number of votes than those who use their brains.

He says wealth is not created by labor alone, and with almost brutal frankness adds that the province of labor is simply to change the form of matter; it is the province of capital to pay labor its wages for so doing, and then assume the risk and responsibility of changing the place and time of matter. "When wages have been paid all obligations of capital cease, except such as pertain to the domain of private conscience." Following up his course of reasoning to its logical result, it would be difficult to find a stronger presentation of the whole question of labor's rights than the following concise summary, with which he concludes:

1. Work is a blessing, not a curse.
2. The greatest philanthropist is he who furnishes employment to others.
3. Aggregations of capital are beneficial to society, as they reduce the cost of production.
4. Capital and labor are partners, but capitalists and laborers are not.
5. Labor must choose between the certainty of wages and the vicissitudes and risks of profit and less.
6. Having chosen wages as its part, when wages are paid the obligations of capital cease, except such as pertain to the domain of private conscience.
7. The obligations of capital to share profits with labor are no greater than those of others to share their surplus with the needy.
8. No man can show authority for dictating to capital its duty to labor when agreed wages have been paid.
9. Honesty, industry and thrift are the basic elements of wealth.
10. The capitalists of to-day were the wage-earners of yesterday, and the laborer of to-day can become the capitalist of to-morrow.
11. The mounds of property are dissipated by the sure laws of nature; hence the State does not need to assist in the work.
12. It is not a crime to acquire and to own. It may be a crime not to do so if one has the ability. Acquiring must not be confounded with avarice.

Finally, man has an inherent and inalienable right to labor, and this right must not be interfered with by unions or strikers. It is not the business of government to aid in the acquisition of money or to make property, but to protect every man, the humblest and the wealthiest, in his lawful efforts to acquire and enjoy the fruits of his labor.

The official report of the Mexican Secretary of the Treasury, giving the exportations from that country for the past fiscal year, has just been issued. It shows that the total value of the exports through the 40 custom houses of Mexico was $75,467,700. Of these exportations the precious metals reached the total value of $50,000,000. The exports of precious metals exceeded those of the preceding fiscal year by $13,000,000, while those of miscellaneous productions fell off $700,000. Tht exports were distributed among foreign nations as follows: Germany, $4,434,231; Belgium, $340,659; Colombia, $31,048; Costa Rica, $1050; Spain, $661,849; United States, $49,392 664; France, $4,644,385; Guatemala, $143,740; Holland, $19,997; Honduras, $4400; England, $15,267,455; Italy, $4732; Nicaragua, $10,914; Russia, $26,200; San Salvador, $3519; Venezuela, $3250. The exports to the United States aggregated $4,949,588 more than in the preceding fiscal year.

The Broadway Improvement Company will put up a fire-proof sky scraper near Fourteenth street for $600,000. The walls will have an iron and steel frame, which may be said to be the fashion in buildings of this description.

"The Metal Worker" Competition in Skylight Pattern Cutting.

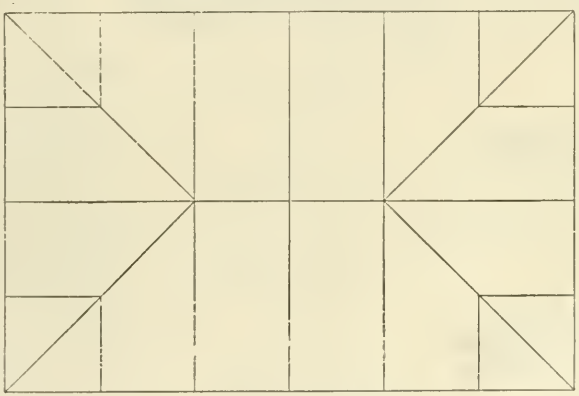
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated on plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

TIN PLATES.

American Tin Plate Brands.—II.

In continuation of the list of brands and trade marks used by manufacturers of American tin and terne plates, printed in our last issue, we present herewith a second list, containing further informatian on this subject, which nearly covers the whole field. There are, however, still a few firms which remain to be mentioned. These we hope to give at an early date, as their communications had not reached us in time for inclusion in the present notice.

Apollo Iron & Steel Company,

Pittsburgh, P., are putting out one quality of American terne plates, the "APOLLO BEST ROOFING." Made in two sizes, 14 x 20 and 20 x 28; IC and IX. The plates are not stamped. Boxes of the smaller size are branded on one end with the name and trade-mark of the firm, as illustrated in Fig. 1, together with the gauge and size marks "IC" (or "IX") "14 x 20."

Fig. 1.—Apollo Iron & Steel Company's Trade-Mark.

Larger-sized boxes bear on the end the same trade-mark, *stenciled*, and "IC" (or "IX") "20 x 28" On the side of all boxes are branded, in 1½-inch letters, the words: "APOLLO IRON & STEEL CO., PITTSBURGH, PA."

Gummey, Spering & Co.,

Philadelphia, are making at the Continental Tin Plate Works, in that city, a considerable variety of brands of bright and roofing plates in standard sizes, IC and IX. The terne plates of the firm's production are heavily coated by palm oil process, and are known as follows:

1. "*Eagle.*"—Bright surface terne plates. Each sheet is stamped with name and gauge, together with the initials of the firm, as in Fig. 2.

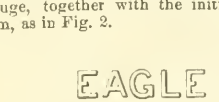


Fig. 2.—"Eagle" Stamp. Gummey, Spering & Company.

Boxes are marked on the end "IC" (or "IX") "EAGLE," while the sides are stamped "AMERICAN ROOFING" and "GUMMEY, SPERING & CO." respectively.

2. "*Liberty.*"—Also a bright surface, palm-oil process terne, stamped on each sheet as shown in Fig. 3. Box marks identical with those of "Eagle," substituting the brand name "LIBERTY" on the end of the box.

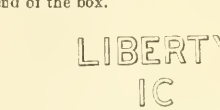


Fig. 3.—"Liberty" Stamp. Gummey, Spering & Company.

3. "*Phœnix.*" } Dark coated terne plates.
4. "*Climax.*" }

made by palm oil process. Sheets invariably stamped with brand name, thickness and initials of the firm. (See Figs. 4 and 5). Box marks similar to those previously detailed, excepting the brand name at the end of box.

Fig. 4.—"Phœnix" Stamp. Gummey, Spering & Company.

Fig. 5.—"Climax" Stamp. Gummey, Spering & Company.

5. "*Flag.*"—An additional brand just added. Marked similarly to above.

6. "*Alderly.*"—Superior roofing plate, resquared, and stamped with brand name. Boxes marked as above, with words "ALDERLY S IC" on the end.

7. "*Pennsyl Old Method.*"—A high-grade roofing plate, hitherto made by the firm abroad, is about to be produced at their American works under the same name.

Of American bright tin plates, Gummey, Spering & Co., are producing four varieties, in standard sizes, IC and IX—namely:

1. "*Phœnix.*"—Best charcoal, "Calland" grade.
2. "*Climax.*"—Best charcoal, "Melyn" grade.
3. "*Liberty.*"—Best charcoal, "Grange" grade.
4. "*Liberty.*"—Best coke plate.

Boxes are all marked on the end with brand, name and gauge, and bear on the side the name of the firm as in the case of roofing plates.

All qualities of plates carry on the box one or other of the company's registered trade marks, namely the "Eagle" or "Liberty Bell," as illustrated in Figs. 6 and 7.

Some of the other brands are about to be registered, but for the present, the "Phœnix" and "Eagle" are used in conjunction with the eagle trade-mark on the

Fig. 6.—Eagle Trade-Mark. Gummey, Spering & Company.

Fig. 7.—"Liberty Bell" Trade-Mark. Gummey, Spering & Company.

boxes, while "Liberty" and "Climax" plates alike bear the bell trade-mark.

St. Louis Stamping Company,

St. Louis, Mo., are turning out two brands of bright tin plates of IC and IX gauge, viz:

1. "*Granite.*"—A rolled plate, heavily coated, made in standard sizes, 14 x 20 and 20 x 28; 112 sheets to the box. The boxes are marked on the side with name of brand, as above, in conjunction with gauge and size. Each box also bears the words "AMERICAN TIN PLATE."

2. "*St. Louis.*"—A rolled plate of American soft steel, bearing a medium coating and finish, IC and IX; sizes, 14 x 20 and 20 x 28, 112 sheets to the box; also IC, 10 x 20, 225 sheets to the box. Box markings are similar to those of "Granite," excepting substitution of the brand name, as above.

In addition to those above noted, a variety of other sizes are made for exclusive use in the company's factory, in the manufacture of stamped and pieced tinware.

Three varieties of roofing plates of American soft steel are also produced by the St. Louis Stamping Company.

1. "*S. L. S. Old Process*"—A hand-dipped terne, made of 20 x 28 size. IC and IX. 112 sheets to the box. The boxes are marked on the end with name of brand, as above, one side being stenciled "OLD PROCESS HAND DIPPED," and the other bearing gauge and size and the words "TERNE S. L. S."

If desired, a guarantee of the amount of coating on these plates is given to purchasers.

2. "*Extra Fine*"—A rolled terne plate, IC and IX, 14 x 20 and 20 x 28. 112 sheets per box. Marked on box, "EX. FINE 20 X 28 TERNE IC" (or "IX").

3. "*S. G.*"—A rolled terne plate, 112 sheets to the box; made in one size, 20 x 28. IC and IX. Marked on boxes. "S. G." 20 x 28 TERNE. "IC" (or "IX"). All boxes bear the name "GRANITE MILLS."

No plates are stamped, and all brands are guaranteed to stand double seaming without breaking.

N. & G. Taylor Company,

Philadelphia, who possess unusually large manufacturing facilities, are turning out

the extensive line of American tin and terne plates detailed herewith:

Roofing Plates.

1. "*The Taylor Old Style.*"—A guaranteed brand. Manufactured in open pots by pure palm oil process. These plates are made IC, IX and XX, 14 x 20 and 20 x 28. The net weight of this brand is 120 pounds for IC 14 x 20, and 240 pounds for IC 20 x 28. Each sheet is resquared and stamped with name, registered trademark (an arrow and target) and thickness, as displayed in Fig. 8.

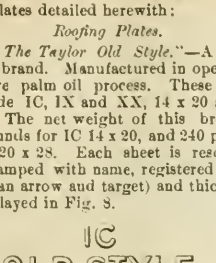


Fig. 8.—"Taylor Old Style" Stamp and Trade-Mark. N. & G. Taylor Company.

Boxes are strapped and marked as follows: On the front "OLD STYLE," with trade-mark and gauge; on the back the word "GUARANTEED," while one side bears the firm name, "N. & G. TAYLOR CO., PHILADELPHIA," and the opposite side bears the words "AMERICAN ROOFING TIN." This marking is uniform for all the brands of roofing plates made by the firm, except that the word "*guaranteed*" applies only to the three first qualities of terne, and is omitted for the lower grades.

2. "*The Taylor Roofing Tin.*"—Guaranteed; IC and IX, 14 x 20 and 20 x 28. Resquared and stamped on each sheet with registered trade mark and gauge, as shown in Fig. 9. Box marks are similar in every respect to those detailed above, except that the front bears the name of this brand.

Fig. 9.—"Taylor Roofing Tin" Stamp and Trade-Mark. N. & G. Taylor Company.

3. "*Columbia.*"—An extra coated plate, made from soft steel, made in standard

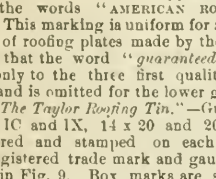


Fig. 10.—"Columbia" Stamp. N. & G. Taylor Company.

sizes, IC and IX. Each sheet is resquared and stamped with registered trade-mark—a shield; also gauge and name. (See Fig. 10.) Marks on boxes similar to those for "Old Style," with the exception of the brand name and trade-mark on the front.

4 "*Maple.*"—Thoroughly coated and well finished; made from soft steel; IC and IX, 14 x 20 and 20 x 28. Sheets re-squared and stamped, with registered trade-mark, displaying brand name and gauge, "IC" or "IX." (See Fig. 11.) Boxes are stamped on one end "MAPLE IC" (or "IX"). Side marks are the same as those of other roofing plates of this firm.

Fig. 11.—"Maple" Stamp and Trade-Mark. N. & G. Taylor Company.

5. "*Willow.*"—A well-coated plate, made from soft steel, resquared; sheets are unstamped, made in sizes 14 x 20 and 20 x 28, IC. Box marks similar to the foregoing brands, substituting the words "WILLOW IC" for brand name on front.

6. "*Knoxall.*"—A registered brand; medium coated plate; made in standard sizes and gauges. Unstamped sheets. Boxes are marked on sides as the other. One end bears name "KNOXALL" and gauge.

7. "*Globe.*"—A well-finished plate, in standard sizes. Sheets unstamped. Boxes marked on the end "GLOBE IC." Side marks similar to those of other roofing plates.

In addition, Messrs. Taylor & Co., manufacture seven brands of Bright Tin Plates of various qualities, viz:

1. "*Brilliant.*"—An extra fine quality, richly coated plate, adapted for high-grade work. Sheets are separately wrapped in tissue paper.

2. "*Royal.*"—A high grade, choicely finished plate for fine work.

3. "*Merion.*"—Well finished, and stated to be a standard quality for first-class wear.

4. "*Linden.*"—Well coated; for good wear.

5. "*Almond.*"—Good ordinary finish; made of soft steel, and intended for every purpose requiring toughness and ductility.

6. "*Mint.*"—Good steel plate of fair finish, suited for all ordinary purposes.

7. "*Locust.*"—Taggers tin of all gauges and kinds.

Boxes are all marked with firm name and address on the side and bear the name of brand stamped in plain letters as above on one end.

United States Iron and Tin Plate Mfg. Company,

Demmler, Pa: The product of this concern includes two grades of bright tin plates, made in standard sizes, 14 x 20 and 20 x 28, with special sizes to order. The gauges are IC, IX, IXX, IXXX, IXXXX and IXXXXX.

1. "*U. S. Bright.*"—A palm-oil process plate, carrying 6 pounds of tin to

Fig. 12.—U. S. Iron & Tin Plate Mfg. Company's Trade-Mark.

the box. These plates are made of extra fine quality American steel, guaranteed to do any kind of seaming. The weights per box are as follows:

14 x 20, IC, 108 pounds.
20 x 28, IC, 216 pounds.
14 x 20, IX, 136 pounds.
20 x 28, IX, 272 pounds.
14 x 20, IXX, 156 pounds.
20 x 28, IXX, 312 pounds.

Each box is stamped with name of brand as above, and also bears on the lid the company's trade-mark and firm name, as in Fig. 12.

2. "*Youghiogheny*" is a bright tin plate which has lately been added, similar in all points to "U. S. Bright," except that it bears 3 pounds less coating per box. Box marks are similar, with the exception of brand name, as above.

Three grades of terne plates are also made in standard sizes, as follows:

1. "*U. S. Eagle.*"—A heavily coated roofing plate, bearing 13 pounds coating per box. The weights per box are:

IC, 14 x 20, 115 pounds.
IC, 20 x 28, 230 pounds.
IX, 14 x 20, 140 pounds.
IX, 20 x 28, 280 pounds.

Each sheet is guaranteed, squared, and stamped as in Fig 13.

Fig. 13.—"U. S. Eagle" Stamp. U. S. Iron & Tin Plate Mfg. Company.

The box also bears the name of brand, with gauge and quality, in addition to trade mark and firm name on lid.

2. "*U. S. Redipped.*"—A very heavily coated plate, carrying about 18 pounds per box. Redipped by hand. Boxes weigh as follows:

IC, 14 x 20, 120 pounds.
IC, 20 x 28, 240 pounds.
IX, 14 x 20, 145 pounds.
IX, 20 x 28, 290 pounds.

Boxes bear on the side a brand "U S. REDIPPED," with other markings similar to those given for "Eagle" brand Each sheet is guaranteed, squared, and stamped as in Fig. 14.

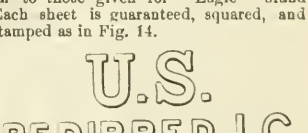


Fig. 14.—"U. S. Redipped" Stamp. U. S. Iron & Tin Plate Mfg. Company.

3. "*U. S. Monongahela*"—Lightly coated plate, 6 pounds to the box. These sheets are coated by oil process, the only one used at the works. Weights of boxes are given as:

IC, 14 x 20, 108 pounds.
IC, 20 x 28, 216 pounds.
IX, 14 x 20, 136 pounds.
IX, 20 x 28, 272 pounds.

Box marks identical with those of former brands, with the exception of

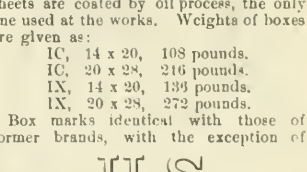


Fig. 15.—"U. S. Monongahela" Stamp. U. S. Iron & Tin Plate Mfg. Company.

brand name, which is placed on the side, as above. Each sheet is squared, and stamped as in Fig. 15.

House Warming.—II.

Broadly, the subject may be considered from two distinct standpoints; first, that of efficiency, which is the adequate production and diffusion of the supply of heat; and, second, economy, or the relation between the existing cost and possible value of the means employed. The former, of ceurse, is the more important, as we must keep warm enough (if we can) regardless of the necessary cost. But, as a purely business proposition, it behooves us to see also that the cost is no more than is necessary. Considered in an abstract sense the comparative efficiency of a heating apparatus is its capacity for delivering, in available manner, the largest possible quantity of the heat generated from the fuel at its most economical rate of combustion. It is, however, the relative efficiency which is the important consideration—that is, its capacity for furnishing the quantity of heat required by the conditions attendant on its location.

For instance, we would say of a stove which was capable of throwing out an unusual quantity of heat on a small consumption of fuel, that it was a very efficient one. And so it would undoubtedly be. But if the same stove were required to comfortably heat a room twice as large as it was capable of doing, the room would not be sufficiently warmed, and we would say it was due to the inefficient heating apparatus, which would not, in any sense, imply that the stove was not a good one, but merely that it was inefficient by reason of the size of the room. Thia is one of the mistakes most commonly made. The heating apparatus, be it stove, hot-air furnace, steam or hot-water boiler, is made of a capacity insufficient for the requirements, and the result is that the fire is forced to a wasteful degree and the rooms are uncomfortable notwithstanding.

CAPACITY OF HEATERS.

It is, of course, a somewhat difficult matter to adapt the capacity of the heater to the exact requirements of its location. The large majority of householders are merely tenants, and as such are more or less given to "moviog." With each change of location there is likely to be a change in the conditions affecting the portable heating facilities, so that the stove which was of ample capacity for the previous requirements becomes totally inefficient in the new quarters. This is to a great extent an unavoidable difficulty to which the migratory class is subject. But it may be rendered much less serious by averaging the conditions between the probable extremes, and, in purchasing a stove, selecting one of sufficient capacity to economically meet the average requirements. Of course people who own their own homes, or those who seldom change their location, may have exactly what is needed, no more and no less, the capacity being made sufficient to easily meet the extreme conditions of the permanent location, thereby placing the medium and minimum requirements under perfect control, as a mere matter of regulation. Stoves may be considered as about the only class of heating apparatus which is strictly portable. Although the majority of modern hot-air furnaces are of the so-called portable class, and being self contained, may be moved as often as desired with the same facility as a stove of equal size, yet they are almost universally considered as permanent items of the house fixtures, and may, therefore, be adapted to the exact requirements of their location. Steam and hot-water apparatus and open grates belong to the permanent class of heaters, and are subject to the same conditions in regard to capacity as the hot-air furnaces.

But whatever be the form of apparatus employed, it is simply the means of transmitting the heat generated by the combustion of ordinary fuels, and whether it is by direct radiation and contact of air; circulation of steam or hot water through pipes and coils, or other form of "radiator," or by conveying a volume of hot air by means of pipes and flues from the furnace to points of utilization—it may be considered broadly as a comparison of the means with the end, wherein the fuel (principally, though not entirely, on the basis of cost) represents the former, and the quantity of heat delivered in available manner the latter.

HEATING VALUE OF FUELS.

Therefore, in order to consider intelligently the comparative efficiency of the several systems of heating, one with an other, and also all, with the theoretical possibilities, we must first ascertain what these possibilities may be. And, to do this, we must ascertain first the heating value of different fuels, according to their chemical analysis; and, second, their relative consumption of air necessary for combustion. The latter involves the effect of combustion on the ventilation, and *per contra*, of the ventilation on combustion, for, as previously stated, the two are interdependent. This, of course, refers only to cases in which the combustion takes place at the point of utilization of the heat, as in case of stoves and open fire places. But the same relation between the heating (independent of combustion) and ventilation exists where the combustion takes place in some location separate from the point of utilization. Also must be considered the fact that the ventilation necessary for health and comfort is, in many cases, far in excess of the requirements of combustion, and that in such instances there is an additional duty imposed on the heating apparatus in raising and maintaining the temperature of the increased volume of fresh air continually entering, while the corresponding quantity is expelled, with its contained heat derived from the heater.

We must, therefore, investigate the requirements of the sanitary phase of the subject; not simply as a matter of sanitation, but with reference to its effect on the heating as well. In the systematic and thorough consideration of such a complex subject, we will naturally perceive defects and conceive remedies therefor more readily than would be possible when our investigations, even though equally extensive, lacked consecutive progression. Consequently, it may be that some suggestions of more or less value can be derived from the examination of the subject now in hand.

Let us now ascertain the theoretical heating, or, to use the technical term, calorific, value of our fuel, and compare it with the amount utilized by the best modern practice. The principal combustible elements found in all fuels are carbon and hydrogen. While there are some others—sulphur, for instance—they are seldom in proportions sufficiently large that they need be taken into account as to their effect on the total calorific value of the fuel, except, of course, for purely scientific purposes, when it is necessary to be theoretically exact in all calculations. As to their chemical and physical effects, outside of the mere matter of heat, they may or may not need to be considered, dependent entirely on circumstances governing their relative importance. There have been many exhaustive experiments by eminent authorities to determine the exact heat-producing powers of the combustible elements. The formulated results of the investigations of Dulong, Pouillet, Regnault, Dalton, Joule, Péclet, Favre and Silberman and many others* agree so closely as to demonstrate their accuracy beyond question. At the risk of repetition in going over well-trodden ground it may be desirable to go into some little detail in order to have the possibly familiar facts before us as we progress.

ANTHRACITE COAL.

As anthracite coal is by far the most extensively used of all fuels for domestic purposes, we will now see the possible value of an average grade according to its analysis, first mentioning that the constitutents of 1 pound of pure anthracite are:

	Per cent.
Carbon	90 to 94
Hydrogen	1 to 3
Oxygen	1 to 3
Ashes	3 to 4
Water	1 to 2

From the exhaustive report of the Geological Survey of Pennsylvania we take the following analysis of anthracite coal from the Lehigh district:

	Per cent.
Fixed carbon	92.07
Volatile matter	5.03
Earthy matter	2.90
Total	100

Specific gravity 1.57. Heat units 14,221.

To ascertain the calorific value of 1 pound of this coal, we must first see the individual values of its several constituents, which according to Favre and Silbermann, are as follows:

Hydrogen	62,032 heat units.
Carbon	14,544 "

It will be noticed that in the first analysis there is a small percentage of oxygen, the effect of which, in a fuel containing hydrogen, is that the available quantity of the latter is reduced by reason of the direct combination of a portion of it with the oxygen in the production of water, without any useful calorific effect. The combining proportions of the two elements being eight of oxygen to one of hydrogen, the net, or available, quantity of the latter will be the given quantity less one-eighth, by weight, of the oxygen present, or hydrogen $= H - \frac{O}{8}$. For example, the analysis gives 1 to 3 per cent. of both hydrogen and oxygen, and we may assume the quantities of the two to be equal, say 2 per cent. of each. We then have $2 - \frac{2}{8} = 1.75$ per cent. of available hydrogen. In the second analysis we have neither hydrogen nor oxygen, but an item of 5.03 per cent. of volatile matter, the composition of which has not been determined. This is usually composed of one or more of the compounds of hydrogen and carbon, which have different calorific values, according to the proportions of each. Oxygen, nitrogen and sulphur being present will, of course, also be accounted for as volatile matter. In anthracite coals the percentage is usually small and need not be given in detail for determining the calorific value. In bituminous and semi-bituminous coals, however, the percentage is so large that its value can only be properly calculated from its complete analysis. In the present instance it will be noted that the heat value is given as 14,221 thermal units, and from this we may ascertain the value of the volatile matter by simply deducting that of the known quantities—carbon only, in this case—which gives:

	Heat units.
Carbon 92.07 per cent. × 14,544 heat units per pound	13,390.7
Total given	14,221.0
Leaving for volatile matter	93.03

* Numerous references are made to Barr's "Combustion of Coal," which contains much valuable information on the subject of fuels.

CANNEL COAL

As we will have occasion to refer later to different bituminous coals, as well as charcoal, coke and wood, we may dispose of the question of their several calorific values in the present connection, making reference to them as we progress in consideration of the subject. Cannel coal, which is a hard variety of bituminous, though not unlike anthracite in appearance, is of totally different composition, being very rich in hydrogen and correspondingly less rich in free carbon. Of several analyses of this coal from Pennsylvania, Indiana and Kentucky, given in detail by Mr. Barr in his "Combustion of Coal," we select as an average the following by Prof. E. T. Cox, the sample being from the mines of the Buckeye Cannel Coal Company, Davis County, Indiana.

	Per cent.
Carbon	71.10
Hydrogen	6.06
Oxygen	12.74
Nitrogen	1.45
Sulphur	1.00
Ash	7.65
Total	100

The available hydrogen, $6.06 - \frac{12.74}{8} =$

Calorific value.

4.47 % × 62,032 = 2,772.8 heat units.
Carbon, 71.10 × 14,544 = 10,340.8 "

Total heat units per pound of coal.....13,113.6

Weekly Prize Competitions.

$25.00.

FOR MORE than six months Weekly Prize Competitions ($10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of $12.50, a second prize of $7.50 and a third prize of $5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. These competitions are open to every one, and it is hoped that there will be a general response from business men. Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers to the different questions will be favorably regarded as meeting the purpose for which these competitions are announced. We shall have the privilege of publishing any or all of the contributions received.

Weekly Prize Competition No. 4.

SUBJECT:

Suggestions as to Improvements in Putting up Goods.

A good deal of attention has been given by manufacturers to the matter of putting up goods, and there has been a great advance in the attractiveness and convenience of packages. There is, however, an opportunity for further improvement, and the object of this competition is to call out suggestions as to how manufacturers can still further meet the wants of the trade in this regard. This subject touches upon the following points, as well as others which will occur to our readers:

The advantage to the retailer of convenient and attractive packages.

Goods which suffer from the way in which they are put up.

Goods which are not put in boxes, but should be.

Improvements in the kind or style of boxes.

Whether packages are of convenient form or size in view of the quantity of goods contained, or shelf or other requirements.

Improvements which might be made in labels as to color, form, prominence of size or number, &c., with samples of desirable labels.

Whether it is desirable for labels to provide a place for marking the cost or selling price.

Whether directions for use are suitably given in connection with goods which require them.

Shortage in count or weight.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

Replies are to be received not later than February 25, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Weekly Prize Competition No. 4.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 1. Closing February 4.
How to Avoid the Accumulation of Dead Stock.

No. 2. Closing February 11.
How to Keep the Store Neat and Clean.

No. 3. Closing February 18.
Waste in the Store and How to Avoid It.

No. 4. Closing February 25.
Suggestions as to Improvements in Putting up Goods.

Another subject will be announced in our next issue.

Our readers are also reminded of the following Prize Competitions, announced on another page, in each of which four prizes, of $50, $25, $15 and $10, are awarded:

No. 6. Closing February 18.
How Retailers Can Best Advertise and Extend Their Business.

No. 7. Closing February 18.
Travelers' Yarns.

No. 8. Closing February 18.
How to Treat Clerks.

No. 9. Closing February 18.
Shop System of Keeping Track of Jobs.

No. 10. Closing February 18.
Business Maxims—At Least 10.

No. 11. Closing February 18.
How Small Retailers May Keep a Record o Prices.

News and Notes.

Several organizations of machinists East and West are endeavoring to make universal a rule requiring four years' apprenticeship before anybody can be recognized as a competent workman.

Glass manufacturers in Pennsylvania find that they cannot depend on natural gas fuel and are adopting coal. The Findlay field is also said to be exhausted. Crude oil as a substitute is too expensive.

Thirty ships were loaded at San Francisco for New York last year, instead of about a dozen per annum, as heretofore.

Over 500,000 lizard skins were imported from Mexico last year for conversion into card cases, pocket books, purses and such articles.

Twelve leading locomotive works in this country built 1703 locomotives in 1892, against 1968 in 1891. Forty-eight of the principal car factories turned out 93,393 freight cars last year.

Horace Smith, of the firm of Smith & Wesson, in his will leaves for objects of charity one-half of his estate, which is estimated at $1,000,000.

Governor-General Stanley of Canada, in opening Parliament, stated that the completion of the canal works at Sault Ste. Marie is being hastened to make Canadian commerce independent of any other route.

Five lighthouses on the coast were destroyed in the recent storms, and the damage to lights and buoys is estimated at $1,000,000.

In the Hawaiian Islands there are 40,000 contract laborers who could not be "annexed" to the United States under existing laws.

What is known as the Arnot case, on trial at Williamsport, Pa., to test the legality of the Reading combine was decided by the Lycoming County court in favor of the defendants. It will be appealed.

The College of the City of New York proposes to erect a new building which will cost not less than $575,000.

President Howell says he expects before long that electricity will take the place of the cable on the bridge railroad.

The Commissioner of Navigation estimates that about $200,000,000 a year is now being paid by Americans to the owners of foreign marine tonnage.

The Boston Heating Company have just realized 10 per cent. on their stock, being the first and the last dividend to be derived from their investment.

Cotton planters are preparing for another convention, to be held next spring, to restrict production.

The Hawaiian Kingdom seeks closer relations with the United States, and the Legislature proposes a royal commisson who shall proceed to Washington to obtain information as to terms upon which more satisfactory relations can be established between the two countries.

STOVE TRADE NOTES.

Changed Conditions in the Stove Trade.—V.

By Stovemaker.

The principle of protecting the retail dealer is just and right, but when a class of purchasers break away almost in a body from one source of supply and seek another it is folly on the one hand to try and hold them back, or on the other to refuse to let them in. When the movement is one as well defined as that proved in an incredibly short time to be, individual adherence to former lines in the hope of thwarting it is business suicide. As well might the clerks refuse their salary because of such freaks as the bosses refuse the trade.

And yet while the best policy for any concern lies in looking new issues squarely in the face and going with the tide of demand, it is nevertheless a fact that such changes work injury to the trade during the transferring process that rob profits for a long time.

The very nature of the changes which the trade has undergone during the last ten years has made it difficult for wholesalers to preserve prices and profits. The desideratum has been to get all the customers possible among new buyers to equal sales to the old, and as many more as might be accomplished. The field, which before was limited and portioned out, as it were, each one having its special territory or customers, became open to everybody and with fewer preferences, so that the concern established 50 or 60 years found their goods no longer enjoying the high rating bestowed on them by old buyers, and the obscure founder jumped to a position of equal footing. To maintain the hold upon the trade and suffer no curtailment of output, prices have been subordinated in hopes that after getting the customers something would happen to warrant an advance.

DECLINE IN PRICES.

Thus it is that in this department of the stove business there has been a decline in prices of at least 20 per cent. in excess of the decline due to natural causes that have taken place in all the other departments, and ranges for flats are furnished to the builder all set up complete for less than the ranges alone were sold for ten years ago. The loss is felt more keenly because every such range set diminishes the demand and lessens the stove trade of the future. The local demand in family cook stoves and ranges is suffering to-day from the lengthened life of the ranges that have been set stationary during the past ten years. Had the same number of portable stoves been used instead, many of them would have been replaced ere this. The difference in the longevity of the two constructions is not due to the difference in the wear and tear from use, but to the destruction from accidents in moving to which the portable stove is subject and the set range is not. The family cook stove that suffers a broken top or bottom through the recklessness of furniture movers is sold to the junk dealer and a new one bought, but the set range remains intact from year to year, and has only to be supplied with new fire linings occasionally to make it serviceable.

The greater risk attached to selling stoves to builders increases the expense for investigating their responsibility, and the percentage of bad accounts is proportionately increased. The high value of such property precludes the possibility of protecting the claim by bidding in the property at a foreclosure sale when the builder fails, and such a thing as a surplus over the mortgages to pay off unprotected creditors is rarely known, so that the failure of the builder means to the stove man a total loss of his bill.

HEATING STOVES.

The cook stove trade is scarcely more affected now by the modern flat construction than the parlor and heating stove business. The front parlors in such flats are now warmed by heat from furnaces or by fire-place Franklin heaters, built in, and the necessity for buying a small heating stove for such rooms is no more. The trade in portable cooking and heating stoves is nowadays practically confined to the lower section of the city below Fifty-ninth street and mainly below Thirty-fourth street, and even in this section it is constantly being reduced as old dwelling houses are torn down, and the new style of tenement erected on the site. In a smaller degree the trade in Brooklyn, Jersey City, Newark, and all surrounding towns is affected by the same cause, and no house with any pretension at all is now built that does not contain a stationary range for cooking, and either a furnace or fire place heater for heating purposes. Old houses that are overhauled and remodeled are furnished in the same manner, and the stove man will shortly find it unnecessary to call at some of these old familiar houses except for repairs, when formerly the frequent change of tenants required his presence and services there often either to deliver a new stove, set up an old one or furnish pipe, fire board or something of the kind.

Stoves will never be driven out of use altogether, but the tendency of the present time is to relegate them to the rear as much as possible. Devices are constantly being made to save people the trouble of making and taking care of several fires in different parts of the house, to save the expense and damage in moving them about, to spare them the labor of putting up, taking down, blacking, fitting and renewing pipe, carting ashes and the danger of fire, and thousands of appliances for burning oil, gas and vapor for heating and cooking have been introduced, and apparatus for heating by hot water and both cooking and heating by steam are extensively adopted, all hastening the retirement of the stove.

REMEDIES FOR THE TROUBLE.

After the diagnosis of the diseases from which the stove trade is shown to be suffering the question is, what remedies shall be prescribed?

How can the ruinous rebates, deductions and concessions to the furniture dealers be eliminated forever as an element in the trade or prices be adjusted to cover them? Can any one house or any dozen houses by the adoption of a conservative policy hope to increase profits to themselves or accomplish the result for all? No, in the present condition of the trade those not joining in the reform movement would hail the opportunity of taking custom from the others, and through their lack of steadfastness the dealers would fly from one manufacturer to another at any attempt to raise prices or abolish concessions that were not general.

How can the repair trade be wrested back from the control of the repair dealers? Can the feeble efforts of individual concerns or a local association expect to do it? No, it will take the determined efforts of a powerful corporation with back bone to sink thousands of capital before the traffic can be rooted out.

How can the merciless and foolish competition in the flat range business be suppressed?—competition that scales down the profit on every successive order taken. There is not a manufacturer hereabouts who caters to that trade and expects to remain a factor in it, no matter how high the repute of his range, who can get a dollar or two more for it than his neighbor with a poorer one who cuts the price.

Who is simple-minded enough to think that one concern can alter the course of business by setting an example to all the others? How long before he would be compelled to shut down his foundries if he let each customer go who demanded a reduction in price to meet another quotation? How can all the New York City men combined expect to change the conditions with Pennsylvania at her door dumping surplus stocks at cut prices which the Pennsylvania Association gives its members the privilege of doing?

A negative reply to the above questions is the only one appropriate, but a very natural conclusion would be, and the reader might well ask, if the conditions of the Eastern trade are as stated, why manufacturers do not come together and with one accord abolish all the concessions which have operated to rob them of just profits? Why they do not resolve that from a certain date the blacking of stoves shall be charged for at a certain price, that stoves in certain quantities will be delivered free of cartage, and when smaller numbers are ordered which must be sent by express, the charges to be collected; that the consignee shall be responsible for all breakages occurring in transit when goods are not delivered by the wholesaler's trucks; that charge will be made for examining a stove put up by a dealer, &c.

POSITION OF LOCAL MANUFACTURERS.

"It is never too late to mend," and it may be admitted among the possibilities of the future that they will do so, but so far as the New York manufacturers are concerned, the time seems very remote. There have been any number of meetings and dinners within the last five or six years among the New York men, and the idea has been broached and some exchange of views and debate upon the subject has occured, but it has been confined to a certain few who have set themselves the task of agitating the matter and endeavored to work up a general sentiment in favor of the reform. Their efforts have always proved abortive and to-day there is no sign visible pointing to such a probability.

A feeling of distrust has permeated the New York wholesale trade for a long time and it sometimes seems it will never die. There can be no doubt that every

firm would be glad to own allegiance to an association whose influence was adding to its profits no less than all others interested in it, but there are too many who refuse to believe that such a result is possible, to help in forming one.

The reason why this disbelief exists is very plain and very natural, and is owing to the unparalleled concessions such an association would be expected to eradicate. They have been so far reaching, so overreaching and so abundant, and the manufacturers have struggled so hard to outstrip each other to find some new concessions to attract customers that they cannot believe there is such a thing as mutual forgiveness for them.

In times past when the allowing of an extra 2 or 5 or maybe 10 per cent., or otherwise cutting prices, worked against profits and made some agreement advisable to adjust matters, the way to a satisfactory understanding was never very hard; but such a condition was a bagatelle compared to the present, and the war that has been waging for so long a time makes it probable that peace will not come till failures call loudly for a cessation of hostilities.

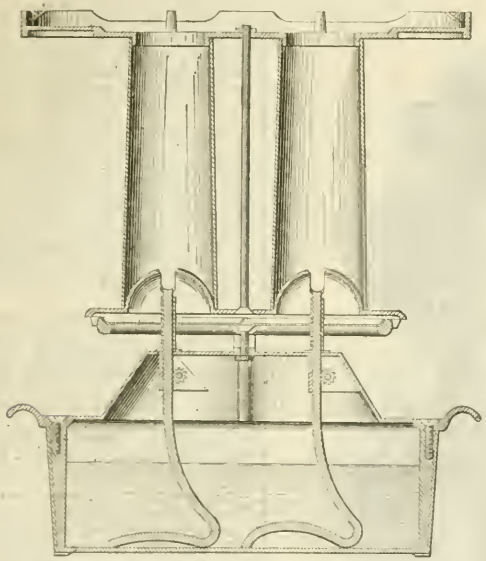
THE END IS NEAR.

The war ought to be over now. The furniture dealers are now about all in. The few remaining who do not sell stoves are all on record as opposed to selling them, and urging by salesmen will not serve to change their determination. The repair business has gone over to the pirates all it ever can, and the builders of flat houses have more or less settled down to using certain ranges—the concessions made by each house to get new customers, and the loss sustained ought to be sufficient to deter all from making any more. But if any agreement upon the matter is impossible, if the formation of an association and the appointment of committees to correct abuses, whose recommendations will be abided by, is out of the question, and if the individual houses continue to be so over-anxious for trade that the methods of the late past and present must be continued with all that that implies, then there can be little question that the only plan to turn back profits into the coffers of the stove manufacturers of New York would be the one considered by so many as oppressive or unjust, and yet which has in so many cases proved a source of profit to those interested, a cheapening of the commodity produced and a benefit to all the people—namely, a trust.

There is reason to believe that while they would hesitate to enter into any other sort of combination, a union of interests such as this would be agreeable. There are those in the city who are known to be strongly in favor of this plan, and who urge its adoption, and there are many listeners to this arrangement among those who laugh at any other.

The Safety Oil Stove.

A new candidate for public favor in the line of oil stoves has just been placed upon the market by the Safety Oil Stove Company of 142 Kneeland street, Boston, Mass. The stove is made with an oil tank constituting the base, this being formed of metal, the top fitting snugly upon and bolted securely to the side walls by means of bolts or screws, as indicated in the sectional view, Fig. 1. There are also provided projecting ears, which form convenient handles for lifting the stove. On the top plate is formed an elevated dome having elongated slots through it for the passage of the wicks, all as indicated in the sectional engraving. Instead of placing the wick raisers within an enlargement of the wick tubes above the dome, as is often the case, they are mounted within the dome. The star wheels on the spindles engage the wick, pressing it against the internal wall or depending flange extending downward at one edge of the wick slot, thus raising or lowering the wick as desired. A good idea of the construction of the wick tube and wick raisers may be gathered from an inspection of Fig. 2 of the illustrations. Above the dome is a skeleton rack having short legs resting on the top, to which it is secured by one or more bolts. The upper frame of the stove consists of several plates between, and to which the chimneys are firmly secured. The cone plate has the usual elongated cones within which the wick tube rises, and around which the base of the chimney snugly fits. It also has a single upright post, to which the front plate is held by a single screw. On top of the chimneys is a skeleton plate for the reception of kettles or articles to rest upon when being heated. The front of the stove is somewhat peculiar, the front plate being an open or skeleton casting, having windows opening into the chimneys at their edges. The sheet metal of which the chimneys are made is cut and turned back against the sides of the openings through the front plate, in order to afford full passage of the light from the burning wick. The openings are closed by a swinging door, consisting of two laterally jointed plates having openings through them corresponding to the windows in the front plate and the apertures in the chimney edges. The construction is such that the top may be readily detached from the base when necessary to trim the wicks, while the latter may be lighted by simply opening the door at the front. We understand that the company are making preparations to place a large number of stoves upon the market at an early date.



The Safety Oil Stove.—Fig. 1.—Vertical Cross Section of the Store.

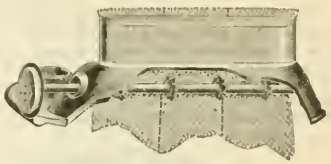


Fig. 2.—Wick Tube and Raiser.

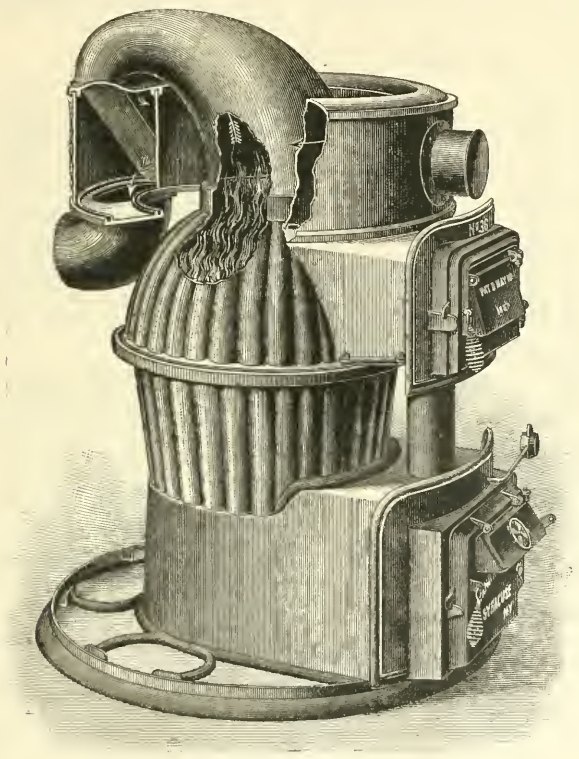
THE BECKWITH MEMORIAL THEATER, reference to which was made in these columns some weeks since, was dedicated at Dowagiac, Mich., on the evening of Wednesday, January 25. The dedicatory address was made by Col. Robert G. Ingersoll, who took for his theme the life of Shakespeare. A large audience was present, including visitors from Detroit, Kalamazoo, Chicago, Niles, South Bend, Lansing, Edwardsburg, Hartford and other places. The Memorial Theater was opened on Friday, January 20, with Mlle. Hortense Rhea in "Much Ado About Nothing." The building is 85 x 115 feet in size and three stories high. The first story is a magnificent arcade of four arches, with 20 feet to each span. The piers are rock-faced and on each is a portrait. The top story front consists of semi-circular headed arches, there being carved bands extending across the piers and bosses to the label moldings. Upon the bay directly over the main entrance is a large medallion portrait of the late P. D. Beckwith, beneath which is a carved panel bearing the name "Beckwith." In the other front bays are portraits in medallion of personages famous in poetry, music and the drama.

ONE OF THE NEATEST advertising novelties which we have seen this year comes from the Art Stove Company of Detroit, Mich. It is a handy little case, of pocket size, which the company are sending out to their customers and to the trade generally. Attached to what may be called the second page of the cover is a little book for carrying postage stamps. It is made of paper prepared for the purpose, and is of a size sufficient to contain in each space eight stamps, with the printed sides together. Attached to the other cover is a folded calendar for the year 1893 and a flat pin cushion. The case is held together by means of an elastic band. Upon the front cover is the name and address of the company, a *fac simile* of their trade-mark

and the words "Laurel stoves and ranges." On the back cover is a picture of the Laurel oil heater. We understand that the Art Stove Company have now ready for the market the new six-hole Home Laurel range, which has been in process of construction for some time past, and to which reference has already been made. They also have ready for the season of 1893 a small oil heater called the Art Laurel Junior.

The Howard Single Radiator Furnace.

The Howard Furnace Company, Syracuse, N. Y., have added to their line a new style of heater, and have just placed it upon the market. This heater, which is illustrated in broken view in the accompanying cut, is constructed to meet the growing demand existing in some localities for a reliable heater of moderate price. We understand that the apparatus is constructed from new patterns made directly under the company's supervision at their own works. It embraces the downward draft principle, which is claimed by the Howard Furnace Company to be so successfully applied in their other heaters. Among the distinguishing features of this new furnace may be noted the large fire pot, increased grate surface and combustion chamber that terminates at its cone-shaped apex in a return flue that is carried over and into the top of a large ring radiator that entirely encircles the upper portion of the heater. The heat is taken around this radiator and thence downward by means of a simple arrangement of dampers into the smoke pipe to the chimney. All these features are clearly shown in the broken view of the furnace printed herewith. The "low down" feature, which is regarded by so many as very desirable, is included in this latest style of furnace. The material and workmanship used in the construction of these heaters, we are informed, are adapted to produce a well finished product. We learn from the manufacturers that this series of furnaces have been subjected to severe trial tests with most satisfactory results. The heater is made in six sizes with fire pot from 18 to 30 inches in diameter, and hight from 50 to 68 inches, and the radiator and all other parts of the furnace are so constructed as to be easily and thoroughly cleaned. The company will continue to manufacture their standard heater, which will be sold as their leading furnace.



The Howard Single Radiator Furnace.

ODD PLATES.

SOUTHARD, ROBERTSON & Co., corner of Water street and Peck slip, New York City, have the following salesmen engaged for the present year: Hilan Seabury will look after the interests of the concern in New York State and the East, while William M. Bray and A. F. Bohn will continue to call upon the trade in New York City and vicinity. We understand that they have already booked a number of gratifying orders for the Columbus ranges, which, with the Wren, Pansy and New Rocket, make a very popular line of low-price goods.

WARREN FOUNDRY COMPANY, Warren, R. I., begin and end their list of traveling salesmen with the name of their general manager, S. H. Peirce, who keeps their stock of Woodlawn stoves and ranges in a gratifying state of hard pan. Mr. Peirce has had much experience with the trade and is known as a thorough all-round stove man.

THE LEHMANDT & MCDOWELL STOVE COMPANY of Philadelphia, Pa., have adopted a neat method of advertising their well-known cook stove known as the "Farmer Girl." The scheme consists of incorporating in the upper left-hand corner of the letterheads of their agents a bird's-eye view of the company's works, below which is the inscription, "This is where the celebrated Farmer Girl cook stove is made—over 500,000 now in daily use." At the extreme right is a circular panel carrying a picture of the cook stove and beneath it the inscription, "The Best in the World."

THE CORTLAND HOWE VENTILATING STOVE COMPANY of Cortland, N. Y., have been advised by Secretary Bicknell of the Massachusetts Charitable Mechanics' Association that they won a gold medal for ventilating stoves shown at the eighteenth triennial exhibition held by the association, at Boston, last October and November.

THE LEBANON STOVE WORKS of Lebanon, Pa., have engaged George Moe to represent them during the next 11 months in Southeastern Pennsylvania, New Jersey, Delaware and the Southern States, and Stephen Light of Lebanon, to canvass the stove trade in Western Pennsylvania, Western Virginia and Western Maryland.

TAUNTON IRON WORKS COMPANY, Taunton, Mass., have recently completed a building 160 x 50, three stories high, which is to be used as an addition to their mounting room and for storage purposes. The offices of the company will also be located in this building, and we are advised that they are very handsomely fitted up. This concern has abandoned its Boston headquarters and now transacts all business at Taunton.

THE FULLER & WARREN COMPANY of Troy, N. Y., have chosen as trustees Walter P. Warren, Charles W. Tillinghast, John Hobart Warren, Gurdon G. Wolfe, Walter Thompson and William Henry Warren. The trustees elected the following officers: President, Walter P. Warren; vice-president, Gurdon G. Wolfe; treasurer, Joseph Mackey; secretary, Robert S. Wood.

THE STUART & PETERSON COMPANY of Philadelphia, Pa., favor us with a copy of a catalogue which they have just issued from the press relative to their leading lines of manufacture. Among the furnaces and ranges we note the Snowflake, made in several sizes; the Fulton, a neat range embodying the modern features; the Favorite, a member of the same general class, and the Madeline. There are also shown several varieties of charcoal furnaces, together with an extensive assortment of enameled, tinned, bright and plain hollow ware, griddles, waffle irons, coffee and peanut roasters, evaporating dishes, steam jacketed kettles, cuspidors, caldrons, &c. The volume is made up of nearly 80 pages and is bound in paper covers. The company also give attention to ice cream storage cans, refrigerator tanks, &c.

THE TRAVELING SALESMEN who will represent the Gibson-Love Mfg. Company of Chattanooga, Tenn., during the present year are M. M. Price, who will cover middle and Southern Georgia, South Carolina and Northern Alabama; W. W. Axley, who will travel in Eastern Tennessee and middle Tennessee, Virginia, Kentucky and North Carolina; J. B. Marsh in Southern Alabama, Mississippi, Louisiana and Florida, and H. H. Jones, who will look after the interests of the company in Chattanooga and immediate vicinity.

THE LINES OF UNIVERSAL STOVES which Cribben, Sexton & Co. of Chicago, Ill., are supplying to the trade are meeting with a very gratifying reception, if one may judge from the letters which are being received by the concern. In their mail

last week was a letter from a customer in West Pullman, Ill., who wrote that the only comfortable house in that place this winter is heated by a Brilliant Universal parlor stove. Five rooms, a hall and stairway were all thrown open, and notwithstanding the fact that during the recent cold snap the thermometer went down to 20° below zero, the stove did its work with entire satisfaction. The wife of the customer considers it the best investment he ever made.

THE MICHIGAN STOVE COMPANY, Detroit, Mich., are putting up a new warehouse building, which will be devoted exclusively to the storage of castings and supplies. It covers an area 156 x 50 feet in size, and is being constructed of brick with a stone foundation.

W. H. PAISLEY looks after the interests of the Paisley Stove Company of Beaver Falls, Pa., traveling through Southern and Western Ohio, Western Pennsylvania, Northern Illinois and Indiana.

THE PHILLIPS & CLARK STOVE COMPANY of Geneva, N. Y., have engaged H. R Chambers to look after their interests in New England and Eastern New York; J. T. Chase in Central New York and Pennsylvania, and R. R Woodcock in Western New York and Ohio.

WE LEARN from E. H. Gilman, treasurer of the Somersworth Machine Company of Dover, N. H., that they will be represented on the road this year by George F. Drew, whose route includes Massachusetts, Rhode Island, Connecticut and the lower section of Vermont; J. H. Moore, who will cover Vermont, New Hampshire and Maine, while M. D. Bingham will look after the local trade.

CHARLES E. COLEMAN, representing Eugene Munsell & Co. of 218 Water street, New York City, is now visiting his many friends in the trade through New York State, Western Connecticut and Massachusetts. Although the thermometer during the recent cold snap registered between 18° and 31° below zero at Elmira, Bridgewater and other Central New York towns, orders for spring and summer goods were plentiful, owing to the fact that the average stove dealer received no little encouragement by reason of his disposal of fall stock of parlor heaters. Mr. Coleman is of the opinion that the present season has been the best for many years. He reports a gratifying demand for the company's specialties, all of which, as our readers know, bear the familiar name "Manhattan."

THE BUCK'S STOVE & RANGE COMPANY of St. Louis, Mo., have recently filled an order for one of their Buck's Brilliant base burners, which was shipped to Ireland.

AMONG THE ORDERS which have been filled by the Peninsular Stove Company of Detroit, Mich., may be mentioned one for a three-gang or triple combination Peninsular wrought steel range for the new union depot in Detroit. We understand that this range is the subject of considerable comment by reason of its handsome appearance and satisfactory operation.

RANDELL & WARD of Le Roy, N. Y., are mailing to their friends in the trade a postal card, upon the back of which are illustrations of their steel lock frame stove truck, one view showing the device ready for use, while the other shows it closed for storing or shipment. We understand that this is a new truck, and that the manufacturers will be in a position to make shipments very soon.

THE BAXTER STOVE COMPANY of Mansfield, Ohio, are making strong claims for their line of Monarch vapor stoves, which, for the season of 1893, possess features likely to attract the attention of dealers generally, and especially those handling vapor stoves. The company have agents in many of the principal cities of the country, and are in a position to promptly meet the demands which may be made upon them.

THE ST PAUL STOVE WORKS, St. Paul, Minn., have made an arrangement with the Laura Nevins Range & Heating Company of that city to manufacture some of the latter company's ranges with the understanding that if the plan proves successful the manufacture will be continued on some basis to be hereafter agreed upon.

AT THE ANNUAL MEETING of the Syracuse Stove Works, held in Syracuse on Wednesday, January 25, J. Emory Eaton was elected president; Fred. J. Fincke, vice-president; Francis Kernan, treasurer; Nicholson E. Devereux, secretary, and William H. Landers superintendent. We are informed that last year was a very prosperous one, showing a healthy increase in business and that orders for 1893 are coming in much better than they did during the corresponding months of 1892. The company look forward to a large volume of trade.

THE RICHMOND STOVE COMPANY of Norwich, Conn., have a staff of traveling salesmen who will look after their interests during the ensuing year, consisting of B. E Mallory, who will cover Southern New England; Norman Whitelaw and Frank W. Whitelaw, who will travel in Eastern New England; Thomas J. Douglas, who will look after the company's trade in Western New England, Eastern Pennsylvania, and along the Hudson River, and Theodore C. Perry, who will travel in the West.

THE SIMONDS MFG. COMPANY, 50 Cliff street, New York, send us an illustrated pamphlet showing Culver's new tubular furnace with upright or round radiator in brick chamber, also with jointless upright radiator, tubular portable furnaces, Montana furnaces for brick setting and also in portable form, steel dome furnaces for coal or wood especially designed for Western trade, and new school house heaters.

C. TERHUNE will represent the interests of Bowie & Terhune of Rome, Ga., during 1893 in the States of Alabama, Mississippi and Louisiana, while E. H. Whitehead will cover Georgia and North and South Carolina.

THE TRAVELING REPRESENTATIVES of the Syracuse Stove Works, Syracuse, N. Y include Col. R. Doggett, who will visit the trade in Central New York; C. H. Ingham in Eastern New York and Vermont; C. B. Hill in Eastern New York and Ohio, and E. A. Wilbur in Ohio, Indiana and Michigan. The Chicago representatives of the company are W. J. McKay & Co., while their Baltimore interests are looked after by Charles C. Heath & Co.

WE HAVE RECEIVED from the Schneider & Trenkamp Company, Cleveland, Ohio, a copy of an attractive catalogue of Reliable gas stoves. It is neatly printed on a good quality of paper and is bound in colored covers with a side title in old gold. A feature of the opening pages are *fac similes* of medals which were awarded the company for their display of goods at the Convention of the Western Pennsylvania Exposition Society held in Pittsburgh last year. There are also given a number of testimonials, following which is a table showing the cost of cooking by coal as compared with gas. The Reliable ranges are shown in great variety, attention being directed to the principal features of construction, the sizes in which they are made, the number of burners employed, the weight when ready for shipment and the price. The engravings are of a character to show the stoves to advantage, and the volume as a whole is likely to prove interesting and valuable to the trade. The line of gas heaters shown is a very attractive one and includes gas grates as well as round and cabinet heaters. A telegraphic code occupies one of the pages.

THE SOUTHERN STOVE WORKS COMPANY of Richmond, Va., will be represented on the road this year by E. T. McCabe and C. H. Fleming, who will cover Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida and a portion of Tennessee.

A. WEISKITTEL & SON of Baltimore, Md., have recently registered in the Patent Office at Washington, two trade-marks constituting the words "Golden Rule" and "Fire King." The former name is applied to a new and complete line of attractive ranges which the company have brought out in three sizes and the usual modifications. The name of Fire King is especially applied to the manufacturers' line of gas stoves, gas ranges, ovens, &c. We understand that they have greatly increased their facilities in the production of gas goods and have made many improvements in this line, besides adding a new cheap gas range, together with a complete line of nickel-treated hot plates. Messrs. Weiskittel & Son have a complete catalogue of gas-burning appliances in process of preparation and it is expected to be ready for distribution among the trade in a very short time.

THE QUAKERTOWN STOVE WORKS of Quakertown, Pa, are operated by the firm of Roberts, Winner & Co., all the members of which are practical men, each having charge of some department of the works. William P. Roberts supervises the operations of the mounting room and attends to the shipping and receiving of goods; O. R. Scheetz is secretary and tressurer, and Frank Cavanaugh is foremen of the foundry. William P. Winner represents the interests of the company on the road, covering Eastern Pennsylvania and Western New York. Charles A. Klump travels in Northern New Jersey, the New England states and New York City, while the Philadelphia sales agency, in charge of Faith, Belson & Co. of 207 Market street, looks after the trade in central and Southern New Jersey and the territory south of Quakertown.

GEORGE M. CLARK & CO. of Chicago, Ill., have taken possession of the building 153-155 Superior street, in order to secure additional facilities for their rapidly increasing business. The new structure covers an area 50 x 150 feet in size and is five stories and basement in hight. It adjoins their old quarters and makes the entire building now occupied 125 x 130 feet in area and five stories and basement in hight. The company also occupy an additional floor at 161 Superior street. The business is of a gratifying volume and the company are shipping large quantities of stoves to all parts of the country. They report the general outlook for the year as very promising.

DURING THE YEAR E. A. Davis will travel in the interests of the Plymouth Foundry Company of Plymouth, Mass.

DURING 1892 the Hanging Rock Stove Company of Ironton, Ohio, melted 1135 tons of pig iron and turned out 8000 stoves and ranges. The Foster Stove Company at the same place melted 1300 tons of pig iron during the year.

JOHN EWIG of Philadelphia, Pa., has patented a moistening attachment for hot-air registers, which has a tray into which partially dips a deflector. The latter has its ends raised above the front and rear walls, while the side walls are cut away. A valve at the rear end of the deflector

controls the vapor from the fluid receiving pan. The inner end of the deflector extends to the rear of the pan so as to overhang the hot-air flue.

A GAS COOKING APPARATUS having a gas tight chamber and means for producing gas therein forms the basis of a patent recently granted to John Ruthven of Topeka, Kan. Hinged to the case containing the gas chamber is a swinging cooking and heating attachment and forming when closed a part of the case. The attachment has a swinging burner plate, drip plate and support, together with burner pipes and burners. Means is also provided for measuring the gas which enters the gas chamber.

RICHARD L. BALL of Terre Haute, Ind., has patented a base heating stove in which the combustion chamber is at the front and a smoke pipe leading upward from the rear portion of the stove. From the upper part of the combustion chamber there are smoke passages leading into the rear portion of the stove and connecting with a hollow radiator at the top. The radiator has a central receptacle which is open at the front. Between the radiator and the smoke pipe is a passage or flue controlled by a damper. The air pipes, which extend upward through the main body of the stove, are open at both ends and arranged to discharge through the top and into the receptacle of the radiator.

GEORGE T. MOE of Philadelphia, Pa., is the patentee of a furnace which is provided with a radiator above, through which the products of combustion are compelled to take a circuitous course before entering the smoke pipe. By means of the construction employed, it is claimed, a large amount of radiating surface is provided at comparatively low cost.

THE CLEVELAND FOUNDRY COMPANY, Cleveland, Ohio, are turning out a fine assortment of lamp stoves, which they are offering to the trade under such names as Puritan, Chief and Triumph. These are attractive constructions, and are made with one, two and three burners. The company have issued a catalogue for 1893, in which these goods are illustrated and their merits fully set forth.

W. J. MCKAY & CO., of 51 and 53 South May street, Chicago, Ill., are sending to their customers in the stove trade a catalogue of 48 pages showing the various specialties which they handle as jobbers. The volume is profusely illustrated, is printed in tinted ink and bound in colored paper covers. One of the first things to catch the eye of the reader is the statement that their territory for the goods manufactured by the Favorite Range & Stove Company and by the Eclipse Stove Company is confined to Cook County, Ill. The goods shown include numerous specialties of the concerns named as well as those of other manufacturers.

RATHBONE, SARD & CO. of Albany, N. Y., have made a number of improvements in their line of vapor stoves for the present season, and their travelers are now on the road with cuts and prices of their new goods. The Tropic, which has been on the market for something like over ten years, is referred to as being simple and durable in construction and perfectly safe in operation. The company do not make any "new process" or "evaporating" stoves, as we understand they have more confidence in the hot generating principle. They have three size of low junior stoves 14 inches high, and two sizes of high juniors 24 inches high. These, we are informed, are new patterns and far ahead of anything they brought out last season.

THE IRWIN MFG. COMPANY of Louisville, Ky., have been appointed sales agents in Indiana, Illinois and the South for the Monarch gasoline and gas stoves, made by the Baxter Stove Company, Mansfield, Ohio. The Irwin Company have recently finished an addition to their foundry, 50 x 30 feet in size and two stories in hight. It is to be used as a pattern shop and finishing room, and was rendered necessary by a very gratifying increase in business.

S. M HOWE'S COMPANY, Boston, Mass., who have been appointed exclusive agents for the sale of the Quick Meal gasoline and gas stoves in the New England States, report a very satisfactory trade, and have placed their second carload order for these well-known stoves. It would appear from this that the prejudice long existing in that locality against gasoline stoves is dying out.

WALKER & PRATT MFG. COMPANY, whose warerooms at 31 to 35 Union street, Boston, Mass., were damaged by fire on the morning of January 25, have located a temporary office at 93 Union street and 164 Blackstone street and are doing business as usual and making shipments regularly. The fire was confined principally to the upper floors and rear, and the front part of the building and lower floors were more damaged by water than by fire. Their offices escaped with a wetting down, and will soon be ready for occupancy. The total loss is stated at about $50,000, covered by insurance. The work of rebuilding has already begun and will be pushed forward as rapidly as possible. Meantime shipments will be made direct from their factory, which is located in the suburbs, and a little or no delay may be anticipated.

THE ADDITION which the Michigan Stove Company are making to their works has rendered it necessary to cut down the old "Pontiac Tree," which for so many years has stood upon their property. Ever since June 2, 1886, the tree has existed only as a stump, and during the past year the lifeless trunk has borne the image of an Indian, cast in stove metal, and "resplendent with the gaudy colors with which the warlike son of the forest was wont to bedeck himself." Last week the image was removed from its lofty pedestal and the axe applied to the roots of the stump, thus demolishing the last vestige of the battle of Bloody Bridge, which occurred early on the morning of July 31, 1763. It is said that ever since the land upon which the tree stood was acquired by the company named innumerable Indian relics have been taken from the earth, in which its roots were imbedded. The tree itself was found to be riddled with bullets, many of which are now in the possession of the officers of the company.

PLYMOUTH FOUNDRY COMPANY, Plymouth, Mass., have recently opened a salesroom at 90 Union street, Boston, in charge of George Beckett. A full line of their Royal stoves and ranges, and samples of their other stoves will be carried.

THE CHICAGO STOVE & RANGE COMPANY will hereafter be the name by which the recently formed Chicago stove company will be known and under which they will transact business. The new name was adopted because the first one selected was too much like the Chicago Stove Works, and might therefore cause some confusion. The company's quarters have just been removed from 41 State street to 45 and 47 Lake street, Chicago, where they have an elegant sample room and enjoy greatly increased shipping facilities. The members of the company are Willis H Steele and J. E. Fitzgerald. Mr. Steele has had long experience in mercantile business and Mr. Fitzgerald has been a stove salesman for a number of years, being particularly acquainted among the city trade of Chicago. They are wholesale dealers in stoves, ranges, &c., but directly represent the Abram Cox Stove Company, the North Dighton Co-operative Stove Company, the Indiana Steel Range Company and the Gurney Refrigerator Company. They will also handle gasoline stoves.

WE REGRET to learn that on the 25th ult. fire broke out at 11 p m. on the third floor of the factory of the Milwaukee Gas Stove Company, at Milwaukee, Wis. The firemen succeeded in confining the flames to the gas stove company's plant, but were unable to save it. The loss is about $35,000; insurance, $30,000. The great Milwaukee fire a few months since burned within half a block of the company's building, but although spared at that time they were evidently only reserved for misfortune later. We presume they will reestablish their business in new quarters.

RATHBONE, SARD & CO., Wabash avenue and Randolph street, Chicago, will issue their catalogue of vapor stoves in the course of a couple of weeks. They have decided, after very careful consideration of the subject, to continue the manufacture of their thoroughly-tried Tropic single-generator stove and not to take up the new process. They have been manufacturing the Tropic for ten years, and in all that time have had so little complaint from their customers that they have concluded not to change. The vapor stove trade has already opened with them in such good shape that they look forward to an excellent vapor stove season. In coal and wood goods they have brought out some new styles of cook stoves, which are now being offered to the trade by their traveling salesmen, all of whom are out and are doing well, even better than expected. Several carload orders have already been received, which is something rather unusual so early in the year. The Beech Acorn wood cook is one of their new stoves. The reservoir style is made with flush top instead of the usual elevated top. The oven is larger at the top than usual, the fire box being placed forward some distance and slightly overhanging the front of the stove The design throughout is very handsome, the panel work being particularly fine. It is made in six sizes and eighteen varieties. The Iron Acorn is a first-class soft coal cook, of large size, which was brought out last year, proved to be very popular, and is now made with flush top reservoir. The oven in this range is unusually capacious, and is so shaped that every part of it is available. The Regal Acorn, a first class wood cook, has been brought out in a new dress. The Acorn calendar, which has been regularly issued by this company for a number of years, appears for 1893 in much more handsome form than ever We have received specimens with gold and silver backs.

The entire baggage, transfer and coach system along the line of the Central Railroad from New York to Niagara Falls has been purchased by a syndicate with a capital stock of $1,500,000.

A strike at the Brooks Locomotive Works in Dunkirk has become so serious that a regiment of troops was called for to protect the men who remain inside the works. The riveters in the boiler department refused to work under the contractors, alleging inhuman treatment.

Naval officers strenuously oppose the introduction of cellulose on ships of war to prevent the ingress of water following the penetration of a missile, on the ground that it harbors vermin and would deteriorate in the tropics. It is suggested that the spaces for it would be filled at the navy yard when the ship is preparing for action.

PRIZE COMPETITIONS.

WE HEREBY ANNOUNCE a series of six prize competitions relating to trade matters in which our readers are interested. Four prizes of $50, $25, $15 and $10 will be awarded in each competition.

The competitions are open to all and a general participation on the part of the trade is invited.

We shall have the privilege of publishing any or all of the contributions received.

The committee of award in assigning prizes will take into account the merit of the different contributions and their suitability for publication.

PRIZE COMPETITION No. 6.

How Retailers Can Best Advertise and Extend Their Business.

The object of this competition is to obtain practical suggestions as to the methods which the retail dealer in Hardware, Stoves, Tinware, &c., can advantageously adopt in building up his business, and is intended to cover such points as the following:

Advertising in the local papers, with suggestions as to how such advertising should be done and to what extent;
The manner in which circulars and other printed matter may be used;
A description of any special or unusual methods of attracting and holding trade; and
General suggestions in regard to ways in which the business can be extended.

An account of any methods which have been found useful in building up trade will be suitable under this competition.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 6.

PRIZE COMPETITION No. 7.

Travelers' Yarns.

The traveling salesman is proverbially happy in the stories which he narrates, and this competition is for the purpose of calling out a collection of good yarns for publication. While the attention of travelers is specially invited to this competition, it is open to all. Stories relating more or less closely to trade or business matters will be preferred.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams 96–102 Reade street, New York, and marked Prize Competition No. 7.

PRIZE COMPETITION No. 8.

How to Treat Clerks.

Under this competition, beside a general discussion of the subject, such questions as the following may be considered:

The extent to which clerks should be given an opportunity of obtaining a knowledge of the business, and of price-lists, prices, &c.;
Whether it is desirable to have formal rules for the regulation of employees and for the management of the store. If so, a set of rules should be submitted;
To what extent clerks should be held responsible for their mistakes;
Suggestions as to how clerks should be treated in order to secure their most intelligent and efficient work;
Mistakes made in the treatment of clerks.

This competition opens an important subject and it is hoped that it will be discussed fully by merchants and by their clerks from their different points of view.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 8.

PRIZE COMPETITION No. 9.

Shop System of Keeping Track of Jobs.

This competition is intended to call out information in regard to methods of keeping account of the cost of labor and material on tin-shop work, repairing and new work, inside and outside. In connection with the general subject such points as the following may be touched upon:

Whether blanks or forms are used in connection with such work. (If so, samples should be submitted);
What record is kept of orders, costs of jobs, charges, &c.;
How time occupied in going to and from the job is covered;
Suggestions in regard to the profitable conduct of the shop.

To illustrate the system it is desirable that a specific job (as for example, repairing down spouting and eave trough, or other job of repairing in which new material is used) be referred to and the method of keeping track of the costs in such job fully explained.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 9.

PRIZE COMPETITION No. 10.

Business Maxims—At Least 10.

Those entering this competition will send at least ten maxims relating to the conduct of business, presenting in a brief and pithy manner practical suggestions which may advantageously be followed.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 10.

PRIZE COMPETITION No. 11.

How Small Retailers May Keep a Record of Prices.

The object of this competition is to call out information or suggestions in regard to the best methods to be adopted in keeping a record of prices, showing cost or selling prices, or both cost and selling prices, of Hardware, Stoves, Tinware, &c., in a small retail store employing not more than four persons in the selling and bookkeeping departments, including the proprietors. Those entering the competition are expected to give a concise and clear explanation of their system, and if a price book is used, to submit as illustrating the system at least three specimen pages. If a price book is referred to it may be of any design or arrangement best adapted to the purpose, and may be original with the contributor or may be one of the different price books on the market. Fictitious names should be used instead of the real names of jobbers and manufacturers.

The committee in awarding prizes will take into account the merit of the different systems described, the character of the descriptions given, and the general utility and interest of the contribution.

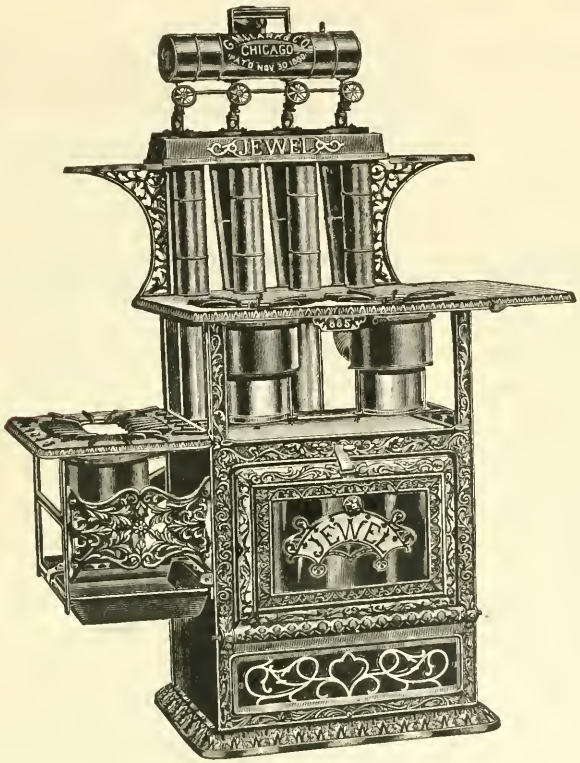
First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business, February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 11.

Jewel Process Range.

In the accompanying illustration we present a general view of the Jewel Process Cabinet Range for 1893, which is being offered the trade by George M. Clark & Co. of Chicago, Ill. The construction is referred to by the makers as possessing those features which are essential to satisfactory operation and as being decorated in a very attractive style. The frame of the range is made of cast iron, while the body is of cold rolled sheet steel finished with japan. Drip pans are provided under all the burners, the burner for the oven being entirely inclosed within that chamber. The arrangement of parts is such, it is claimed, that all the heat is utilized for baking purposes before it is allowed to escape to the chimney. The oven, which measures 17¼ x 14 x 12 inches, has a drop door and spring balance, it being constructed exactly on the principle of the Jewel portable ovens; that is, direct heat with a rear connection for the chimney. The top measures 23¾ x 22¼ inches, and the hight from the floor is 35¼ inches. The small top surface is 26 inches from the floor, and measures 13¼ x 19¾ inches in superficial area. The upper shelves of the stove are 46¾ inches from the floor, while the end shelf is 7¼ x 19¾ inches in area. There are two burners in the top surface of the stove, one on the step at the side and one in the oven. The stove is referred to by the manufacturers as one of the finest productions for using gasoline which they have ever produced.



The Jewel Process Range.

No less than twelve thousand traction engines, it is stated, are at present in use in England for hauling heavy freight, or for passenger service, or for steam plowing, or as road rollers, and are built as a rule in one of three sizes. The smallest is an engine weighing nine tons when fully equipped and has cylinders 8 x 10 inches in size.

The Harper Stove Caster.

Harper Mfg. Company, Peoria, Ill., are offering this caster, as herewith illustrated. Four of these casters form a set, weighing about 12 pounds to the set and designed to carry 2000 pounds. They are for use under sample stoves in the store, and under stoves in the blacking room. As one person can place them under a stove and move it with ease, the casters are well adapted for use in private families for moving stoves when taking up carpets, and for storing stoves.

The Harper Stove Caster.

A correspondent in the stove and tinware business, writing to us from Seattle, Wash., says that trade in that city has been good ever since the great fire, and a flourishing business is anticipated for the present year.

The Comstock Pipe Cutter.

H. Comstock & Co., Fulton, N. Y., are offering this cutter, as herewith illustrated. It is made from steel drop forging, with all parts interchangeable. The cutter wheels are forged from fine cast steel, turned and tempered, and are fitted to the cutter block with a strong steel screw that can be removed with an ordinary screw driver in case of breakage and a new wheel inserted. The tool is provided with an abrading or scraping attachment that cleans the obnoxious burr and the hard rough scale that forms when cutting. In Fig. 2 the upper end of the pipe represents the clean bright surface resulting from the use of this tool, ready for the threading dies. The point is made that the cutter is light and strong, and made in three sizes, to cut pipe from ⅛ to ¼ inches.

Fig. 1.—The Comstock Pipe Cutter.

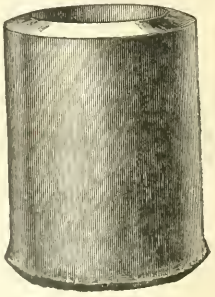


Fig. 2.—Showing the Work Done.

Unique Pickle Grabber.

Unique Mfg. Company, 35 Murray street, New York, are bringing to the notice of the trade a novel style of pickle tongs, as illustrated herewith. It is a silver-plated device, 8 inches long, with a stationary spoon and a movable claw, the latter actuated by a spring. After introducing the grabber into a bottle, as shown in Fig. 2, the knob at the top is pressed, when the movable claw opens; when the pressure is removed it automatically grasps the pickle. Pressing the knob again releases the pickle without injury to it, while the spoon serves the liquor. The prodding or stabbing of pickles with a fork is thus superseded by this unique contrivance. It may be utilized for serving sardines, oysters, pickles, olives, sliced cucumbers, &c. This is the first of a series of unique servers which will be offered by the company. Sugar and bonbon servers will be ready shortly, followed by sardine and asparagus servers,

Fig. 1.—Unique Pickle Grabber.

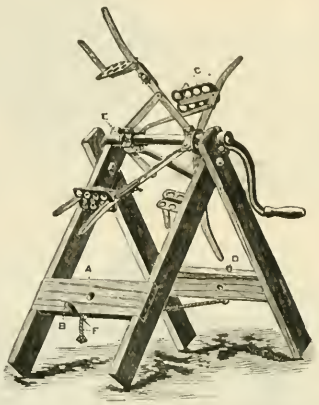
Fig. 2.—Pickle Grabber in Use.

each to be distinctively different in design and adapted to the purpose intended.

The agent of a Canadian firm interested in an attempt to establish a steamship line to Jamaica has returned after a year's absence in that country. He believes that a successful trade can be built up, both in provisions and manufactures. He concedes, however, that New York and Boston have the advantage in distance and in affording a better market, besides furnishing larger return freights. There are now in the American trade four large lines, and the circumstance is mentioned that four weeks ago 5000 packages were left on the New York dock for lack of ability to carry them. The reasons assigned for the alleged American monopoly is that manufacturers here have gone to the trouble to make goods especially for the Jamaica trade.

The Buchanan Combined Wire Reel.

The Buchanan Fence Company, Smithville, Ohio, are manufacturing the wire reel herewith shown. It is made of malleable iron, and when not in use, or when being taken from place to place, it can be folded so as to occupy a small space.



The Buchanan Combined Wire Reel.

The reel is adjustable, so it can quickly be made to fit any sized coil of wire, and is used for taking wire off of coils and also for coiling wire. Wire may be taken from larger coils and put on smaller ones, or wire can be taken from a fence and put on coils, making a coil of any size desired. It avoids tangling and ruining coils of wire, provides a practical way for retailing wire and leaves the original coil in good condition, and by its use allows any one handling wire to do it in a satisfactory manner. It is recommended by the makers for the use of hardware dealers, fence builders, farmers, &c.

The Jack Frost Freezer.

The Jack Frost Freezer Company, 29 Murray street, New York, are offering an

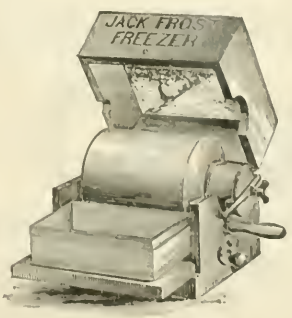


Fig. 1.—The Jack Frost Freezer.

improved form of their freezer, as illustrated in Figs. 1, 2, 3 and 4. Fig. 1 shows the article complete and ready for use. Fig. 2 represents the cylinder with the metal cap removed. In use this cylinder should be carefully packed with broken ice and rock salt, rammed solid with a flat wooden stick, using about one part salt and six parts of ice. When full the cap may be put on, a close joint being assured by using the rubber ring furnished. The handle is then attached and held firmly in place by means of the thumb

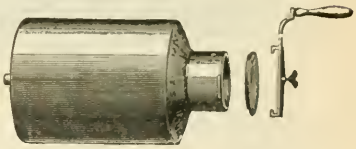


Fig. 2.—Cylinder with Cap and Handle Detached.

screw in the center. The mixture is then poured into the pan shown in Fig. 3, this pan being rounded at the bottom permitting the entire contents being used. By turning the crank very slowly the intense cold generated by the mixture of ice and salt will cause the liquid to adhere to the cylinder in a frozen state. It may be said the cylinders are now made much larger in proportion to length than formerly. At

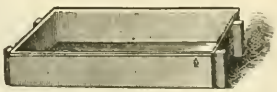


Fig. 3.—Pan with Rounded Bottom for Holding Mixture to be Frozen.

the ends of the box, as seen in Fig. 1, are knobs for raising and lowering of the pan. Fig. 4 shows the front or repacking box, which can be used to catch the frozen cream scraped from the cylinder by a hard wood implement sent with each freezer, so made that it may be attached readily to the repacking box, causing the material to pass into the receptacle as the crank is

Fig. 4.—Front or Repacking Box.

turned. These freezers are inclosed in varnished antique oak boxes, having a drop front which can be used as a shelf for the repacking box, or if desired to accumulate the entire contents of the pan on the cylinder before removing the box may be closed tight. If the cream is prepared hours before it is wanted, the box when packed may be covered with the tin top, the whole wrapped in a damp cloth and packed in ice and salt until needed. The manufacturers remark that by employing this method various mixtures may be frozen in less than 30 seconds.

The Davis Corkscrews.

Detroit Corkscrew Company, Detroit, Mich., are manufacturing a line of corkscrews, as illustrated in the accompanying cuts. The Davis corkscrew, Fig. 1, is

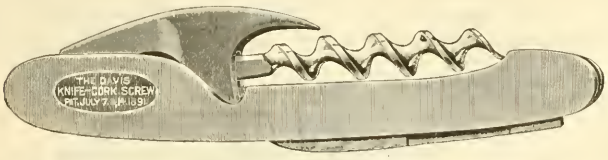


Fig. 1.—The Davis Corkscrew.

made of steel, polished, nickel plated, and combines a pocket knife, wire cutter and lever corkscrew. In use the wire is cut, as in Fig. 2, with the wire-cutting fulcrum; then the cork is pulled with the fulcrum in position, as in Fig. 3. The device is 4

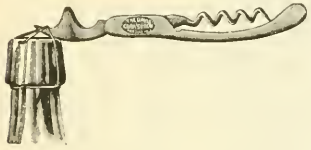


Fig. 2.—Cutting Wires on Bottle.

inches long, with a knife blade 2 inches long, and is intended to be carried in the pocket. The knife blade is designed for general use, or may be used exclusively for a fruit knife. This corkscrew is made in the same form without a blade, as shown in Fig. 2, of the same length as that in Fig. 1, but proportionally lighter. The

Fig. 3.—Drawing the Cork.

Puddefoot corkscrew, Fig. 4, is a folding pocket device, with a wire fulcrum to turn down in drawing the cork. These goods are neatly and substantially made, designed to fit any bottle, and may be operated by a woman or child. The company have recently completed a machine

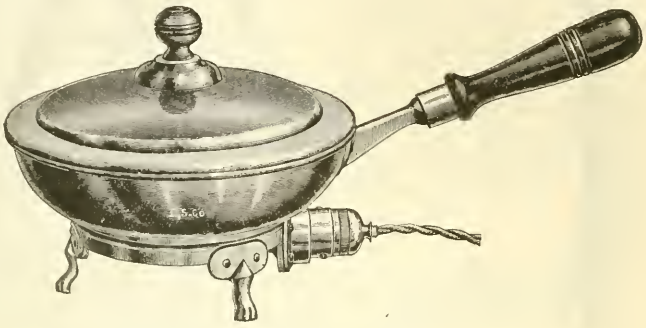
Fig. 4.—The Puddefoot Corkscrew.

for manufacturing the cut-worm screw, and are now in a position to compete with hand-made imported corkscrews.

A citizen of Tokio, Japan, now in this country, says that beginning about May 1 the Pacific steamships will have all they can do for several months transporting passengers from Eastern countries who are preparing to visit the United States.

Electric Chafing Dish.

In the accompanying illustration we present a general view of a nickel plated chafing dish designed to be heated by electricity, and which has just been introduced to the trade by the Carpenter Electric Heating Mfg. Company of St. Paul, Minn. This cooking utensil is made in a very substantial manner, having a cast-iron bottom plate and a body of heavy spun copper. The bottom plate is lined with asbestos felt, which protects the enamel in all cases, and is also fitted with a waterproof nickel-plated connection which is interchangeable, being the same size for all nickel-plated goods made by the company. The capacity of this article is said to be 1 quart, and will boil a pint of water in 9 minutes and a quart in 12 minutes. It consumes, according to the manufacturers' statement, from 4 to 5 ampères on 110 volts and 8 to 10 ampères on 50 volts. The device can be used, we understand, on any electric-light wire which may be in the house.



General View of Chafing Dish Heated by Electricity.

The screw propeller ferryboats have thoroughly shown their superiority since the rivers filled with ice, this being the first experience of the new boats on the Pennsylvania route across the Hudson River. While other boats are liable to have their wheels clogged and labor so hard that they are occasionally delayed to raise steam, the submerged propellers experience no difficulty whatever, and run nearly on schedule time. The large screw steamers on the Sound have done equally well.

Golden Crown Ware.

The Stuart & Peterson Company, Philadelphia, Pa., are introducing a line of this ware, as shown herewith. These goods are of fine annealed iron, tinned or porcelain lined, composition finished on the

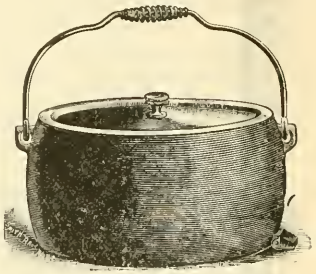


Fig. 1.—Golden Crown Ware.

outside and provided with always cold handles. The article shown in Fig. 1 is a flat-bottom oval boiler not in use, while Fig. 2 shows it with the device for regulating the heat under the vessel. This device consists of a V-shaped iron, hinged to a projection cast on the vessel, and when turned down raises one side of the boiler ¾ inch. The line of vessels include flat-bottom round boilers, flat-bottom

Fig. 2.—Golden Crown Ware in Use.

bellied saucepans, deep French stew kettles, deep French stewpans, fish kettles and oyster cookers. The manufacturers claim that the tinning on this ware is of the highest grade, or the porcelain lining of superior quality, and that the new composition on the outside will not chip off.

Record's Screw Caps and Spouts.

Record Mfg. Company, Conneaut, Ohio, have a line of screw caps and spouts on the market, representations of which are herewith given. Fig. 1 is a full-size cut of their 1¾-inch screw, with a sealing cap being put in place, which seals the nozzle air tight and secures the contents of the package during transportation. After the cap is put in, the screw cap is put on over the sealing cap, which not only seals it, but gives additional security. The point is made that should the screw cap become loose in transit, which is often the case, the sealing cap prevents loss of the contents of the can. Cans are also made with nozzles in which a cap is secured, but with no provision for using a screw cap over it. Record's 1¾ inch screw with vented screw spout is shown in Fig. 2, closed for shipping; and in Fig. 3, open for pouring; showing how the spout hangs in the can, and also when ready for use. This size is applied to shipping cans and other large cans that require free pouring. A drop screw straight spout, but without vent or wire, is made with a thread on the bottom of the spout, that screws into the thread over which the screw cap goes, and holds the spout in position for pouring. The screw cap has a cork in it which makes it tight.

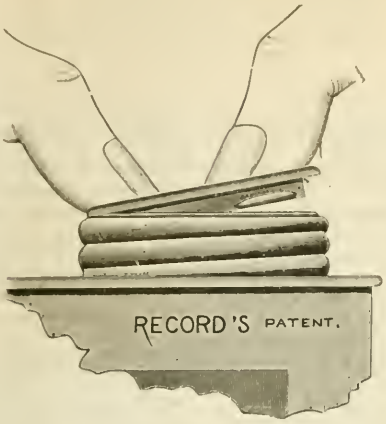


Fig. 1.—Record's Self-Sealing Screw Top and Cap.

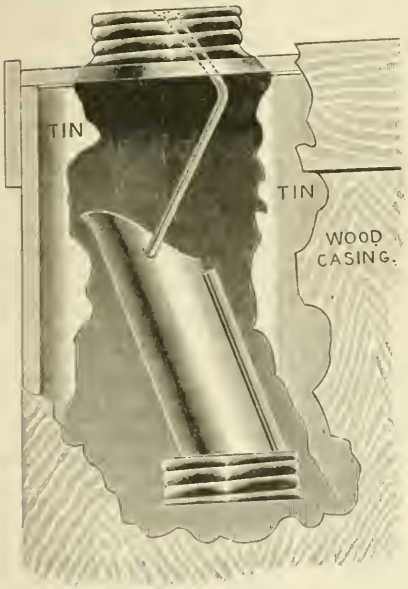


Fig. 2.—Record's Vented Screw Spout.

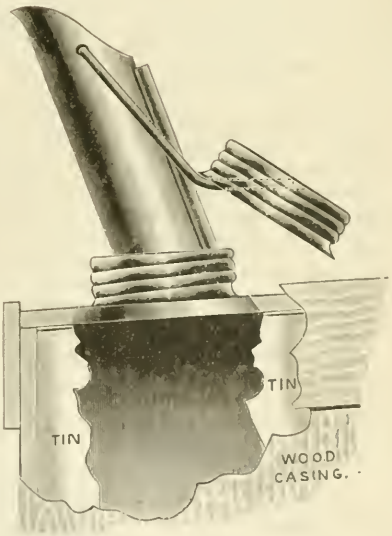


Fig. 3.—Vented Screw Spout Open for Pouring.

B. B. Wire Fence.

The accompanying illustrations represent the B. B. wire fence, being offered by B. B. Wire Fence Company, Indianapolis, Ind. B. B. wire is one continuous piece, nicely wound on wooden spools of from 80 to 110 pounds each. It is made of spring steel, heavily galvanized, and, the manufacturers claim, will not rust on account of age, season or climate. They also state that the wire will not twist, pull or sag; that the fence will retain its shape substantially as when first constructed; that it is quickly and easily applied to iron or wood posts, and that its application and tension can be readily adjusted and controlled by any kind of wire stretchers or wire lock now in use. The fence is referred to as possessing superior qualities of beauty and strength; of not destroying stock or even marking them for life by cutting or lacerating their flesh, and having the advantage of being low in price.

Fig. 2.—B. B. Wire on Spool.

Fig. 1.—B. B. Wire Fence.

TRADE REPORT.

The Iron Market.

The condition of the Pig Iron market has undergone no important change during the past week. While high-grade Irons and favorite brands hold their prices, there appears to be an unsettled and distrustful feeling in the trade, resulting in a drooping tendency to prices in general. The demand for Iron varies considerably in different sections of the country, but on the whole may be considered as fair. The hand-to-mouth policy pursued by many in buying has latterly given more steadiness to the trade than was formerly the case when large contracts were being placed for yearly requirements. While the condition of the Iron and Steel market, in both raw and finished material, is not all that could be desired, it is anticipated that large orders will soon be placed by corporations for supplies, which will likely have a salutary effect on prices all along the line, resulting in a more satisfactory condition of affairs. It is a notable fact that when one large concern places an order of this kind, others almost immediately follow. The month of January, which has just expired, shows quite a large volume of business, although quotations were not always strictly adhered to in effecting sales. There are a good many inquiries in the market at present, and considerable Iron will probably change hands in the near future. In New York the Pig Iron market is quiet, with indications that some Southern and some Northern companies are endeavoring to stimulate business by shading prices. Quotations remain unchanged as follows: Northern brands at $14.75 @ $15.25 for No. 1; $14 @ $14.50 for No. 2. Southern Iron, same delivery, $14 75 @ $15 for No. 1; $13 75 @ $14 for No. 2 and No. 1 Soft; $13.25 @ $13.50 for No. 2 Soft.

In Philadelphia the latter part of the last week in January was marked by dullness in the Pig Iron Market, and, while standard brands held their prices, other descriptions developed an unusual degree of irregularity. Whether some transactions were for financial reasons or because of the Ore situation is not known, but whatever the cause the effect has been to unsettle the market and to cause general indisposition to buy anything that is not actually wanted. A very large business was done during January, covering almost all grades of Iron, and it may be said at all sorts of prices, and, while the immediate outlook is not altogether satisfactory, it is still possible that the shaking up of the past few days may clear the atmosphere and ultimately lead to a better market. Quotations are unchanged, however, and are on the following basis:

American Scotch, No. 1X.....	$17.00	@ $17.25
American Scotch, No. 2X.....	16.00	@ 16.00

Reports from Pittsburgh state that a good many inquiries are in the market at present, and as buyers and sellers are nearer together in their views of prices than they have been for some time past it is not improbable that considerable Iron will change hands within the next week or ten days. The market on Gray Forge continues extremely dull, and a very limited amount of this kind of Iron is changing hands. Buyers have been unable to force the price of Bessemer Pig down to lower figures, and it is the impression that there would be no little difficulty in placing an order for Bessemer at this time, at a price 25 cents a ton in advance of that recently offered. We quote Foundry Irons as follows:

No. 1 Foundry	14.00 @	14.10.	cash
No. 2 Foundry	12.00 @	13.00	"
Charcoal Foundry No. 1....	19.00 @	20.00,	"
Charcoal Foundry No. 2....	18.50 @	19.00,	"

At Chicago the tonnage of Pig Iron booked during January has been very large, covering a good percentage of the buyers in that vicinity. The past week was characterized by an excellent general demand, although very few orders ran above 500 tons. A good feature of the trade at present is the fact that consumers are urging prompt shipment. Purchases by the smaller class of buyers are more frequent, which indicates that they are well employed. In fact, the foundries in this vicinity are reported as having seldom been in as active a condition in midwinter as they now are. The consumption of Iron thus keeps up very well, and manufacturers are looking forward to a year of good business. Prices, however, show no improvement, but on the contrary show weakness. Quotations are as follows, cash, f.o.b. Chicago:

Local Coke Foundry, No. 1... . ..	$13.50 @ $14.00
Local Coke Foundry, No. 2.....	13.00 @ 13.50
Local Coke Foundry, No. 3.....	12.75 @ 13.00
Local Scotch...	14.00 @ 14.50

In the Southern markets little or nothing has transpired during the past week which could be termed interesting. Consumers have adopted a waiting policy, and as furnaces still appear determined to maintain their prices there is no very large business doing. The month just closing has been a severe disappointment to furnacemen, both as regards volume of trade and prices, and at this time it looks as if February will not prove any better unless some radical change shortly takes place. The market certainly is weaker than it was when our last report was written, and unless consumers enter the market very shortly the future of prices will doubtless be downward. Furnaces which sell high-grade Irons still maintain prices, but as they are meeting with concessions every day, it seems only a question of time when they will have to reduce their prices. The consumptive demand during the week under review was fairly good, and the week's sales would foot up several thousand tons. For ordinary quantities we quote as follows for cash, f.o.b. cars St. Louis.

Southern Coke, No. 1 Foundry,	$14.25 @	$14.50
Southern Coke, No. 2 Foundry,	13.00 @	13.50
Southern Coke, No. 3 Foundry,	12.50 @	12.75

Billets and Rods.—The only transaction recorded is a sale of about 1500 tons of Foreign Wire Rods, Pacific Coast delivery, at private terms to two different works. Domestic Billets and Rods are weaker.

Steel Rails.—Eastern mills have taken contracts for over 70,000 tons, which includes sales of 60,000 tons to the Pennsylvania Railroad. This transaction is regarded as being of unusual interest, since it indicates that the great trunk line is placing its contracts. For many years it has been the practice of a considerable number of railroads throughout the country to follow the Pennsylvania in making purchases. Its entering into the market is a signal for more extensive buying, and it is believed that this year a similar movement will now take place.

Manufactured Iron and Steel.—The prospects for work in this particular locality are regarded as excellent. A number of office, bank and public buildings are known to be in architects' hands which will call in the aggregate for 7500 to 8000 tons of Beams within the next 90 days. This includes such structures as the Continental Life, Lincoln Bank, a large hospital, the Manhattan Life, the Astor residence, Corn Exchange Bank, Jewelers' Building and others. There are other structures being practically decided upon which will add several thousand tons more to the demand for Beams during the first six months. In addition to this there is the consumption of small lots for residences, flats and stores. Altogether, it seems certain that the consumption of Beams and Structural Material in the city of New York and immediate vicinity will be unprecedently large this year.

Metal Market.

Copper.—There is no perceptible change in the situation. Manufacturers of the general line of Copper and Brass Goods are well employed, the future of those branches of trade looks promising, and all signs point to a very much heavier consumption for electrical purposes in various

parts of the country. For the moment, however, the demand is tame, and enough small lots are knocking about to impart a sort of weakish appearance to the market.

Tin.—The transactions recorded on the Metal Exchange up to Wednesday involve about 600 tons. During the same time a moderate business was effected outside on regular terms, but, with free arrivals, it is doubtful whether the spot statistical position has changed for the better. Data of movement from the Straits also tended to impair the statistical position, the returns showing total shipments of 4000 tons during January, against 2980 tons in December, of which quantity 3650 tons were for Great Britain and the United States. Between the statistical exhibit, the legislation on "options" and uncertainties regarding the McKinley tariff, the horizon is variegated to an extent that bewilders nearly everybody identified with the market, as merchant, broker or speculator.

Pig Lead.—Large Consumers have secured a few hundred tons of Common domestic at slightly advanced prices. All told they have taken at least 1000 tons during the past week for shipment during the next 60 days. The low price of silver and the annual January curtailment of work at some mines, along with the periodical "shutdowns" here and there, are brought to the surface as factors in regulating values. Whatever there may be behind all this is problematical, but the result thus far is practically as outlined above, and the market shows firmness in tone that is not only interesting, but doubtless a little surprising in some quarters.

Spelter—Delivered in the East, is quite as free at the present time as it was a week ago. The demand has not improved, at least not sufficiently to be perceptible in this market. Some shipments to Europe have been made, but orders from that quarter are exceedingly few and far between, since prices for foreign product have receded.

Antimony.—Except for ordinary quantities there has been no inquiry. Supplies are ample and prices continue somewhat irregular.

Tin Plate—Very good orders have been secured from can makers and canners for 100 lb and lighter Bessemer Steel Coke finish Plates, with prices on latest dealings about 2¼¢ ℔ box above the lowest rates recently established. Special sizes used by petroleum canners have also been taken to a fair extent. Otherwise the business in futures makes a modest showing, and spot trade to all accounts continues to be of strictly routine character. There is no change in demand from retailers, as the weather is not such as to warrant a large amount of outside work. Prices remain unchanged.

Coal.

The great Anthracite Coal pockets in every direction at tidewater and interior points have been made bare by the unprecedented demand of the last few weeks. Zero weather not only increased consumption, but temporarily cut off supplies by blocking transportation. It is needless to say that Coal has been selling at a good profit, estimated by some at $1 advance over prices realized for a long time past, and that miners are consequently in a cheerful frame of mind. Trade at the present time has recovered nearly normal conditions. Spot Pea that has sold as high as $3.75, alongside, may now be quoted $2.65 @ $3 and Buckwheat is $2.25 @ $2.50, alongside. Reading is bare and is behind on orders for lack of transportation facilities. As a rule the companies are making deliveries with good dispatch, and the combine prices hold. Spot cargoes of Pea are still at a premium where necessities are imperious, for example, where a steamer is ready to sail and has no fuel. Production last week was 684,000 tons, a slight decrease compared with the same time last year, and since January 1 the decrease is 235,000 tons compared with the correspoding time last year.

John Edwards, the new New York sales agent of the Reading Company, is an old and valued employee of the company, having had full charge of the Coal trade for many years.

The Anthracite Coal shipments from Buffalo westward, by lake, for 1892, show an increase of 500,000 tons over 1891. The importance of this up freight as a factor in the threatened rivalry of the Canadian canal and St. Lawrence route with the American lake, rail and canal route is simply decisive.

The Bituminous trade is active and prices are firm. Operators complain that there are not enough railroads; that they could make big profits if they had Coal to sell. The price is about $3 50, regardless of kind. As they say, "Coal is Coal."

The following is the first publication of the Anthracite Coal tonnage shipped during 1892 for the roads named:

	1892.	1891.
Reading & Lehigh Valley	15,195,581	15 821,549
Jersey Central	5,271,131	5,857,968
Lackawanna	6,529,649	6,198,048
Delaware & Hudson	4,058,520	3,930,917
Pennsylvania	5,571,320	4,994,509
Pennsylvania Coal Company	1,921,020	1,892,419
Erie	1,388,822	1,204,271
Ontario & Western	807,071	69,770
Coxe Bros. & Co	1,210,187	43,882
Total	41,803,301	40,448,333

It will be seen that the increase for the year 1892 over 1891 was 1,144,983 tons. The Reading group, made up of Reading, Lehigh Valley and Jersey Central, showed an actual decrease of 1,122,483 tons. In order to arrive at the actual increase of the remaining seven companies, it is necessary to add this decrease to the total increase, making 2,773,788 tons.

It will be seen by the table that Coxe Bros. & Co. increased their tonnage 1,166,305 tons. The Pennsylvania Railroad shows the biggest increase, the amount being 576,811. This was due to the fact that the company were untrammeled by the combination and made a market during the dull months by shading the established prices. The next road in point of increase was Lackawanna, the amount being 331,601. Delaware & Hudson's increase was 118,609. The loss to Jersey Central of over 500,000 tons indicates that the combine to them was a failure.

Chicago Report.

Scrap.—Business is decidedly better. Consumers are now buying much more freely. Dealers quote the following buying prices:

	Per net ton.	Per ℔
No. 1 Wrought Scrap	$12.50	13½
Machinery Cast	10.00	....
Malleable Cast	8.00	....
Stove Plate (free of burnt)	7.50	....
Burnt Iron and Grate Bars	5.50	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12 00	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	7.00	....
Horseshoes	13 00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	2¼¢

Anthracite.—Business has seldom, if ever, been so scarce as it was last week. Numerous factories were obliged to shut down. Anthracite has consequently been in very active demand and prices are very firm. Quotations on carloads of 12 net tons are as follows:

	Grate.	Egg, Sto. and Cb.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.85	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

The population of Canada in round numbers is 5,000,000 souls. The most accurate returns available are those furnished by the census of 1891. The table which follows shows the population in each province during the decennial periods from 1871:

Provinces.	1871.	1881.	1891.
Ontario	1,620,581	1,923,228	2,114,321
Quebec	1,191,516	1,359,027	1,488,535
Nova Scotia	387,800	440,572	450,396
New Brunswick	285,594	321,233	321,263
Manitoba	18,995	62,260	152,506
British Columbia	36,127	49,459	97,613
Prince Edward Island	94,021	108,891	109,078
Northwest Territories	...	56,446	98,967
Totals	3,625,024	4,324,810	4,882,679

This table exhibits a gross gain in entire Canada for ten years of 507,869 people. Of this increase over 160,000 is credited to four cities—Montreal, Toronto, Hamilton and Ottawa.

The ice blockade in Long Island Sound and in the coal ports adjacent to New York threw an enormous traffic over the Poughkeepsie bridge.

A bill in the Pennsylvania legislature provides for a manual training school for indigent children.

CONDITION OF THE

Hardware Trade.

January business was affected to some extent by the general prevalence of severe wintry weather, which, while it operated advantageously in promoting the sale of seasonable goods, interfered to a good extent with general trade. The reports which come to us, however, indicate that the aggregate of the month's business is fully up to the average, and in many cases has probably exceeded it. February opens with a fair demand, as the trade are placing their orders more freely, and a confident tone prevails which promises well for future business. Prices are without important change and the market as a whole is not characterized by a strong tone, a good many of the staple goods being exceptionally low. It is, however, thought by many that, in view of the large demand which is anticipated, there may be a strengthening of prices in some lines. There is some complaint in regard to collections.

Notes on Prices.

Cut Nails.—Cut Nails are in substantially the same condition as at our last review, the market having changed but little in the matter of price, with, however, a somewhat improved demand. Eastern mills are pursuing a conservative course with reference to production, being careful to avoid the accumulation of heavy stocks.

As announced in another column, the representatives of the Eastern and Western Nail manufacturers met in Philadelphia yesterday and adopted a National Price-List on Cut Nails, which goes into effect immediately and takes the place of the Nail card which has been in use. It was not formally determined by the meeting what would be the discount or the abatement from the list, this matter being left for the present to the judgment of each manufacturer. A prominent New York house advise us that the rebate will probably be $1.20 per keg, at the mill, in carload lots, and $1 on small lots from store in New York.

Advices from Chicago.—Manufacturers are doing a moderate business, but the local factories manage to pick up sufficient trade to keep running very steadily.

Wire Nails.—The demand for Wire Nails is unusually large, the mills receiving some heavy orders from large purchasers, and also a good many from the trade at large. Small lots from store in New York are quoted at $1.70 to $1.75.

Advices from Chicago.—The weakest sellers, who have latterly been demoralizing the market, have apparently been satisfied, and have now withdrawn from this market. Other manufacturers are consequently having a better trade and report plenty of inquiries. It may take a little time to recover from the very low level recently reached. Manufacturers have latterly been insisting strenuously on a good specification, refusing to sell low averages at the prices ruling. Small lots are quoted from stock $1.65 to $1.70.

Barb Wire.—This market is characterized by low prices, there having been as yet no recovery. The manufacturers are disposed to refuse to make concessions. The amount of business has been fair. There is an improvement in the export demand, and it is noted that higher prices prevail for export than for home trade. Small lots from store in New York are held at $3.10 for Four-Point Galvanized or $3 for carloads.

Advices from Chicago.—Barb Wire manufacturers state that inquiries are now unusually numerous, indicating an active trade in the near future. They quote $2.20 and $2.65 for Painted and Galvanized Wire respectively, but jobbers are underselling slightly.

The court has ordered the receiver of the Joliet Enterprise Company to sell the stock of Wire on hand in lots to suit purchasers instead of disposing of it to the lowest bidder It comprises about 2300 tons of Painted.

Home Tacks and Nails.—Atlas Tack Corporation, Boston, Mass., and 116 Chambers street, New York, are now putting on the market an assortment of Tacks for household use, which will be known to the trade as Home Tacks. These will be offered in different assortments and sizes. Each assortment is contained in a strong pasteboard box, very attractively gotten up, having a hinged cover, the top and front being tastefully printed in color. This box contains 12 smaller boxes, which are intended to be retailed, each box containing six papers of Tacks, namely, one paper of 1-ounce Curtain and 3-ounce Gimp, two papers of 8-ounce Carpet, and one paper each of 10 and 12-ounce Carpet. A larger assortment consisting of 24 boxes is also put up, and other assortments containing Tacks and Nails will, it is expected, be out before long. The list prices for Carton No. 50, containing 12 small boxes, is $3, and for Carton No. 100, containing 24 small boxes, $6, subject to a discount of 50 per cent.

Golden Crown Ware.—The following is the price-list of the Stuart-Peterson Company, Philadelphia, on their Golden Crown Ware, Tinned or Porcelain-Lined, with a new device for regulating heat under the vessel, of which a description was given in a recent issue. The list is subject to a discount of 60 per cent.:

GOLDEN CROWN WARE.

Flat-Bottom Round Boilers.

No.		List.	No.		List.
1, 2	Pints	$0.80	17, 7	Quarts	$2.05
3, 3	"	.94	19, 2	Gallons	2.20
5, 2	Quarts	1.05	21, 2½	"	2.60
7, 2½	"	1.14	23, 3	"	2.85
9, 3	"	1.22	25, 3½	"	3.35
11, 4	"	1.40	27, 4	"	3.60
13, 5	"	1.60	29, 5	"	4.20
15, 6	"	1.85	31, 6	"	5.67

Flat-Bottom Bolted Saucepans

No.		List.	No.		List.
2, 1	Pint	$0.65	20, 6	Quarts	$1.85
4, 1½	"	.74	22, 7	"	2.05
6, 2	"	.80	24, 2	Gallons	2.20
8, 3	"	.91	26, 2½	"	2.60
10, 2	Quarts	1.05	28, 3	"	2.85
12, 2½	"	1.14	30, 3½	"	3.35
14, 3	"	1.22	32, 4	"	3.60
16, 4	"	1.40	34, 5	"	4.20
18, 5	"	1.60	36, 6	"	5.67

Deep French Stew Kettles.

No.		List.	No.		List.
10, 3	pints	$0.85	70, 4½	quarts	$2.00
20, 2	quarts	1.00	80, 5	"	2.20
30, 2½	"	1.15	90, 6	"	2.50
40, 3	"	1.35	100, 7	"	2.80
50, 3½	"	1.60	110, 7½	"	3.10
60, 4	"	1.85	120, 8	"	3.35

Deep French Stewpans.

No.		List.	No.		List.
1, 3	pints	$0.85	7, 4½	quarts	$2.00
2, 2	quarts	1.00	8, 5	"	2.20
3, 2½	"	1.15	9, 6	"	2.50
4, 3	"	1.3[illegible]	10, 7	"	2.80
5, 3½	"	1.60	11, 7½	"	3.10
6, 4	"	1.85	12, 8	"	3.35

Flat-Bottom Oval Boilers.

No.		List.	No.		List.
1, 1	gallon	$2.00	7, 4	gallons	$4.35
2, 1½	"	2.35	8, 5	"	5.00
3, 2	"	2.75	9, 6	"	5.70
4, 2½	"	3.00	10, 7	"	7.50
5, 3	"	3.50	11, 8	"	8.85
6, 3½	"	3.85	12, 10	"	10.85

Fish Kettles.

No.		Inches long.	List.	No.		Inches long.	List.
1, 12	quarts,	16	$3.75	4, 22	quarts,	22	$6 70
2, 15	"	18	5.00	5, 26	"	24	9.30
3, 17½	"	20	5.84	6, 31	"	26	10.60

Oyster Cooker.

	Depth.	Diam.	List.
No. 1, 1½ quarts,	2½ in.,	7½ in.	90c. each

Family Soldering Set.—A. S. Henn & Co, New Haven, Conn., for whom James P. Kenworthy, 96 Chambers street, New York, is agent, are putting on the market a Family Soldering Set which they call the Tinker's Dread. It is sold to the trade at $1.50 per dozen or $15 per gross.

Wrought-Iron Pipe.—Nothwithstanding the fact that the demand for Wrought-Iron Pipe has been large, and the mills have been diminishing their output, prices are weak and irregular. During the latter part of last month they were lower than they had been for some time, and remain in substantially the same condition notwithstanding the efforts of the manufacturers to advance them. There has been some conference with reference to re-establishing the association with a view to an agreement as to the production and prices, but thus far without result.

Aluminum Cooking Utensils.—The Illinois Pure Aluminum Company, Lemont, Ill., issue a circular relating to their Aluminum Cooking Utensils. It calls attention to the advantages which Aluminum possesses for such purposes, the following points among others being emphasized: That under no circumstances can poison be extracted from Aluminum; that this material is three times lighter than the lightest metal used for Cooking Utensils; that it is almost equal to silver in its heat conductivity and is superior to other metals in its retaining quality; and that Aluminum Cooking Utensils possess the advantages of porcelain-lined utensils without the annoyance connected with their use. The company also state that they are ready to purchase a used utensil of their own manufacture at scrap price, the price for scrap being given in the circular. Their price-list is as follows, terms net 30 days, 5 per cent. for cash on receipt of invoice:

	Per dozen.
1-quart saucepan	$4.00
2-quart saucepan	8.00
4-quart saucepan	16.00
10 inch fry pan	
10½-inch wash bowl	4.80
13-inch wash bowl	

	Per half-dozen.
Tablespoons	$1.50
Teaspoons	1.00
	Per pound.
Aluminum sheet of all gauges and widths carried in stock up to 18 B. and S. gauge and up to 12 inches wide, in lots of 50 pounds	$1.00
From 18 to 24 B. and S. gauge and up to 12 inches wide, in lots of 50 pounds	1.10

The circular also gives the scrap value of the goods as follows:

	Per dozen.
1-quart saucepan	$1.20
2-quart saucepan	3.00
4-quart saucepan	6.00
10½-inch wash bowl	1.50

National Price-List of Cut Nails.—At a thoroughly representative meeting of the Nail manufacturers of the country, held at Philadelphia on January 31, the policy of having a Nail Card was abandoned, and instead of this method of quoting and selling Nails a price-list was established covering the different kinds and sizes, such list to be subject to a discount, or, more strictly, a rebate per keg. This method was considered by the manufacturers to have important practical advantages over the Nail card, and the list has been arranged so as to permit a given rebate to apply to all kinds and sizes of Nails. This price-list is herewith printed and goes into effect at once, quotations by the manufacturers to be from this list and not from card, as heretofore.

The trade will recognize this as a radical departure. It is regarded with favor by some of the manufacturers, who heretofore questioned the advisability of a revision of the Nail card, and if in practice it is found to work satisfactorily it will be a matter of congratulation and will serve the convenience of the trade. Our readers will understand that the system now in force contemplates the quoting of Nails at a certain discount or rebate from list. For example, $1 per keg discount would make a 10d Common, the list of which is $3, to cost $2, and a 3d fine, the list of which is $4, to cost $3.

National Price-List of Cut Nails, Adopted January 31, 1893, *Subject to Discount* $ ... *Per Keg on All Sizes.*

	Common, Fence, Heavy Brads, Sheathing.	Casing, Flooring, Slating, Box and Eastern Finishing	Fine Blued and Fine Finishing.
2d	$3.75	$4.25	$4.35
3d	3.55	4.05	4.00
4d & 5d	3.35	3.50	3.60
6d & 7d	3.20	3.35	3.45
8d & 9d	3.10	3.20	3.30
10d	3.00	3.10	3.20
12d & 16d	3.00	3.10	3.20
20d	3.00	3.10	3.20
30d	3.00	3.10	.....
40d	3.00	3.10	.....
50d	3.00	.....	.....
60d	3.00	.....	.....

Cut Spikes.

All Sizes	$3.10

Clinch.

1½-inch	$3.00
1¾ "	3.00
2 "	3.75
2¼ "	3.75
2½ "	3.60
2¾ "	3.60
3 "	3.50
3½ "	3.50
4 "	3.50

Light Barrel and Lining.

¾-inch	$4.25
⅞ "	4.00
1 "	3.75
1 1-16"	3.75
1¼ "	3.50
1⅜ "	3.40
1½ "	3.40

Common Barrel.

¾ inch	$4.15
⅞ "	3.90
1 "	3.65
1 1/16 "	3.65
1⅛ "	3.40
1¼ "	3.40
1⅜ "	3.30
1½ "	3.30

Tobacco Manufacturers' Box Nails.

4d and 5d Lining	3.35
6d and 7d	3.20
3d Caddy	4.00
4d "	3.75
5d "	3.75

Cooper, Tobacco and Warehouse.

4d and 5d	3.65
6d and 7d	3.50
8d	3.35
10d	3.25

Each half keg 10 cents extra.

Wringers.—Colby Wringer Company, Montpelier, Vt., have adopted a system of discounts and quantity rebates on their Wringers applying to the following prices, which are subject to a cash discount of 2 per cent.:

The Colby Improved Wringer.

No. 3	Rolls, 10 x 1¾	inches, per dozen	$36.00
No. 2	" 11 x 1⅞	" "	42.00
No. 1	" 12 x 1⅞	" "	48.00

The Premium Wringer.

No. 10	Rolls, 10 x 1¾	inches, per dozen	$25.00
No. 11	" 11 x 1⅞	" "	28.00
No. 12	" 12 x 1¾	" "	31.00

The company will be pleased to furnish information as to the discounts and quantity rebates on application.

National Saw Company.—There have of late been current a good many exaggerated and unfounded reports in regard to consolidation of Saw interests. The facts in the case are that the National Saw Company have bought the plants of Richardson Bros. of Newark, N. J., and the Harvey W. Peace Company of Brooklyn, N. Y. The capital of the National Saw Company has not been changed, remaining as before, $3,000,000. The officers of the company are:

GEORGE N. CLEMSON, president.
LOUIS DUHME, vice-president.
ROBERT J. JOHNSON, treasurer.
F. B. EARLE, secretary.

The offices of the company will be at 96 and 98 Reade street, New York City.

The company advise us that they have no intention of advancing prices, the consolidation having been effected to secure economy and efficiency in the manufacturing and marketing of the goods. The point is also emphasized that Henry Disston & Sons, Philadelphia, are entirely independent of the National Saw Company.

Glass.—It is understood that application was made at Madison, Wis., during the past week for a charter for the National Glass Company of Milwaukee, but that the headquarters in Milwaukee will be merely one of sufficient formality to practically comply with legal requirements and preserve the charter. A meeting of the company is announced to be held at Chicago this week, when it is expected that the work of organization will be perfected and a full staff of officers and a board of directors elected. The company propose, as outlined by the press, to control their members by the penalty of forfeitures deposited, otherwise capital stock must be subscribed. The deposit, or stock subscribed, under the agreement will be forfeited if the regulations are violated by any member. Jobbers will also be admitted to the company. There has been no decrease in the number of pots in operation since the Glass factories started up last summer, for while many houses which were operating last fire are either idle at present or have gone out of business, there has been more than a corresponding increase in new factories and in the capacity of old ones. It is reported that there are 1681 pots in operation, which is an increase over the number employed at any time during 1892.

Local trade in both American and imported Glass is quiet, though out-of-town trade is reported as fair. Prices in both lines are fairly well maintained, probably being somewhat stronger in anticipation of the successful organization of the National Glass Company. There are no new developments in the Plate Glass market. Prices remain unchanged, as follows:

American Window Glass, 1000-box lots or more, 80 and 15 per cent. discount; carloads, 80 and 10 per cent. discount; less than carloads, 80 and 5 per cent. discount. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	@	.03
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔ lb.	@	.04½
Wringer Wire Rolls, ℔ lb.	@	.02
Syringes, ℔ lb.	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb	10¢
Light and Tinned Copper	℔ lb	9¢
Heavy Brass	℔ lb	7¢
Light Brass	℔ lb	6¢
Lead	℔ lb	3½¢
Tea Lead	℔ lb	3½¢
Zinc	℔ lb	2½¢
No. 1 Pewter	℔ lb	14¢
No. 2 Pewter	℔ lb	7¢
Wrought Scrap Iron	℔ gross ton,	$17.00
Heavy Cast Scrap	℔ gross ton,	10.00
Stove Plate Scrap	℔ gross ton,	7.00
Burnt Iron	℔ gross ton,	5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags	℔ lb	4 ¢
No. 2 White Rags	℔ lb	3 ¢
Mixed Rags	℔ lb	1½ @ 1¾ ¢
Blues and 3ds	℔ lb	1¾ @ 2 ¢
Hard Sized White Shavings	℔ lb	2¼ @ 3 ¢
No. 1 White Book Shavings	℔ lb	2¼ @ 2½ ¢
No. 2 White Book Shavings	℔ lb	1¾ @ 1¾ ¢
Light Book Shavings	℔ lb	⅞ @ 1 ¢
No. 1 Mixed Shavings	℔ lb	1¼ ¢
No. 2 Mixed Shavings	℔ lb	¾ @ ⅞ ¢
No. 1 Printed Books	℔ lb	1⅝ @ 1¾ ¢
Ordinary Mixed Books	℔ lb	¾ @ ⅞ ¢
Newspapers	℔ lb	½ ¢
No. 1 Manila Paper	℔ lb	1¼ @ 1¾ ¢
No. 2 Manila Paper	℔ lb	¾ @ 1 ¢
Bogus Paper	℔ lb	½ @ ¾ ¢
Common Paper	℔ lb	⅝ @ ¾ ¢
Straw Chips	℔ lb	½ @ ⅝ ¢
Binders' Clippings	℔ lb	½ @ ⅝ ¢
Jute Butts	℔ lb	1¼ ¢
No. 1 Jute Bagging	℔ lb	1¼ @ 1⅝ ¢
Mixed Bagging	℔ lb	1 ¢
No. 2 Bagging	℔ lb	¾ ¢
Hemp Twine	℔ lb	2½ ¢
Manila Rope	℔ lb	2¼ ¢
Jute Rope	℔ lb	1¾ @ 2 ¢
Mixed Rope	℔ lb	¾ @ 1 ¢

Trade Notes.

THE BERGER MFG. COMPANY, Canton, Ohio, in another column of this issue present an announcement relating to Steel Roofing. The advertisement also refers to Corrugated Iron, Steel Brick Siding, Eave Troughs and Cornices.

THE TOLEDO TINWARE MFG. COMPANY, Toledo, Ohio, are directing attention to IC Sap Pails which they manufacture.

RIVES, SCHIRCK & CO., Rochester, N. Y., make reference elsewhere to their line of Registers, showing one design in the announcement.

GERMAN PUTZ-LIQUID is the subject of an advertisement of the Meyers-Putz Pomade Company, 271 Franklin street, Boston, that appears in another column of this issue.

JOSEPH W. WAYNE, 124 Main street, Cincinnati, Ohio, is calling attention to Wayne's Cork Filled Self-Ventilating American Refrigerator.

P. B. CALVERT & CO., 68 North Second street, Philadelphia, Pa., in their advertisement elsewhere, illustrate and briefly describe the Earl Revolving Ventilator and Chimney Cap, which is made of galvanized or kalameined iron, and is stated to be a sure cure for smoky chimneys.

THE FLETCHER FIRE MAT COMPANY, Murdock Block, Cincinnati, Ohio, make a prominent announcement in our advertising columns this week respecting the Fletcher Fire Mat, in which they present illustrations and point out its numerous uses and advantages.

JOHN DUNLAP COMPANY, Pittsburgh, Pa., are directing attention to their special brand of Roofing Plate, which they describe as "Dunlap's Double Dipped," made by the palm-oil process.

UNDER RECENT DATE the firm of John Dunlap & Co. announce that owing to the death of their senior partner, John Dunlap, on June 6, last, the firm of John Dunlap & Co. were dissolved. Under same date the announcement is made by John Dunlap Company stating that they have purchased the machinery, merchandise and good-will of the late firm of John Dunlap & Co., manufacturers of Stamped and Japanned Tinware, which business the late John Dunlap had successfully conducted for almost 53 years, consecutively.

THE WORKS OF THE Clark Novelty Company, Rochester, N. Y., were destroyed by fire on January 21, a portion of their machinery and office effects being saved. Another location was at once decided upon and new works are now established at 21 and 27 North Water street, Rochester. New tools and machinery requisite for the manufacture of their specialties are being placed and the business which, at the time of the fire, was in a most prosperous condition, will be resumed with only slight interruption.

FROM THE ILLINOIS PURE ALUMINUM COMPANY, Lemont, Ill., we have received copies of their recently issued circulars. One is the general announcement of the company directing attention to their Cooking Utensils and pointing out the merits they possess. They also inclose a paster, which, we presume, they send out with their vessels. It likewise describes the advantages of this metal, and, what is novel and of interest in sending out Kitchen Ware, there is a line stating what the scrap value of the utensil is, which means that the company will pay that amount for the utensil if injured.

WE ARE INDEBTED to Rives, Schirck & Co., Rochester, N. Y., for a tasteful calendar that they are sending out to their friends in the trade. It is of convenient size and prettily decorated with a spray of apple blossoms and two highly colored birds, the appropriateness of which is that by the time the birds get back Registers will be in demand, and the above company ask their customers to bear them in mind. With the calendar is a little trade announcement of the same concern, and they also issue an illustrated price-list of their goods.

GEO. A. KEMPER, Akron, Pa., is building an addition to his establishment for the purpose of adding Hardware and House-furnishing Goods to his business.

ACME STAMPING COMPANY, East Stroudsburg, Pa., call attention, in a circular, to their Acme Dinner Pails, with Strayer's Patent Combination Ear and Cover Fastener. The pail is illustrated on the leaf, and seven reasons are given why it should be used in preference to other dinner pails.

THE DENVER STAMPING COMPANY, Denver, Col., manufacturers and importers, issue a catalogue of the goods which they manufacture and deal in. The volume is neatly gotten up, contains about 50 pages and is freely illustrated. The first section is devoted to pieced Tinware, next comes Japanned Ware, the last including such articles as Tyler's Flour Receptacle and Sifter, Tea and Coffee Caddies, Spice Cans, Oil Tanks, &c. The next section is devoted to Black and Galvanized Iron Ware and at the close of the pamphlet reference is made to Stove Boards, Stamped Ware, Granite Ware, Tinners' Trimmings, Hollow Ware, &c. A later circular issued by the same company pertains to some of their leading specialties for 1893. The goods shown embrace Water Coolers, Oil Cans of several sorts, Flour Sifters, Cad dies, Dinner Pails, Lard and Honey Cans and other articles. The firm issue separate catalogues of Plain, Stamped and Japanned Tinware.

JOHN C. RIMES & CO., 34 Wabash avenue, Chicago, issue a notice to the jobbing trade, reminding them of the Copper Wash Boilers which they handle, describing them as made of 14-ounce planished copper with drop handles riveted by cleats and drop covers. Inclosed with the announcement are circulars relating to a number of goods which the company either manufacture or handle as manufacturers' agents. Among the printed matter are circulars relating to goods of the Ohio Lantern Company, Tiffin, showing the Brilliant and Standard Tubular Lanterns and others; also the Steel Ash Cans of L. H. Chubbuck & Co. of Boston. Other goods noted are Shelf Brackets, Axeline, Cyclone Post-Hole Digger, &c.

THE SMITH & ANTHONY STOVE COMPANY, 48 Union street, Boston, Mass., make an interesting announcement in our advertising columns this week respecting The Hub Hot-Water Heater of their manufacture. They print a very flattering letter from one who has used this Heater, showing what it does in active operation.

WILLIAM J. H. GLUCK, Baltimore, Md., distributes a series of catalogues and circulars of his manufactures. One, entitled "List No. 16," is a condensed price list of factory and railroad Milk Cans. The little publication contains some 30 pages and illustrates a variety of cans, besides giving a table of sizes and price-lists. Other page circulars draw attention to Gluck's oil can and Gluck's steam cooker, made in various sizes.

HALL & CARPENTER, 709 Market street, Philadelphia, Pa., send a series of Steel Engravings on cards, which are held together by a ribbon and form a handsome calendar for 1893. The dates of two months are given on each of the six cards forming the set, the engraving on each card representing scenes appropriate to the season of the year covered by the month. Thus for January and February a winter mountain scene is shown; for March and April a fishing smack, &c. On the back of each card are dates for the entire year. Each card calls attention to a different line of goods which the firm import or for which they are agents. The calendar is artistic in execution and arrangement, and is entitled to a prominent place in the office.

THE NEW SHEET MILL of the Lalance & Grosjean Mfg. Company, at Harrisburg, Pa., is ready for operations and will be started up in about a week. All of the machinery of the different departments is in position, and the billet mill is already in operation. The principal product of the works will be sheets for consumption in the company's factory at Woodhaven, L. I.

THE MURRIN HAT REST COMPANY, 1515 South Jefferson avenue, St. Louis, Mo., in an advertisement elsewhere, direct attention to Murrin's Hat Rest, illustrate it and refer to its advantageous features.

AMONG recently authorized corporations in Illinois are the following: Detroit Heating Company, at Chicago; capital stock, $10,000; for the manufacture of boilers, engines and heating apparatus, plumbers' and steam fitters' supplies; incorporators, Frank M. Peters, Frank A. Winslow and John G. Nazro. The Aurora Bicycle Company, at Aurora; capital stock, $10,000; for the manufacture of bicycles; incorporators, Walter S. Frazier, Jr., Edward S. Frazier and Lincoln B. Frazier. The Buerk Hardware Company, at Chicago; capital stock, $25,000; for dealing in hardware; incorporators, Martin M. Gridley, Luther Ellison and Edward A. Cross. The Boles Company, at Chicago; capital stock, $6000; for the manufacture of spreaders for road, speed and draft horses; incorporators, E. Duthil, N. A. Throop and George N. Lyman. The New Haven Silver Plate Company, at Chicago; capital stock, $600,000; for the manufacture of silver and plated ware; incorporators, S. O. Livenson, William M. Northrup and Benjamin V. Beeker. The Bremer Strand Company, at Chicago; capital stock, $10,000; for the manufacture of dividers, calipers and forging dies, and for manufacturing in wood and metals; incorporators, John Bremer, E. E. Barrett and E. J. Hamel. St. Louis Smoke Preventing Company (operating under S. E. Flint's patents), at East St. Louis; capital stock, $60,000; for the manufacture of smoke preventing devices; incorporators, S. E. Flint, W. F. Mills and William Kuehne. The Chicago Steel Spring Company, Chicago; capital stock, $200,000; incorporators, Douglass C. Gregg, Malcolm Daleowen and Ross C. Hall. Chicago Smokeless Furnace Company, Chicago; capital stock, $100,000; incorporators, Charles E. Walker, Delos Carskaden and John D. Brinkerhoff. S. K. White Company, at Chicago; capital stock, $200,000; for the manufacture of machinery; incorporators, E. P. Hatch, R C. Rtscher and S. K. White. The Illinois Stoker Anti-Clinker Grate Bar Company, at Chicago; capital stock, $250,000; for the manufacture of grate bars; incorporators, Charles B Bean, Fred S. Bean and Watson Ryder. The Victor Key-Opening Can & Machinery Company, at Chicago; capital stock, $1,200,000; for the manufacture of key-opening metal cans and the machinery for making the same; incorporators, Edward Barray, Charles O. Johnson and Louis Spahn. The Mendota Metal Body Carriage Company, at Mendota; capital stock, $10,000; for the manufacture of metal body vehicles; incorporators, John Schaller, Matthew Wilson, C. Henning, C. W. Russell, H. B. Aldrich and Benjamin Tanner.

THE IRON CLAD MFG COMPANY, 22-24 Cliff street, New York, inform us that although they have added materially to their facilities in the way of presses and machinery, and have lately doubled the capacity of their plant over last year, making it three times as large as two years ago, they are being pushed to execute their orders. They refer to trade as very good, and add they are now making a large line of Stamped and Pieced Enameled Ware, to which they are continually adding in the way of new goods.

HAYDOCK & BISSELL, 12 Murray street and 15 Park Place, New York, announce a large trade sale of Cutlery on Wednesday, Thursday and Friday, February 8, 9 and 10, particulars in regard to which are given. This is the opening Cutlery sale for 1893, and is an important one for buyers of Cutlery to attend, as all the goods will be sold without reserve in quantities to suit the jobbing and retail trade.

BRITTAN & BOND, 154 Lake street, Chicago, are representing the Duffy & Lovelock Tool Company, who are manufacturing a line of fine Steel Tools. It is their aim to offer the very best Steel Tools made, and all goods marked Duffy are fully warranted. Their line includes Vest-Pocket Berry-Box Openers, Hip-Pocket Crate Openers, Boot and Shoe Dealers' Case Openers, Cigar Box Openers, California Fruit-Case Openers, Duffy's Wine-Case Openers, Concrete Tools, the Chicago Gate Hinge, Cabinet Makers' Bench Hooks, Bricklayers' Hammers and Chisels, Cold Chisels, Punches, Tinners' Chisels, Tinners' Punches, Hand Groovers, Rivet Sets, Blacksmiths' Cutters and other Tools. Their 1893 catalogue illustrates these goods with descriptions and prices.

THE H. B. SAHLER FURNITURE & CARPET COMPANY, Atchison, Kan., have purchased the stock of Hardware, Stoves, House-furnishing Goods, Tinware, &c., formerly carried by Herman Jochems of that city.

WITH the compliments of Geo. M. Scott & Co., 168 Main street, Salt Lake City, Utah, is sent a handsome metallic end banger, to the lower part of which are attached calendar leaves for 1893. The larger portion of the card is taken up with the head and shoulders of a young lady, done in colors, of more merit than usually found in this class of advertising. Under the firm's name at the top is a business card calling attention to their stock of hardware and metals.

JANNEY, SEMPLE & CO., Minneapolis, Minn., have just issued a handsome catalogue of 1105 pages, substantially bound in leather and cloth, with beveled edges and of a fine quality of paper. The desirable arrangement of the cuts and list prices is particularly noticeable, while the whole book gives evidence that neither time nor expense has been spared in compiling it. On the first page is given a view of their stores, 30-36 South Second street, corner First avenue. Goods are classified in departments, which are enumerated on the page opposite the index, as follows:

Mechanics' and Edge Tools	Pages	1 to 200
Farming Implements and Miscellaneous Hardware	"	201 to 516
Builders' Hardware	"	517 to 804
Pocket and Table Cutlery, Razors, Scissors, Shears, &c.	"	805 to 888
Fishing Tackle, Revolvers, Ammunition, Skates, &c.	"	889 to 968
Granite Iron Ware, Pieced and Stamped Tinware, Tinners' Trimmings and Stock	"	969 to 1,044
Tinners' Tools and Machines	"	1,045 to 1,064
Blacksmiths' Hardware, Iron, Steel, &c.	"	1,065 to 1,105

The catalogue embraces a large variety of goods and is especially adapted to the wants of the Northwest trade.

BURN STAMPING & MFG. COMPANY, 66 Lake street, Chicago, advise us that they are producing all their own Steel Plates used in the manufacture of milk cans and also Roofing Plates 20 x 28 inches.

BREGENZER & ZILISCH have purchased the hardware store of the Rendtorff Hardware Company at 291 and 293 North avenue, Chicago. They will not only handle builders' hardware and mechanics' tools, but also stoves, ranges, furnaces and house furnishing goods. The firm consists of M. M. Bregenzer and C. A. Zilisch.

It Is Reported—

That the Hardware store of J. F. Barber & Co., Phillipsburg, Pa., was destroyed by fire on the 16th ult. The loss was $9000; fully insured.

That the Allerton-Clarke Company, have been formed in Chicago. The capital stock is $50,000. The company will deal in Hardware. The incorporators are Cortlandt C. Clarke, Crandall A. Rosecrans and Samuel W. Allerton.

That W. H. Wibbs' Hardware store, at Prospect, Ohio, was damaged by fire on the 16th ult. Loss, $1000.

That Frank Dorrance, son of W. H. Dorrance, Hardware merchant, Camden, N. Y., has been taken into partnership. The firm name will hereafter be W. H. Dorrance & Son.

That Elliot & Kennedy have opened a Hardware store at Hamilton, Ohio.

That the Peters Hardware Company have been formed at Emporia, Kan. The directors are George B. Peters, Edwin R. Peters, Hattie G. Peters and George W. Goodding, all of Emporia. The capital stock is $40,000.

That Konow & Donovan are a new Hardware firm at Ivesdale, Ill.

That Henry G. Burrell, dealer in Hardware and Tin, Stoughton, Mass., is erecting an addition to his store.

That Augustus Young is about to sell out his Hardware business at North Berwick, Maine.

That a new Hardware store has been opened at Sarahsville, Ohio, by Chas. F. Hellyer.

That James Ferman, dealer in Hardware, Creston, Iowa, has taken Frank Kingsbury of Adair into partnership with him.

That the Lofton Hardware Company of Chattanooga, Tenn., who were recently incorporated, have commenced business at 824 Market street. For the present the company will confine themselves to the retail trade, and will handle everything in Heavy, Shelf and Builders' Hardware. Their specialty will, however, be Sporting Goods, and Rifles, Guns, Baseball Goods, Fishing Tackle, &c., will be carried by them. The officers of the company are: Jno. M. Lofton, president and treasurer; W. H Boyle, vice-president, and H. B. Rigg, secretary.

That David Nesbit has embarked in the Hardware business at Brockport, N. Y.

That Indianola, Iowa, has a new Hardware store, the proprietor of which is F. L. Beymer.

That the Hardware firm of Bressler & Schmehl, Lebanon, Pa., have been dissolved by mutual consent, and the interest of Mr. Bressler has been purchased by C. Dorsey Gloninger. The business will hereafter be conducted under the style of Schmehl & Gloninger.

That the Hardware firm of Humphrey & Brown of Delevan, N. Y., has been dissolved, Mr. Humphrey retiring.

That H. A. Cook of Hoopeston, Ill., will move his stock to Ladoga, Ind.

That C. M. Smith is closing out his Hardware business at Cloverdale, Cal.

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See Standard Lists on Following Pages.

CHICAGO, FEBRUARY 2, 1893.

Tin—
Straits pigs.....22¢@22½¢

Imported Tin Plates—
Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
IC,	10 x 14	@ $6.75
IC,	12 x 12	@ 6.75
IC,	14 x 20	@ 6.75
IC,	20 x 28	@ 13.10
Calland and IX,	10 x 14	@ 8.75
Melyn Grade { IX,	12 x 12	@ 8.75
IX,	14 x 20	@ 8.75
IX,	20 x 28	@ 17.50
DC,	12½ x 17	@ 6.50
DX,	12½ x 17	@ 8.50
Allaway Grade, IC,	10 x 14	@ 6.50
" IC,	12 x 12	@ 6.50
" IC,	14 x 20	@ 6.50
" IX,	20 x 28	@ 13.00
" IX,	14 x 20	@ 8.00
" IX,	20 x 28	@ 16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14, 14x20	@$6.00
IC, 14x20, 90 ℔	@ 5.75
IC, 14x20, 100 ℔	@ 5.85
10 x 28	@ 9.00
20 x 28	@12.00
IX, 10x14, 14x20	@ 7.50
BV Grade.—IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Manseland Dean Grades.—	
IC. 14 x 20	@ $5.62½
20 x 28	@ 11.25
IX. 20 x 28	@ 14.25
Worcester Brand and equal.—	
IC, 14 x 20	@ 6.12½
IC, 20 x 28	12.25 @
IX, 14 x 20	7.62½ @
20 x 28	15.25 @

American Tin Plates
Charcoal Plates.—Bright.

Irondale, A. A.—IC, 14 x 20	$7.00
" " IX, 14 x 20	9.00
" " IXX, 14 x 20	11.00
" " IC, 20 x 28	14.00
" " IX, 20 x 28	18.00
" " IXX, 20 x 28	22 00
Florence.—	
IC, 10 x 14, 12 x 12, 14 x 20	$7.00
IX, 10 x 14, 12 x 12, 14 x 20	9.00
Palma.—	
IC, 10 x 14, 12 x 12, 14 x 20	$7.50
IX, 10 x 14, 12 x 12, 14 x 20	9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, IC, 14 x 20	$9.25
Royal, extra, IC, 14 x 20	7.25
Merion, IC, 14 x 20	6.75
Abound, IC, 14 x 20	6.50

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (No. 205), 20 x 28	@$11.50
Crescent, IC, 20 x 28	@ 12.00
" IX, 20 x 28	@ 15.00
Hickory, IC, 20 x 28	@ 13.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20 x 28	@$14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.50
" IX, 20 x 28	@ 18.50
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@$21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	$25.00
Irondale A.—	
IC, 14 x 20	$6.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Kensington:	
IC, 14 x 20	6.62½
IX, 14 x 20	8.12½
IC, 20 x 28	13.25
IX, 20 x 28	16.25
Taylor's Old Style, IC, 14 x 20 (Stamped and Resqueared)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resqueared)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resqueared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resqueared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
Globe, IC, 14 x 20	5.75
" IC, 20 x 28	11.50

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.60
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50
		Per box of 56 sheets.
X, 14 x 56	29.50	16.50
XX, 14 x 56	32.50	18.20
X, 14 x 60	31.50	17.65
XX, 14 x 60	35.50	20.00

Sheet Iron—
Black.

	Common American	Refined.
Nos. 10 to 16	℔ 2 7-10¢	3 3-10¢
17 to 20	℔ 2 8-10¢	3 4-10¢
21 to 24	℔ 2 9-10¢	3 5¢
25 and 26	℔ 3¢	3 6-10¢
27	℔ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ A, 10¾¢; B, 9½¢
dis. 5%
Craig Polished Sheet Steel.....℔ 8½¢

Galvanized.

List on following page.
Juniata, or first quality.....dis. 70%

Copper—
Ingot.

Lake.....13¢ @ 13¼¢
Casting Brands.....12¢ @ 12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.

Copper, Bronze and Gilding Tube, 3¢ ℔ ℔ additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 ℔.

Above 5-16 inch to 3 inch inclu...	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ¼ inch	60¢
Plain, 3-16 inch	$1.00
Plain, ⅛ inch	$1.50
Fancy Tubing, Brass, to No. 20 incl	43¢ ℔
Bronze Tubing, 3¢ ℔ ℔ more than Brass	

35 @ 40%

Roll and Sheet Brass

List on following pages. 35 @ 40%.

Spelter—
Western Spelter.....5¢

Zinc—
600 ℔ casks.....6¼¢
Less than Casks, ℔ ℔.....7¢

Lead—
Soft Pig Lead.....4¢
Bar.....4½¢@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....25¢
Sheet.....6¢, dis. 10%

Solder—
½@½.....13¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—
Cookson.....13¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—
List on following page.

1¼ and under, Plain	60&10%
1¼ and under, Galv	52½&10%
1½ and over, Plain	70&10%
1½ and over, Galv	60&10%
Boiler Tubing, list Oct. 24, 1892	65%
Casing, list Nov. 16, 1892	62½%
Inserted Joints Casing, list Nov. 16, 1892	47½%
Steel Boiler Tubes	27½%
Cold Drawn Seamless Steel Tubing	50%

Cast-Iron Soil Pipe—
Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—
Abendroth's Galv. Spiral Riveted.....55%
Austin's Corrugated.....60¢
Gordon & Gilbert's Corrugated.....55%
Kitchie's (Galv. Iron only) Cor'd.....55%
Kitchie's Spiral Lock Seam, Galv'd.....50%
Austin's Spiral Ribbed Pipe.....55%
Plain Adjustable Elbows.....55%
James A. Miller Bros. (Galv'd Iron only) Corrugated.....55%

Steel Roofing—
Perfection.....$3.75 square
Climax.....$3.50 square

Metallic Shingles—
Cushman's.....$1.25 square
Merchant & Co.'s Spanish Tiles:
Copper, 14 oz.....$36.00 square
Steel, painted.....$9.00 square

Drain Pipe—
Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	℔ 2 ¢
" " Brown	℔ 1½¢
" " Purple	℔ 2½¢
" " Ground in oil, B. Red	℔ 6½¢
" " Ground in oil, Red	℔ 6½¢
" " Ground in oil, Brown	℔ 5½¢
" " Ground in oil, Purple	℔ 6 ¢
Linseed Oil, Boiled, in bbls	51¢
Linseed Oil, Raw, in bbls	48¢
Mineral Paints	2@4¢
Orange Mineral	10¾¢
Pure White Lead in Oil	6¾@7¼¢
Dry White Lead in bbls	6¾@6¾¢
Red Lead, American	7@7¼¢
Red Venetian, English, dry	$1.65@$1.70
Red Venetian in oil, ass'd cans, 8½¢; kegs	7¼¢
Sipe's Japan Oil, in bbls, ℔ gal	34¢
Spirits Turpentine, in bbls, ℔ gal	37½¢
Asphaltum, Trinidad Refined, ℔ ton	$45
Coal Tar, Felt, 1 Ply, ℔ 100 ℔	$1.65
Coal Tar, Felt, 2 Ply, ℔ roll 108 sq. feet	$1.50
Coal Tar, Felt, 3 Ply, ℔ roll of 108 sq. feet	$2.00
Roofing Pitch, ℔ bbl. of 300 ℔	$3.25

NEW YORK, FEBRUARY 3, 1893.

Aluminum—
Guaranteed over 98½% pure.....℔ ℔ .75
Guaranteed 94@98¾% pure.....℔ ℔ .65
Lots under 100 ℔ 5¢ ℔ ℔ additional.

Antimony—
Cookson.....℔ ℔, 12½¢
Hallett's.....℔ ℔, 10¾@11¢

Brass—
Planished—
List on following page.....net

Roll and Sheet—
List on following page.....35@40%

Brass and Copper Tubes
Brazed Brass Tubing—
List May 20, 1880.

	Per ℔.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above 3 inch	45
Plain, 5 16 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu	43

35&40%

Copper and Bronze Tubing—
3¢ ℔ ℔ more than brass.

Bronze, Tobin—
Drawn Rods for Bolts, Forgings, &c.

Over ¼ to 3½ inches inclusive.....17¢ ℔ ℔
Over 3½ to 5 inches inclusive.....18¢ ℔ ℔

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive.....18¢ ℔ ℔
Over 3½ to 5 inches inclusive.....19¢ ℔ ℔

Conductors—
Corrugated. *Round or Square*—
Lists on following page.
Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—
List on following page.
Galvanized.....50%
See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—
Bottoms, Pits and Flats.

List on following page.....10¢@ 0%

Ingot.

Lake.....13¢
Ansonia Grade Arizona.....12¾¢
Ansonia Grade Casting.....11¾¢

Planished.

List on following page.....net

Sheet and Bolt.

List on following page.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—
Soldering Coppers.....℔ ℔, 10@21¢
Covert's Adjustable, list Jan. 1, 1895.....30&2%

Eave Troughs—
List on following page.
Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—
List on following page.
Lap or Slip Joint.....list, net

Elbows—
List on following page.

Plain Adjustable
Tin.....70%
Galvanized.....70%

Crimped Tubing.
Re-Tinned or Galvanized.....35%

Elbows and Shoes—
List on following page.

Flat Crimp.

Tin.....35%
Galvanized.....35%

Corrugated.
Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—
Black.

	Common American.	R. G. Cleaned American.
Nos. 10 to 16	℔ ℔, 2¾@...	3¾¢
Nos. 17 to 20	℔ ℔, 3 @...	3¾¢,
Nos. 21 to 24	℔ ℔, 3¼@...	3¾¢
Nos. 25 and 26	℔ ℔ 3¾@...	3¾¢
No. 27	℔ ℔, 3½@...	3¾¢
No. 28	℔ ℔, 3¾@...	4¢
American B. B	℔ ℔, 4¢@4½¢	

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ ℔, 12@13¢
Patent Planished....℔ ℔, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ ℔, 8½¢

Galvanized.

	B. B.
Nos. 10 to 16	℔ ℔, 4 2-10¢
Nos. 17 to 22	℔ ℔, 4½¢
Nos. 23 to 24	℔ ℔, 4¾¢
Nos. 25 to 26	℔ ℔, 5¢
No. 27	℔ ℔, 5¼¢
No. 28	℔ ℔, 5½¢
Nos. 29 and 30	℔ ℔, 6½¢

Lead—
American Pig.....4½¢@4¾¢
Bar.....4¾¢

New York Prices.

Pipe.....6¾¢, 20%
Tin Lined Pipe.....15¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....27½¢, 20%
Old Lead in exchange, 3½¢ ℔ ℔.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ ℔, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ℔, .05½¢, 10&5%

Metal, Expanded—
Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Door Mats, Galvanized	25%
Window Guards, Paneled	15%
Tree Guards, Paneled	15%

Mitres, Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.—

Dry Yellow Ochre	1¾@3
Dry Venetian Red	1¾@3
Linseed Oil, Boiled, in bbls	48¢
Linseed Oil, Raw, in bbls	51¢
Brown Metallic Paint	1¾@3
Red Lead, American	7¼¢
Pure White Lead in Oil	7¼¢
Red Venetian, English dry	$1.65@$1.70
Red " in oil, ass'd cans, 11¢; kegs, 8¢	
Spirits Turpentine, ℔ bbl	30¢
Asphaltum, Trinidad Refined, ℔ ton	$30.00@$35.00
Asphaltum, Rock, ℔ ton	$14.00
Coal Tar Felt, 1 Ply, ℔ ℔	2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl	$2.24
Plumbago, E. 1., Po., ℔ ℔	4@6¢
Plumbago, American, ℔ ℔	6@10¢
Plumbago, Gunpowder Glazing, ℔ ℔	10¢
Plumbago, Shot Polish, ℔ ℔	10¢

Pipe, Drain—
List on following page.....50%

Pipe and Fittings, Cast Iron, Soil—
List on following page.
Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive.....60&10&10%
Other sizes.....55&55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 inches.....60&60&10%
Other sizes.....55@55&10%

Pipe, Spiral—
List on following page.
Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—
List on following page.
For discounts see Current Hardware Prices.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, February 11, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....220 South Fourth Street
BOSTON.....146 Franklin Street
PITTSBURGH.....Room 509, Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....S. E. cor. Fifth and Main Streets
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....219 Superior Street

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

The Cincinnati office of *The Metal Worker*, in charge of Henry Smith, manager, has been removed from the southeast corner of Fourth and Main streets one square north, to the Pickering Building, on the southeast corner of Fifth and Main streets, opposite the United States Custom House and Post Office.

Catalogues and Catalogues.

The trade catalogue is a feature of modern commerce that is here to stay. By no other means can a manufacturer get so thoroughly in touch with customers, or those he desires to become customers, as through a well-designed, well-written, and well-executed catalogue. But the adjectives "well-designed, well written, well-executed" imply their opposites, at least as a possibility, and any one competent to judge of the matter can, in a collection of catalogues, satisfy himself that the possibility becomes a reality in many instances. "A collection of catalogues!" Does any one ever make what may be termed a collection of catalogues? Yes, a library of catalogues, if you please, and if well selected a very valuable library of reference and of technical information it may become. In the first place, it is a rare repository of words and terms used in the trades. Were a publisher to undertake the production of a dictionary of such words, the very best thing he could do would be to buy, beg, or otherwise obtain as large an assortment of such catalogues as he could get together, and set a compiler to making an alphabetical list of the trade terms they contain with the names of the catalogues in which they are to be found. Secondly, a vast store of useful information may be culled from a collection of well-prepared catalogues. It has come to be the custom to render these books worth preserving. They are useful to the draftsman, who needs on occasion to refresh his memory as to the form of a particular kind of a screw, a valve, a fitting, an implement, or what not. They are useful to engineers, who can find therein standard dimensions, tables of strength of materials, delivery of pipes under varying conditions of pressure, &c., the items of information named being only samples of a thousand points of practical usefulness such books when collected may contain. He who seeks information for its own sake may also often find explanations of the action of machines, tools or apparatus that he might vainly search for in books of a more ambitious sort. A carefully arranged and indexed set of catalogues on the shelves of an engineer's or architect's office indicates that their owner is a man who delves deeply for practical knowledge, no matter how well he may be equipped with the knowledge gained in schools.

Some Defects in Catalogues.

Of course a catalogue may be prepared in an inartistic style as to its printing, illustration, paper and binding. Such deficiencies lessen its value, in the same way as they would lessen the value of any other book of reference. The primary purpose of a catalogue is that, as a work of reference, it shall assist customers in ordering goods from the list it contains. The better it can be printed and illustrated the better it will subserve this primary purpose; and the better the paper and binding the longer it will last in use; so that, as a measure of economy, good work in a catalogue is as desirable as in a book intended for library or professional use. In the preparation of some large catalogues (many could be cited in the stove and hardware trade that are large quarto volumes) thousands of dollars are not infrequently expended on a single edition. These are furnished without cost to actual, regular customers, and though from previously unknown parties a price is often charged, it is very doubtful that any edition of any catalogue by direct sale could ever be expected to reimburse to its publishers the cost of its production. We recall to mind a catalogue of surgical instruments issued by a prominent American manufacturer which is nearly as large and thick as Webster's quarto dictionary, and which is illustrated by perhaps two thousand wood cuts. Another in the hardware trade reaches about similar proportions. Another in the stove trade on magnificent paper, with illustrations of the finest quality, and elegantly bound, is a book that, if its subject pertained to general literature, art or technical science, would be considered cheap if single copies were sold for ten dollars. But there is not much need of further emphasizing the importance of good style and good work in catalogues; the examples cited, and the fact that the preparation of catalogues in connection with other advertising has given rise to a distinct profession in which expert skill in this kind of work is placed at the command of any firm that wishes help in so important a matter, are sufficient to indicate that experienced business men have not overlooked its importance.

Explicitness in Trade Catalogues.

The worst defect, however, that can exist in a catalogue is want of explicitness. Essentially a book intended to impart information, its author should not jump to the conclusion that because long familiarity with the facts he states gives him a complete understanding of them, a very brief, concise statement will enable others who have not had his training to grasp the idea he wishes to convey with equal readiness. This error in writing is all too common among those who write articles for trade papers; it should be most carefully avoided in a catalogue. If, in a catalogue of tools, machines or apparatus for any purpose it is found necessary to require some essential adjustment, manipulation, lubrication or order of procedure radically different from what is usual with other analogous appliances, the reasons for this departure should be carefully set forth, else the purchaser may naturally suppose these requirements are not absolutely essential to the operation of the machine, but are merely the preferred way of the manufacturer of the articles. Many a failure in the use of machines and tools has resulted from want of proper explanation of the reasons underlying the directions given for their use, and even though the manufacturer may legally shield himself behind the directions and throw the blame for the failure upon the user, who did not follow them in every particular, it is not good business policy to risk such results when the risk could be avoided by remembering that his future customers will probably be no more inclined to act in a specific way without specific reasons than he himself would. The common-sense view of mankind is that which assumes the majority to be endowed with common sense; and the common sense of most people revolts at apparently mere arbitrary requirements—requirements that could probably be made to appear perfectly reasonable by a judicious explanation of why they are necessary.

Wage Fluctuations in Germany

The United States Consul in Cologne, in a recent report, gives an interesting summary of a number of statistics collected by various trade unions on the fluctuations in wages in 906 German cities and 924 unions. The figures show that wages have increased in only seven cities, while they have declined in 229, and have remained stationary in the rest. The machine industry, representing 400 local unions, with 20,000 members, shows only two places in which wages have lately risen; in 72 they have declined, while in the balance they have remained stationary, although the

price of food has risen. In all the great centers of the machine industry wages have decreased, such as Aix-la Chapelle, Berlin, Breslau, Dortmund, Dusseldorff, Erfurt, Essen, Leipsic, Magdeburg and Nuremburg. In only 211 out of 906 cities was there full employment, while in 30 there was an almost complete stoppage of work. It is stated, also, that in most parts of Germany to-day the workman alone cannot earn enough to support his family. With a family of four persons the average expenditure appears, from "family budgets" which have been collected, to be about $260 a year, while the earnings of the head of the family alone amount to only $194.

Magnetism of Great Cities.

An increasing drift of the rural population citywards is one of the most marked features of the age. Such is the present condition among the people of all civilized countries, the United States being no exception to the rule. In almost all the older and more thickly-peopled States of this country the large cities are absorbing the youth of the rural districts and increasing rapidly in size, while the census shows us that the country villages and smaller towns either remain stationary, as regards population or go backward. This tendency is to be accounted for in more ways than one. First and foremost, however, may be placed the attraction of pecuniary advantage. Wages in the city are higher than they are in the country; there are there more opportunities of money making, among the vast number of industries, manufacturing and otherwise, than present themselves in country life. Consequently the country youth, male and female, imbibe from their earliest years the idea of one day going to the city "to better themselves" or "make their fortunes." This is a natural tendency and, within certain limits, is not to be deplored. Indeed, it is a laudable ambition, provided the aspirant possesses the necessary qualifications for success in life. But the question arises, *Does* the rural immigrant generally better himself? It is hard to answer. Leaving out the moral and physical aspects of the question, and looking only at the financial side, we cannot but think that a considerable proportion of those who come to the great social and commercial centers, expecting to find highly-paid labor awaiting them, with prospects of speedy fortune and independence in the near future, would do far better if they were to remain in the sphere in which they were born.

Employment in Cities.

It is true that a bright, smart youth finds in the city a fairer field for his talents than he would find by remaining in the country; and, provided he possesses the requisite moral qualities, such a person will undoubtedly make his way, But for the lad of no particular points or education the streets of the city are not paved with gold. In the congested condition of so many of our great centers nowadays, the struggle for existence is daily becoming more pressing. Employment is hard to get except for skilled labor, even in the numerous manufacturing industries which have multiplied to such an extent within recent years, while as to other employments, foreign immigrants crowd the principal seats of wealth and activity, and their competition in the labor market is hard to meet. The cost of living is far higher in cities, and whatever advantage is gained in respect of wages is generally neutralized by increased expenses. Moreover, the physical comforts and general conditions of existence are by no means better in a New York tenement house and factory than they are in a country workshop or on a farm. We would not desire for a moment to discourage legitimate ambition or the natural tendency which impels young and ardent minds, who feel their own strength, to try it in the fiercer strife of the great cities. Let them come, and carve out their fortunes, by all means. But to those who have a fair prospect before them in the country town or village where they now are, we would say: Think twice before you cast away the substance —perhaps only to grasp the shadow in its place.

How To Do, Etc.

BY FOSSIL.

There are several texts in *The Metal Worker* which will serve as inspirations to possible writers who may feel a call to use them. The letter of "A. R.," in issue of January 21, offers a comprehensive theme for both the "old and young boys" for the questions "How to do work," and "How not to do it," are of broad import. It seems to the writer that, How to do? is not confined to the specific directions which a veteran might give regarding the doing of a particular job, but rather asks for broader information, which shall be of general application. It is possible that there are mechanics who are in possession or trade secrets—as referred to by "H. J.," in Letter Box—which, if made public, would materially assist some brother chip without injuring the original holder. Imparted knowledge does not diminish learning's store, but "H. J.'s" man seems to be of that kind who answer all questions with a "What will you give to know?" Such men are probably rare, and little loss would occur should their secrets perish with them. "There is nothing hidden that shall not be revealed" in the line of metal working, for if men will refuse to assist in a private way, as in the case of "H. J.'s" "deacon," or neglect a public call, as per "A. R.," there remains the choice of asking *The Metal Worker* or working out the problem for one's self. There is a reminiscence of old time which may come in here as apropos to both the letters referred to above. There was a tin shop where worked an apprentice who applied to older hands for information in laying out elbows, this being at that time a trade secret and patterns not furnished. But failing of assistance, he helped himself in this way. Taking a joint of stove pipe, he immersed a part of it in water at the angle of his desired elbow pattern, then cutting the miter on the water line and making the pipe a plane surface, he got on to the track of that trade secret and by a little more study and experiment made it his own, with no thanks to the former monopolists.

Taking the question of How to do? on the wide ground before referred to, there are certain cardinal methods which the experience of the veterans has proved to be of advantage and these have been often mentioned in the way of advice, which, as has been said, is sometimes more blessed to give than to receive. But usually the persons so advised prefer to "go it alone," practically doubting the wisdom of the ancients, also if told how not to do, they often copy the lady who, being advised not to marry by one who "had seen the folly of it," said she desired a like experience for herself. Everybody has read the directions in Mrs. Glass' book for cooking a hare which begin with "First catch your hare." We may say first choose your trade. There are too many round men found in square holes or *vice versa*, because care was not taken in the start, and a nature diverted from its original tendencies will not succeed like that which, as we say, was born for the place. In boyhood we used to turn the tops of young hickory trees downward and lash them to and parallel with the trunk; after a while the forced crook would become permanent and a tolerable walking stick was made by spoiling the tree in its youth Circumstances, precedents, unwise counsels and other binding forces have made poor walking sticks from boys who might otherwise have grown to larger usefulness.

Having carefully chosen and demonstrated the wisdom of the choice, go in to win by making, as a veteran worker puts it, "every blow count." The man who does a good job in a good way has a regular chain of linked operations in mind, each important in its place and each connecting in order—every moment from start to finish conducing to the desired result. In like manner let the apprentice learn that patient climbing, with every advancing step well considered and no false motions made, will get the desired eminence in his craft more certainly than a soaring ambition that ignores details. There was a lesson taught by watching workmen lately making ships' cables at the Charlestown Navy Yard. Link by link the iron constituents were heated, attached and welded one at a time, receiving the care and attention of the operator, and so the massive chain grew long and strong in proportion to the soundness of material and the good work done on each individual link.

A young mechanic may study with profit the operations of those automatic machines which seem almost like sentient beings, carrying on their processes of manufacture orderly and consecutively from the introduced material to the completed article. That steady, do one thing at a time and do it well, shows the good workman as well as the good machine. It does not follow that a man having attained to the preciscness and regularity of a machine should remain contented. There are ideas born of practical hands and thinking heads which culminate in useful and valuable inventions, and those mechanical successes, which are not the result of patient plodding, industry of hands coupled with earnest study of brains, are the exception and not the rule.

Secretary Wilson of the New York Chamber of Commerce presents statistics showing that the present market value of the silver purchased by the Government since the passage of the Silver act of 1878 is $351,457,257. It cost the Government $432,372,907. The loss in value of the metal amounts to $80,915,650.

The Bank of England holds about $15,000,000 more gold than it did a year ago, the Bank of France $40,000,000 more, the Bank of Germany $12,000,000 less, the Bank of Austria $25,000,000 and the Bank of Spain $2,500,000 more.

WORLD'S FAIR NOTES.

Exhibits by Great Britain.

Sir Henry Trueman Wood, Secretary of the British Commission, has made public particulars of the character and extent of the British exhibit at the fair. The British section, he says, will cover 600,000 square feet, which is the largest space ever occupied by Great Britain at any international exhibition. Two-fifths of the space will be given to the colonies of Great Britain. There will be about 600 exhibitors in the industrial departments of the fair, and great care has been taken to select exhibits which shall give the most adequate illustrations of Great Britain's commerce and art. The allotment of space is divided among the following departments: Agriculture, Electricity, Fisheries, Forestry, Live Stock, Machinery, Manufactures and Liberal Arts, Mines and Mining, Transportation, Fine Arts, and in the Woman's Building.

In the Manufactures Building there will be shown fine specimens of Worcester porcelain, Doulton ware, jewelry, furniture, silks, wall papers, billiard tables, linen and old gold work from Ireland, chemical products, an extensive exhibit of photographs, including work by amateurs, newspapers, scientific instruments, and various educational appliances used by the School Board of London and the Science and Art Department.

In the Transportation Building the Britons will show engines and carriages from various English railways, bicycles, a model of the Forth bridge, carriages and vehicles, and an elaborate display of models of ships sent by the great shipbuilding firms of the United Kingdom. The latter exhibit attracted great attention at the naval exhibit in England, and, it is predicted, will be one of the most popular features of the British contribution to the great show, to view every exhibit in which, Sir Henry Trueman Wood says, will necessitate a walk of 50 miles.

In the Machinery Department a great number of miscellaneous mechanical devices will be in view. Printing and typesetting will be illustrated, there will be looms, spinning frames, steam hammers, three steam engines at work, and specimens of cotton-cleaning machinery.

English electricians, the secretary states, have not contributed so liberally to the electrical section as the Commissioners have desired. The chief British exhibit will be a splendid collection of telegraph apparatus in use in the Post Office Department.

Burdett-Coutts, M.P., will show a model of his stud farm in the Agricultural Building. There will also be a model dairy.

Of England's colonies Canada will hold the premier position, says Sir Henry. Its exhibits will be large in the Agricultural, Mining and Manufactures Building. New South Wales will show timber and merchandise and an enormous trophy of silver taken from the Broken Hill mine. Ceylon will show teas in native stall, with native attendants. India will send specimens of Indian art, silks and other articles. The Indian exhibit, though not decided upon till late, will nevertheless be creditable and interesting. South Africa will send exhibits, noticeable among which will be an illustration of the process of diamond mining, and the samples of clay sent over to show the operation of washing will be selected for their probability of containing diamonds.

Great Britain will have a handsome representation in the Fine Arts section. There will be between 800 and 900 works by some 300 painters who have been chosen out of 1000 applicants. There will be few pictures from the public galleries, but nearly all of the royal academicians will have canvases at the fair. The Queen has lent several pictures which will be sent over. In explanation of the limited number of pictures from public galleries, Sir Henry Wood states that the collections in the National Gallery and at South Kensington are precluded from being lent, a rule which is in contrast to the regulation on this point governing the public collections in France and Germany. These may be drawn upon with the assent of the government, which is not difficult to obtain.

Many of the British exhibits are now on the way to Chicago, and the organization of the section will be begun this month by Sir Henry Trueman Wood in person, assisted by a regular staff. He is confident that the entire exhibit will be complete and ready by May 1.

The Hon. Arthur Renwick, who will represent the New South Wales Commission to the exposition, is now in Chicago and will remain there at least until the exhibit is installed. He makes a stronger claim for New South Wales than Sir Henry Wood, evidently believing that the antipodes will surpass any of Great Britain's nearer colonies. He says:

"Our principal displays will be those of minerals and wool. In the former we expect to beat everything except, perhaps, the display of the United States, and in the latter, the world. Our mining exhibit will include samples of almost every known mineral—gold, silver, coal, iron, copper, tin, lead, zinc, platinum, bismuth, plumbago, manganese, cobalt, mercury in the form of sulphides or cinnabar, magnetite, nickel, &c., in addition to many kinds of precious stones.

"Australia is the second gold producing country and the yield of this metal in the last 40 years has exceeded in value $1,500,000,000. 'The Welcome Stranger,' one of the biggest nuggets ever taken out of a mine, will probably be on exhibition. 'The Welcome Stranger' is a nugget of gold weighing 3040 ounces, found in 1869. It will be the central feature of the exhibit of which it will be a part, and while on exhibition will be guarded by a force of detectives specially detailed for the purpose. We claim and visitors generally concede, that Sydney, our capital, is the best paved city in the world. We had intended originally to lay down a section of a street in Chicago with our wood-blocking but the great cost of carriage militated against this, and we are going to content ourselves by laying down a small section in or outside one of our courts."

Krupp's Big Guns on the Way.

Fried Krupp, the great gunmaker of Germany, has shipped the first consignment of the implements of war to Jackson Park. The bills of lading were received at the Chicago Custom House on the 30th ult. The consignment left Baltimore on January 26, and included six guns, valued at $132,000. While Herr Krupp intends to send later the monster gun of the age, the ones which are now *en route* between Baltimore and Chicago are by no means small. The largest one is approximately 16 inches in diameter and is meant for coast service. There are an 8-inch central pivoting gun, a 16-inch 40 pound quick-firing gun; a 5-inch 40 pound quick-firing gun, and two additional smaller ones. Within a few days the monster gun, the biggest one ever constructed, will be *en route* to Chicago. This one will have a bore of 25 inches in diameter and will weigh about 130 tons. Herr Krupp has manufactured it especially for the World's Fair at the request of Emperor William. A special pavilion is under construction for its reception. In addition to the cannon which will be received there will be a large quantity of packages containing gun carriages, steel armor plates, steel tires, disk wheels, driving wheels, iron cables, plates, tools, &c.

G. Gillhausen and Richard Abe arrived from Germany during the week to take charge of the work of installing the Krupp exhibits.

Roofs Damaged by Snow.

On the 28th ult. considerable damage was done to some of the roofs of the large buildings by accumulations of snow, which formed avalanches under the effect of a heavy rain. The frame work of the roofs was not injured in the least, having been built to withstand almost any strain short of an earthquake. Skylights and glass work suffered, as they could not be braced against such an accident as a snow slide. An erroneous impression has prevailed that the roofs themselves did not bear the weight of the snow. The Manufactures Building is constructed in what might be considered three sections. First there is a main portion 376 feet wide with a towering roof several hundred feet high. On either side of this are annexes or naves, much lower, 175 feet wide. It was on the great hight of the main roof that the snow accumulated. There are at least 16 acres of space there, and the great fall of snow in the last few weeks steadily accumulated. When the mild weather came on, accompanied by rain, the 16 acres of snow became saturated with moisture. As the rain continued the burden became heavier, and finally the great mass of wet snow slipped from its moorings and started on the down grade. For 200 feet it had a clear track and acquired a great momentum. Then it had a clear jump of 50 feet to the glass roof below. Thither it fell and crashed everything before it. The curve in the main roof gave even a greater fall, and apparently the snow left its base of support on reaching this curve and made a sheer jump of nearly 100 feet. Of course nothing in the way of the ordinary roof structure could withstand the shock. But to repair damages will only cost $5000, which proves that it was not a very serious matter. The injury to other roofs was of the same character but even less serious.

The Boiler Controversy.

The Babcock & Wilcox Company have won the first stage in their suit against the Exposition Company, in which they claim the right to place their boilers in the space lately granted by the exposition management to the Stirling Boiler Company. This case was referred for a preliminary hearing to a master in chancery, who reported to the court on the 1st inst. in favor of the Babcock & Wilcox Company. The case will now be fought before the court, but even if the decision is then in favor of the Babcock & Wilcox Company the matter will not then be closed, as the Stirling Company will insist that they have an actual contract for the space in dispute, which should take precedence over an allotment by the chief of a department. The contest between these boiler manufacturers is exciting no little interest in the trade, as it evidently means much more than the mere desire to exhibit specimens of a few boilers at the World's Fair.

Miscellaneous

An engine built by James Watt, Lancashire, England, in 1815, is to be exhibited in the Department of Transportation The owners, John Rourke & Son of Savannah, Ga., will make the exhibit. The firm have been using this old engine since the time of its construction.

The Western Union Telegraph Company has shipped a model of the famous steamship "Great Eastern," which laid the Atlantic cable. It is valued at $5,000.

Pittsburgh's assessed valuation increased last year $13,000,000.

TIN PLATES.

American Tin-Plate Brands.

III.

Herewith we print a further installment of the information collected in respect to brands, trade-marks, &c., of manufacturers of American tin and terne plates. We hope to complete the list in a fourth notice, as there are yet a few makers whose reports have not reached us in time for incorporation in the present article:

John Hamilton,

Pittsburgh, Pa., is devoting his attention to the production of high-grade American roofing plates, of which three qualities are turned out at his works, branded as follows:

1. "*Hamilton's Best Re-Dipped.*"—An old-style terne, made of best American soft steel, coated by hand by the pure palm-oil process. Redipped by hand and thoroughly assorted. Each sheet bears a very heavy and smooth coating, and is resquared. These plates are made of standard sizes, IC and IX, and are stamped with name and gauge, as in Fig. 1. Boxes are marked with name, size and gauge.

Fig. 1.—"Hamilton's Best Re-Dipped" Stamp. John Hamilton.

2. "*Osceola.*"—Second grade of old-style plate, made in similar way to "Hamilton's Best," but the coating is not quite so heavy. Sizes 14 x 20 and 20 x 28, IC and IX. Each sheet is resquared and stamped with name and gauge. (See Fig. 2).

Fig. 2.—"Osceola" Stamp. John Hamilton.

3. "*Lulu.*"—High grade rolled plate, with medium coating. Coated by palm oil process. Made in 20 x 28 sheets, IC and IX. Sheets are stamped with name, as shown in Fig. 3.

Fig. 3.—"Lulu" Stamp. John Hamilton

Merchant & Co.,

Philadelphia, Pa., are turning out an extensive line of American tin and terne plates of superior quality. The roofing sheets produced by this concern include the following brands, all made in IC and IX, 14 x 20 and 20 x 28:

1. "*Merchant's Old Method.*"—A guaranteed hand-dipped plate, bearing a very heavy coating. All plates are resquared, and stamped with name of brand and thickness. (See Fig. 4). Boxes containing these and all of Merchant & Co.'s terne plates are marked on one end with the name of brand and gauge in plain letters. The side of every terne-plate box invariably bears the words "M. & CO. AMERICAN COATED TERNE."

Fig. 4.—"Merchant's Old Method" Stamp. Merchant & Company.

2. "*Merchant's Roofing.*"—An extra heavily coated hand-dipped plate, carefully assorted. Each sheet is stamped with name and gauge, as illustrated in Fig. 5.

Fig. 5.—"Merchant's Roofing" Stamp. Merchant & Company.

3. "*Alaska.*"—Heavy coated patent rolled plate. Sheets stamped as shown in Fig. 6.

Fig. 6.—"Alaska" Stamp. Merchant & Company.

The three brands above detailed are all guaranteed plates, made by palm oil process. No wasters are sold.

4. "*Special Extra Coated.*"—A heavily coated plate, made by palm-oil process, but not guaranteed.

These plates are recommended for general work where a heavy coating is desired. Each sheet is stamped with brand, name and gauge, as shown in Fig. 7.

Fig. 7.—"Special" Stamp. Merchant & Company.

5. "*Hickory.*"—Good quality terne plate, claimed to be better than "Emlyn" or "Melyn" grade of roofing plates. Dull finish. Sheets stamped as in Fig. 8.

Fig. 8.—"Hickory" Stamp. Merchant & Company.

6. "*Empire.*"—Good quality terne. Equal, it is said, to "Worcester." All sheets stamped with name, &c., in the usual manner (see Fig. 9).

Fig. 9.—"Empire" Stamp. Merchant & Company.

7. "*Crescent.*"—Good quality cheap terne, bright finish, equal, it is said, to "Dean" grade. Sheets stamped as in Fig. 10.

Fig. 10.—"Crescent" Stamp. Merchant & Company.

8. "*Palm.*"—Ordinary cheap terne plate, dark finish. Stamped as shown in Fig. 11.

Fig. 11.—"Palm" Stamp. Merchant & Company.

9. "*Arch.*"—Ordinary cheap grade terne, bright finish. Stamped as in Fig. 12.

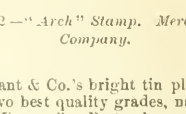


Fig. 12.—"Arch" Stamp. Merchant & Company.

Merchant & Co.'s bright tin plates consist of two best quality grades, namely:

1. "*Minerva.*"—Best charcoal plate, "Allaway" grade; made in IC, IX and IXX thicknesses, 14 x 20 and 20 x 28. Boxes containing these plates are marked plainly on one end with name of brand and gauge, and on the side "M. & CO. AMERICAN COATED TIN."

2. "*Florence.*"—Best charcoal plate. "Melyn" grade; made of standard sizes.

IC, IX, IXX and IXXX. Boxes are marked as in the case of "Minerva," substituting brand name on the end.

A. A. Thompson & Co.,

New York. This firm are now producing four qualities of American terne plates, IC and IX gauge, 14 x 20 and 20 x 28. All plates are coated by palm-oil process.

1. "*Old Colony.*"—An extra heavily coated, redipped, roofing plate, stated to be superior to "M.F." Each plate is stamped with name of brand, as shown in Fig. 13. The boxes are stenciled on the end with name "OLD COLONY," and gauge, and on the side with the words "MADE BY A. A. T. & CO., N. Y."

OLD COLONY

Fig. 13.—"Old Colony" Stamp. A. A. Thompson & Company.

2. "*Durham Old Style.*"—Is, as its name denotes, an old-style plate, bearing a very heavy coating; claimed to be equal to "M.F." Every plate stamped with name of brand, as Fig. 14. Boxes bear on the ends the word "DURHAM," with "IC" or "IX," according to gauge, and are stenciled similarly on the side to those containing "Old Colony" plates.

DURHAM
OLD STYLE

Fig. 14.—"Durham Old Style" Stamp. A. A. Thompson & Company.

3. "*Puritan.*"—Heavily coated. Sheets stamped with name of brand, as in Fig. 15. Box marks are similar to those detailed for other brands, excepting the name "PURITAN," which is stenciled on end.

PURITAN

Fig. 15.—"Puritan" Stamp. A. A. Thompson & Company.

4. "*Central.*"—Medium coated. Sheets have been unstamped hitherto, but will in future bear the name of the brand, as in the case of other qualities. Box marks similar to those above mentioned.

All these plates are made of best Siemens-Martin steel sheets.

Freights on Tin Plate.

Chairman Midgely of the Western Freight Association, Chicago, has issued a ruling in regard to the use of proportional rates on imported tin plate. Some time ago a rate of 12½ cents a hundred pounds from Mississippi River crossings to Southwestern Missouri River points on tin plate shipments via Newport News and Baltimore was authorized on the application of the Kanawha Dispatch and the Continental line, addressed to the Chicago & Alton road. The latter road had acquired the right to make the rate by a notice duly filed and acted upon. Subsequently the Grand Trunk applied for the use of the same rate in connection with the shipments via Portland, Maine, and Montreal, and the authority was granted. Then the Rock Island requested the privilege of making the same proportional rate on tin plate consigned to Omaha and Council Bluffs. The authority was given, but restricted to imports via Newport News and Baltimore. It afterward was learned that the other lines were applying the rate on offerings at Mississippi River crossings destined to Missouri River points when imported via Philadelphia. Consequently a ruling was asked for.

In deciding the question, Chairman Midgely says that the proportional rate of 12½ cents may be used on deliveries of tin plate imported via any Atlantic port on the written application of the initial seaboard line. Inasmuch as the Kanawha Dispatch and the Continental line are at liberty to quote rates at their discretion to East St. Louis on shipments destined beyond, other lines from the seaboard should be equally free to quote rates from their seaports to the Mississippi River crossings. In case they should do so, Chairman Midgely decides that lines in the Western Freight Association may accept their agreed proportions of such published proportional rates on tin-plate shipments destined to the Missouri River and beyond. This rule is effective from and after February 6.

Blairsville Rolling Mill & Tin Plate Company's Plant.

James B. Scott & Co., Pittsburgh, Pa., make announcement that they are sole factors for the Blairsville Rolling Mill & Tin Plate Company of Blairsville, Pa., whose plant is now in active operation; and that they will in future control the entire output of that concern.

The Blairsville Rolling Mill & Tin Plate Company are operating a complete plant, consisting of hot and cold rolling mills, heating and annealing furnaces, pickling department and tin houses provided with machinery for coating plates. The black sheets turned out are stated to be of excellent quality, well cold rolled and annealed, and presenting a handsome finish. A portion of the output is used in the manufacture of tin and terne plates on the spot, the remainder being disposed of to other concerns for coating purposes.

The plant is located very advantageously at Blairsville on the line of the Pennsylvania Railroad, from which it has its own private siding. Being also on the banks of the Conemaugh River, the facilities for water and fuel supplies are excellent. A large acreage surrounding the works is owned by the company, facilitating any extensions of plant that it may be found necessary to make to meet increasing business in the future.

BRITISH BOARD OF TRADE returns for the year 1892 show a material falling off in the exports of tin and terne plates from Great Britain during the 12 months ending December 31, 1892. The reduction in the case of shipments to the United States amounts to 46,664 tons, as compared with the figures for the previous year. These are given in the return as follows: 1891, 325,143 tons, valued at $26,000,000; 1892, 278,479 tons, valued at $18,500,000. These totals show a more considerable percentage of decline in the value of exports of tin plates than in their volume, which is, nevertheless, very great, comparing unfavorably with any year since 1887. It should be stated that the decrease in British tin-plate shipments for 1892 has not been peculiar to this country, but has been almost uniform to all foreign countries. The total volume of exports of this material from Great Britain, we learn, decreased last year 11.7 per cent. from those of 1891, and their value fell off 25.5 per cent. for the same period.

A. L. Burtis, Lockport, N. Y., has brought out in card form for tinners' use the elbow chart that was illustrated and described in *The Metal Worker* of December 31. The card, measuring 14 x 11 inches, has on it the elbow chart and also the quadrant chart for giving intermediate points for exact work. The elbow chart, it will be remembered, gives directly the rise of the miter line for elbows of any diameter and number of pieces and for any angle, so that for quick work the pattern can be sketched in. With the chart is issued an illustrated and descriptive circular explaining the application, with a practical example of its use. A neat feature of the chart itself is a silk thread fastened in one corner, by means of which the hight of the miter lines can be determined, the thread taking the place of the rule. The price of this chart is 50 cents.

Reception to the New York Trade School Students.

The very cordial welcome extended to the students of the New York Trade School, at the reception given them on Monday evening, February 6, by the Management Committee and members of the Twenty-third street Young Men's Christian Association, was truly appreciated. The students wore in the coat button hole the school color—royal purple, and the Association members their color—blue. An informal programme made everything easy and delightful for the student body, and they enjoyed the music and visiting the different well-arranged departments, as well as the refreshments that were served. The address of welcome by Alfred E. Marling was full of earnest, suggestive thought and most happily made. J. Stanly Thomas of the Trade School responded in behalf of the students. The Association members who helped make this entertainment such a pleasant success may always have a consciousness of gratitude from the Trade School students.

Henry C. Earle of New York City has patented a gas water heater, so constructed that only a portion of the entire volume of water receives all the heat of the gas flame for the purpose of very quickly vaporizing the water, and thus rapidly heating the radiator, which is connected with the heater. The water reservoirs are so arranged as to gradually feed the heater, as the water is evaporated therefrom, by maintaining the water level in the heater always constant. In order to do away with a cumbersome and complicated system of valves, the heater and reservoirs are so formed that they constitute one continuous series, the reservoirs discharging water from one into the other and thence into the heater. The latter is so situated as to be directly exposed to the burner flame, while the reservoirs are not exposed to it. This, the inventor claims, is effected by organizing the whole as a pipe coil, whereof one leaf or length constitutes the heater and the others the water reservoirs. The heater length is placed about one-half its diameter above the water reservoir lengths, which are on a level with each other. The steam supply pipe is connected with the heater length and the water of condensation ultimately returns to one of the water reservoirs. Between the latter and the burner is placed a shield or deflector having perforations for the purpose of admitting air to the burner. The patentee claims that by this arrangement the flames of a burner are concentrated upon the heater length of the coil, and the first evaporation reduces the water level in that length to the top of the hot-water reservoir. By this operation a space is left in the top of the heater to act as a steam space and to facilitate the ready development of steam. It is claimed that the water level in the heater can never fall lower, because, as rapidly as evaporation takes place water enters the heater from the reservoirs, and since the condensation returns to the reservoirs no waste occurs except a little from the air valve or pet cock when the radiator is first being heated.

PLUMBING AND GAS FITTING.

Bursting Pipes by Frost.

BY LEICESTER ALLEN.

There are some rather mysterious circumstances attending the bursting of pipes in cold weather, or, perhaps, I should more properly say, conditions believed not to be generally understood by the plumbing fraternity, which it is the purpose of this article first to explain, and, second, to point the way to some precaution whereby frozen pipes may be prevented from bursting while thawing them out, an accident that often happens even when the act of freezing has not strained the pipes to the limit of their strength.

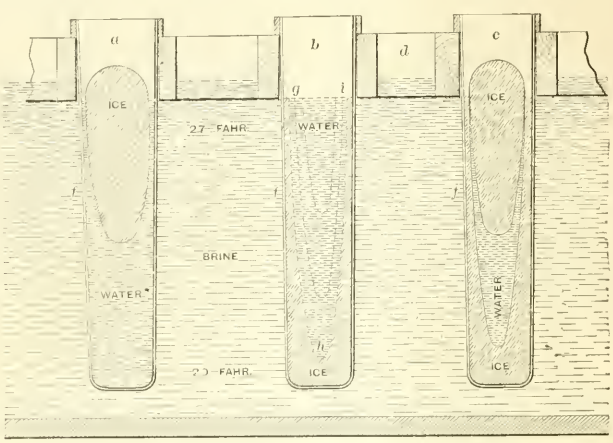
My attention was first strongly directed to the subject by an occurrence which I will briefly narrate. In an ice-making plant of a capacity to turn out about 3 tons of ice in 24 hours, a set of ice cans or molds made of heavy galvanized iron and which had been used many times without any apparent injury, one day, while charged with water and placed in the cold brine for freezing as usual, were found to have burst. There was not a single exception; every one of the molds had given way at some point below the level of the brine in the tank. This accident was so extraordinary that an investigation to find the cause was instituted, and, among others, I was consulted. I was, perhaps, better qualified to give an opinion than some of the engineers who made an examination of the cans; not because of greater learning, but because I happened to know something of the conditions under which the plant had been working, which they did not.

The plant, as I knew, having been erected for exhibition purposes, was not regularly and continuously operated in the usual manner of ice making; but was started up and worked whenever, for the purpose of making a sale or for other business reason, it was desired to show it in operation.

On the occasion of the accident to the ice molds the superintendent gave orders to the man in charge of the ice machine, as usual on such occasions, informing him that an appointment had been made with some expected customers to show them the plant in operation, and directing him to refill the ice molds and start up at an hour named, so that everything might be in normal working condition when the expected visitors should arrive. The order was obeyed as given, with the single exception that the attendant, instead of refilling the molds as directed, left them as he found them in the tank, already filled as they had been at a previous exhibition. The molds, which at the last running had been frozen full of ice, were found to have still some ice in them, and the attendant, representing to the superintendent that the water in the molds was pure, obtained permission to start up the machine without again filling them, as emptying and refilling them involved considerable labor.

The machine having been started at the time appointed, everything appeared to go on well until beginning to take the ice from the molds, when each mold as it was taken out was found to be burst as above stated.

I cross questioned the attendant minutely about the condition of affairs when he started up the machine, and finally elicited the fact that in each mold, floating at the top of the water therein, there was a loose chunk of ice, and that at the sides of this chunk there was a space of from $\frac{1}{4}$ to $\frac{3}{8}$ inch between the ice chunk and the metal of the mold. As this fact gave me the clue sought as to the cause of the bursting, and as it leads directly to the explanation of the bursting of pipes under peculiar circumstances, I have illustrated the condition of affairs in Fig. 1, in which is shown a longitudinal vertical section, *a*, of the ice mold as it was when the ice machine was started up, a similar section, *b*, of a mold in the ordinary process of freezing, illustrating various stages of ice formation therein, and, *c*, the peculiar condition of things that resulted in bursting the molds.



Bursting Pipes by Frost.—Fig. 1.—Section through Ice Molds.

In the illustration, *d* is the timber framework which supports the molds in the brine in the freezing tank. The brine may be assumed to have at and near the bottom a temperature of 20° F., or 12° below the freezing point, and in the upper part a temperature of 27° F. In actual practice the brine is often maintained at a temperature 6 or 7 degrees lower than this.

The galvanized iron molds *f* transmit heat from their contained water to and into the colder brine, first bringing the water down to the freezing temperature and then freezing it. The ice at first forms faster in the lower part of the mold, as shown in the mold marked *b*, and thus the water, after the freezing begins, is always contained in a cavity in the ice which is open at the top, but which has a shape at an early stage of the freezing, as shown at *g h i*, the curve being very much such as would be obtained by holding a string one end at *g* and the other at *i*, and letting the middle part hang down to *h*. In later stages of freezing the yet unfrozen water lies in cavities still open at the top and having shapes indicated by the dotted outlines; and this goes on, the cavities getting smaller and smaller, till at last they disappear entirely and the cake of ice is ready to be taken out.

Now, when starting up the machine and commencing to circulate cold brine in the tank around the cans or molds in the case cited, each mold had a cake of ice in it of form somewhat as shown in the mold marked *a*, and which, floating in the water, because ice is lighter than water, bulk for bulk, protruded some inches above the water in the mold. When the freezing in the molds again commenced, ice formed in the molds exactly as described and illustrated in the mold *b*, and soon brought about the condition illustrated in the mold marked *c*. The yet unfrozen water became sealed up in a cavity instead of lying in a cavity open at the top, the ice forming from the bottom upward, along the sides of the mold, uniting with the floating chunk; and shortly after this the cans burst, because the freezing of the inclosed water expanded it, and, as it could not expand upward, its expansive force was exerted against the sides of the molds. These not being able to change their form, being packed full of a practically inelastic substance, the thick ice shell had to give way under the strain as they did, each at some point weaker than other parts of the mold.

Now, this dearly bought experience lights the way to general principles that were verified by later experiments, which will presently be described.

There is a critical point in the temperature of water at which either heating or cooling will cause it to expand with great force, and if at this temperature water be confined in a pipe or vessel already strained by pressure to nearly its limit of strength, this limit may be passed easily either by cooling further or by warming the confined water. In probably nine out of every ten instances of the bursting of water pipes it is this action that causes the break.

Having framed this theory by reflection upon the bursting of the ice molds above described, I was not content to accept it without practical proof. I therefore proceeded to test the truth or falsity of the reasoning by the experiments described below.

The critical temperature at which water expands, either by cooling it or warming it, is almost exactly 4° C. or 39.2° F. Contracting by cooling till it reaches this temperature, further cooling causes it to expand again slowly till 32° F. is reached. At this point, while the water is freezing, a much more remarkable expansion occurs. While the water remains under ordinary atmospheric pressure its temperature remains unchanged while freezing, standing constantly at 32° F. till the water is finally formed into ice; but in taking on the condition of ice it expands about 7 per cent. of its volume at the freezing point. If, however, in a strong pipe or vessel the freezing progresses gradually in any given direction, in a space open at one end, the expansion will always take that direction, as it does in the ice molds, where, as shown in Fig. 1, at *b*, the freezing progresses from the bottom toward the top, and the sides of the mold receive no undue strain, the expansion in freezing taking the direction of least resistance—in this case the upward direction. If, now, these molds be intentionally or unintentionally sealed at the top, as happened in the case above cited, and thus make the resistance in the upward direction greater than in some other direction, bursting results.

When a bucket or other vessel of water is set out in the open air in freezing weather it freezes at the top first, and unless the vessel is unusually strong up

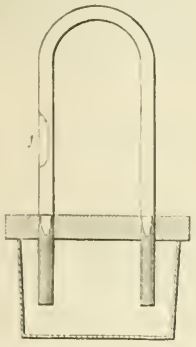


Fig. 2.—Experiments with Glass Tubes.

ward expansion meets a greater resistance than expansion in other directions, after the ice has become 3 or 4 inches thick at the top. A weak vessel under such conditions always bursts. If the vessel be strong the expansion of the water below the layer of ice first formed at the top forces this layer upward, and the vessel is saved from bursting in this way. In such a case, after the water is all frozen, the middle of the upper surface of the cake of ice will be found much above the level at the margin, showing that this surface was upheaved in the act of freezing.

We have reached, then, this principle, that if the freezing progress in an inclosed space (for instance, an iron pipe) in either direction toward unfrozen water, and this unfrozen water is free to move away as the ice (expanding while freezing) encroaches upon the space, the pipe, unless unduly weak, will not burst.

Suppose such a strong pipe leading to a faucet to be frozen at a point not very distant from the faucet. The pipe may be burst if the faucet be tightly closed, or saved if the faucet leak a little. If the ice plug be at considerable distance from the faucet and the freezing do not extend very far, the elasticity of the metal may save the pipe even if the faucet be tightly closed. But now suppose another state of things. Water has been drawn through the faucet in cold weather at, say, a temperature of 42° F. (very near to the critical temperature above named). The pipe and the water will take the same temperature. The water can contract only a very little more. Very cold air is flowing through a crevice upon this pipe at some distance from the faucet, which we will now suppose to be suddenly and tightly closed. Circulation of water is thus stopped, and the contained water at the point where the cold air is blowing upon the pipe is frozen in perhaps three minutes. The pipe being a good conductor, permits the formation of ice perhaps a foot or more on each side of the point where the cold air strikes. On the side of this point, toward the water main, the water is pushed backward by the expansion of the ice, and it will never burst on that side, unless somewhere further along a second ice-plug has been simultaneously formed, which stops the movement of the water in that direction. On the faucet side there is no relief from the fast accumulating pressure. The pipe will burst unless the elasticity of the small quantity of air always contained in water that has been exposed to air and the added elasticity of the metal due to the length of the pipe from the ice plug to the faucet are sufficient to save it.

Now, make another supposition. Two ice plugs have formed in a pipe, say at a distance 1 or 2 feet apart, yet the pipe has not burst. It is proposed to thaw out the pipe, and to this end cloths wet with hot water are wrapped about it as nearly upon the frozen part as the judgment of the operator can locate the spot. The cloths get on the pipe between the two plugs. The pipe bursts. Why? The space between the plugs is filled with water at its maximum density, and the pipe is already under a strain almost to the limit of its strength, through pressure upon the confined water caused by the expansion of the ice in freezing, the space being thus encroached upon by the ice plugs respectively from opposite directions. Heating the confined water immediately expands it, the ice plugs remain firm and the pipe has to yield.

Suppose the cloths are placed on the pipe between the faucet and the nearest ice plug without opening the faucet, and suppose the faucet to be tight and the distance of the plug from the faucet is small, the pipe may and will probably be forced open between the plug and the faucet.

Again, suppose the cloths to be placed between the ice plug most distant from the faucet and the water main; no amount of heating at this point will now burst the pipe.

It follows that to thaw out ice plugs in pipes with entire safety to the pipes, assuming that the pipes have not already been burst while freezing, that the ice plug nearest the main should be the first attacked, and it should be attacked at the end nearest the main.

A light hammer tapped upon the pipe will locate the ice plugs by the difference of sound emitted in the same way as studs are located by taps on a plastered wall. Of course, the difference in the sound cannot be described in words; the ear must be educated to detect it by practice.

It has been denied that pipes can be burst in thawing them out. I think the following experiments decide this point conclusively. It must, however, be borne in mind that the precise moment at which a crack forms in a pipe is very difficult to determine. The pressure increases so slowly in freezing that there is no sound emitted, as in an explosion, when the crack begins to form, except in the case of glass tubes, in which, if the ear is attentive, a sharp but not loud click may be perceived. Usually the first indication is a small leak, which rapidly increases as the rupture extends along the metal.

Fig. 2 illustrates an experiment several times repeated with a glass tube. The tube, bent into the form shown, had one of its open ends stopped with a ground glass stopper and the leg so stopped was partly filled with water. Both legs being passed through a wooden cover into a vessel containing brine cooled to about 20° F. by a freezing mixture of ice and snow packed around the vessel, the tube was gradually shoved deeper and deeper into the brine until an ice plug of from 3 to 4 inches in length formed in the leg containing water. The experiment being performed in a temperature of 40° F., the water put into the tube was very nearly at its maximum density, or very close to the critical temperature above alluded to. When water was placed in one leg of the tube only, the tube could be gradually shoved in to the very bottom of the freezing vessel without breaking it. When the tube was completely filled with water and both ends stopped with ground glass stoppers, the tube was invariably burst, and only once did the fracture occur in the part where the ice plugs, one in each end of the tube, formed. I broke about a dozen of these tubes in this way, the fractures occurring in various places, presumably weaker parts. One of these fractures, drawn as nearly as I can remember its form, is shown at *f* in Fig. 2. The shape of the upper surface of the ice plugs was concave, as shown, this form being analogous to the formation of ice in the ice-mold *h* in Fig. 1.

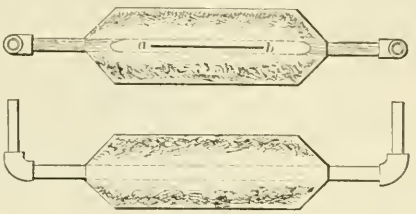


Fig. 3.—Experiments with Iron Pipes.

Not yet satisfied, I repeated the latter experiment with one-inch iron pipe, fitted with elbows and nipples as shown in Fig. 3, stopping the open ends with rubber corks and introducing the nipples downward into separate freezing baths till ice plugs formed in them. With nipples 1 foot long I could burst an intermediate pipe 4 feet long, the water in the intermediate part remaining liquid. This was repeated six or eight times. When an ice plug was formed in one of the nipples, the other remaining corked, the expansion of the ice in freezing would force out the cork from the unfrozen nipple and water would flow out. No exception to this action took place.

By timing the act of freezing and measuring the length of the ice plugs formed, which could be done by screwing out the nipples, I found I could form plugs of

approximately any length desired, and could also determine the mean length of the plugs necessary to burst the intermediate pipe. Unfortunately, I am unable to find my notes of these experiments, and am hence unable to give these lengths, but by this means I was enabled to freeze plugs that, while they would put the intermediate pipes under considerable strain, approaching the bursting strain, still would not actually burst them. After thus testing I wrapped the intermediate pipe with very porous sacking, as shown in Fig. 3, and froze plugs that would generate a strain almost to the limit of strength in the intermediate pipe. I then poured boiling water upon the wrapping. In every case the pipe burst at some point between the ice plugs.

By unscrewing the nipples, corking one end of the intermediate pipe length and freezing a plug in the corked end, then, with the remaining space filled with water and corked, freezing a plug in the other end of the pipe, the pipe has invariably burst, the bursting taking place whether in freezing or in applying hot water to the sacking in the same way as before, always between the ice plugs. One of the cracks thus opened is indicated at *a h* in Fig 3, and it occurred while freezing the second plug. The drawing exaggerates the length of the split; it was only about 4 inches long.

These experiments satisfy me, that beginning at the stopped end and gradually freezing water from end to end in a pipe, one end of which is plugged and the other left open, and thawing it out again from the open end toward the plugged end, the pipe never could be burst either in freezing or thawing out, though the process might be repeated a thousand times, and that the real danger arises from the confinement of water between an ice plug and a stopped end, or between two or more ice plugs.

I did not experiment with lead pipes, and perhaps very different results might be obtained with a material so malleable as lead, and having so little tensile strength as compared with iron. Yet even with lead pipes I am inclined to think the same principles will produce similar or, at least, analogous results. Any expansion that materially enlarges the bore of a lead pipe of course weakens it very much at the enlarged part, and it is possible that (unless very thick) lead would not afford sufficient resistance to prevent the ice from expanding in all directions while forming.

Effect of Curves in Supply Pipes.

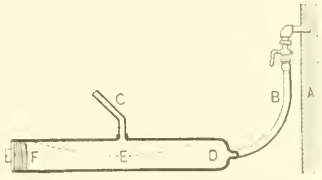
From J. P., *Covington, Ky.*—I fitted up an old school building last summer to which an additional wing had been built on each of the three floors, in which a water closet had been placed. The tank from which the water supply for these new fixtures as well as the old closets is drawn is located in the old part of the building under the roof, and is only 3 feet in depth, the bottom of the tank being on a level with the top of the water-closet cistern belonging to the newly set water closet on the top floor in the new wing. A 2-inch galvanized pipe carries the water from the tank to the water-closet cistern, a distance of about 90 feet, along the halls and passages and one of the classrooms. The supply, however, is very inadequate, hardly sufficient to do more than trickle through the flush run, particularly during teaching hours, when the closets are used in quick succession. As this is the first job of any great extent I put out of my hands since I started in business for myself it has bothered me how to remedy the defects. If I could have run a separate line of supply pipe in the new part of the building it might be the better way, but this would have involved the purchase of another pump and my contract was too close to warrant the expense. The trustees are not satisfied and are willing to pay for such improvements as I can show to be necessary. Can you help me with an idea from what I have written of the job.

Answer.—The trouble with the water supply in the new portion of the building is, in our opinion, mainly attributable to the fact that the water has to be carried a distance of 90 feet, the line of pipes being necessarily full of sharp bends consequent on its having to be run along the walls of the hallways and classrooms. As every bend increases the friction and lessens the force of the flow through the pipes, it is not to be wondered at that when a stream starts under a 3-foot pressure the force is well-nigh spent before it reaches the first water closet. The remedy we would suggest is that, instead of carrying the 2-inch pipe along the top floor through hallways and rooms, the pipe be carried down into the cellar, thence along the ceiling in the most direct line possible to the new wing and then up to the top floor along the line of the soil pipe. This would remove the friction, furnish the necessary pressure and leave the closets free for constant use and with all the speedy flush required. In so far that the water-closet cistern on the top floor of the new wing is below the supply tank in the old part of the building there need be no fear that the water will not rise sufficiently high to supply the cistern. Water will always, if permitted, rise to its own level. If the use of the cellar is possible we think the plan we suggest will work satisfactorily.

Fungus Growth in Water Pipes.

From W. A. J., *Philadelphia, Pa.*—I noticed in *The Metal Worker* of the 28th ult. some statements relative to the experience of a New York plumber with fungus growth in water pipes. It is difficult to comprehend how the "snake grass," so called, could get through the gate valve or stop cock in the main in the cellar, and it would be interesting to know exactly how it was kept out of the service pipes in the house. Cannot Mr. Reynolds enlighten the craft on this point? Has his been the only experience in that line in New York City?

Answer.—Thus far we have not heard of any other New York plumber experiencing



Fungus Growth in Water Pipes.—Fig. 1.—Remedy Employed.

the difficulty which Mr. Reynolds had to overcome. The device which he employed is represented in Fig. 1 of the appended diagrams, Figs. 2 and 3 being the means suggested by other plumbers who, with the modesty characteristic of the craft, keep in the background.

The remedy illustrated in Fig. 1 will be readily understood, and in practice has been found by Mr. Reynolds to work satisfactorily. The water enters the reservoir, which consists of a piece of 4-inch lead pipe, about 2½ feet in length, at the right hand end from the street main B, and passing up through the perforated diaphragm E, is distributed through service pipe, C, to all the fixtures. Should the perforations in E become choked up, the hand hole fitted with cleaning screw, F, is opened and

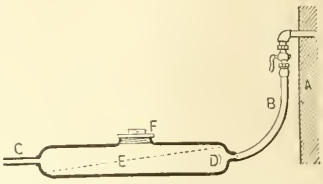


Fig. 2.—A Second Remedy Suggested.

the obstructions blown out, after which a brush may be passed under the perforations, when the cleaning screw F is again inserted in place.

In Fig. 2 the water enters the reservoir D from Croton pipe, B, and after filling up same is discharged through the service pipe C. A perforated diaphragm, E, extends diagonally across the reservoir, acting as a strainer to the water before it enters the

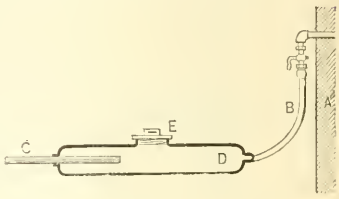


Fig. 3.—A Third Remedy Suggested.

service pipe C, while the hand hole and cleaning screw F is intended to permit the removal of fungus or other obstructions. This arrangement does not appear to be as well adapted for the purpose as Fig. 1, because there is no provision for the removal of obstructions from the section of the reservoir below the diaphragm E otherwise than by the detachment of the Croton pipe B at the point of connection with reservoir, D. In Fig. 3 we have no diaphragm. The water enters the reservoir D in the same manner, until the latter is full, when the discharge takes place through the service pipe C, which extends about half way through the reservoir. It is claimed for this device that the fungus matter, being light, will float on the surface or highest level of the water and can readily be removed through the hand hole E, while the house water supply is taken from the center of the body of water in the reservoir. Mr. Reynolds, however good the others may be, claims that his device "fills the bill," and considers that he has solved the problem of how to get over the difficulty in the simplest and most practical manner. It should here be noted that in the three

diagrams the Croton pipe B should be understood as lead pipe, notwithstanding the apparent joint inadvertently made at the bend inside front wall.

The New York Plumbing Examining Board.

After patient waiting the New York Master Plumbers have their desires gratified by the appointment by Mayor Gilroy on the 7th inst. of the members of the Examining Board of Plumbers, as follows: For the one year term, Joseph W. O'Brien, master plumber, 154 Spring street. For the two year, term Michael Ryan, master plumber, 1000 Sixth avenue. For the three year term John McKenna, journeyman plumber, 340 East Fifty-Third street. These, with Col. George D. Scott, Chief Inspector of Plumbing in the Building Department, and Chief Engineer of Sewers Loomis of the Department of Public Works, constitute the first Examining Board for New York City under the law known as Chap. 620 of the Laws of 1892. Considering the large number of master plumbers doing business in this city for years, who must at least go through the form of an examination and have a new license issued, and of the many journeymen who may be desirous of joining the ranks of the master plumbers, it will be pretty close work to have the work completed in conformity with the act by the first of March—only three weeks distant from the date of appointment. The respective terms of the plumbers appointed on the board will date from December 31, 1893.

St. Paul Master Plumbers.

The annual election of officers of the Master Plumbers' Association of St. Paul, Minn., which was held in January, resulted as follows:

President, John McDonough.
First vice president, J. F. McQuillan.
Second vice president, George Dempsey.
Secretary, H. S Krauze.
Treasurer, George A. Kees.
Sergeant at arms, J. F. Holmes.

The Board of Directors elected consists of Messrs. Adamson, Shea, Hudner and Culliton.

The New York Master Plumbers' Annual Ball.

From N. Y. P., *New York.*—The communication of "G. T. M." in *The Metal Worker* of the 4th inst. might mislead outsiders into the belief that there was a lack of harmony in the New York association. Nothing could be further from the truth, and the best proof of it may be found in the success which attended the annual ball of the association, which came off on the 17th ult. at the Central Opera House, East Sixty-seventh street. On the different committees the names of the sympathizers of the rivals for Presidential honors worked hand-in-hand for the general comfort and enjoyment of their guests, included among whom were members of the Brooklyn Master Plumbers' Association and representatives of the various supply houses in New York. The Reception Committee, composed of Chairman John Byrns and 46 members, and the Floor Committee, officered by Chairman James Corbett and a like number of aids, co-operated to make the event the most successful ball yet given by the master plumbers.

It is generally known that James B. Clow & Son, manufacturers and dealers in plumbers' supplies, &c., Lake and Franklin streets, Chicago, control the advertising space in the various toilet rooms connected with the World's Fair buildings. W. E. Clow has returned from a trip to New York, where he has been arranging to send agents to England, France and Germany to solicit advertisements for the above mentioned advertising space.

TRAPS AND VENTS.

The Bronson Plumbing & Heating Company of Hornellsville, N. Y., have been succeeded by the Babcock Plumbing & Heating Company. The new element infused into the concern is furnished by F. G. Babcock, C. C. Babcock, F. G. Babcock, Jr., Blake B. Babcok and George A. Bronson. The new concern start off under the most favorable auspices. They will at once increase their facilities and field of operation. They will do a wholesale business in their line. The present stand will be retained, but will be overhauled for the purpose of adding to the firm's conveniences.

The J. L. Mott Iron Works, manufacturers and importers of plumbing and sanitary material, 311-313 Wabash avenue, Chicago, furnished the Mexican onyx lavatories, &c., for the Mormon Temple at Salt Lake City. The slabs for these lavatories were 1¼ inches thick. Midgley & Sons Company of Salt Lake City did the plumbing. This temple, which was begun in 1853, is just being finished.

James B. Clow & Son, manufacturers and dealers in brass goods for plumbers, steam engine builders, gas and steam fitters, &c., Lake and Franklin streets, Chicago, have secured the agency for, and will represent entirely in that market, the sewer pipe manufactured by Robinson Bros. & Co., Akron, Ohio. The firm have yards at Englewood, Ill., and on Ogden avenue near Belt Line Railroad, where a large stock of pipe will be kept on hand. A number of large orders have already been received for pipe.

The New York Master Plumbers intend in the near future to present Colonel Geo. D. Scott, at present chief inspector of plumbing in the Building Department, with a life-size portrait of himself, as a mark of appreciation and of the esteem in which he is held by his associates. A meeting of those interested in the movement was held on the 27th ult.

James B. Clow & Son, Lake and Franklin streets, Chicago, have issued a very fine catalogue of cast-iron pipe and general water works supplies. The form of this catalogue is peculiar. The page is 7¼ x 13½ inches and the leaves are bound together at the top in the style of legal documents, while the paper is printed on one side only. The cover is of pale blue thin paper, and the ink used is dark blue. The paper is highly calendered. The contents comprise cast iron water pipe and gas pipe of standard sizes, specials of all descriptions for connections, flexible or ball pipe joints, drip boxes, manhole covers, curb grates and pans, Eddy hub end gate valves, special gate valves, standard gate valves, quick-opening valves, brass gate valves, American gate valves, Eddy fire hydrants, American fire hydrants, valve boxes, service boxes for gas and water, Hersey meters, Jewell filters, cotton and rubber hose, lead pipe, packing, the Clow patent lead-pipe connection, corporation stops, service stops, diaphragm trench pumps, Clow patent water connection, derricks, water and gas tapping machines, melting furnaces, tampers, chisels, wedges, barrows, shovels, lanterns, &c. The catalogue will be seen from this brief *resume* of its contents to cover everything needed for the installation of water supply, except the men to do the work.

Mayor Bishop of Buffalo, N. Y., has appointed Samuel H. Wright as a member of the Supervising and Examining Board of Plumbers, to succeed Thomas J. Mc Quade, resigned. Mr. Wright has long been one of the head men for Irlbacker & Davis, the plumbing firm, and was recommended for the office by the Journeymen Plumbers' Union.

Alterations and improvements to the extent of $5000 are being made to the salesroom of the J. L. Mott Iron Works, 311-313 Wabash avenue, Chicago. A new iron and plate glass front is being put in, and will occupy a position 2 feet nearer the street than the old one. A new tile platform has been constructed, on which will be placed samples of onyx and imported marble lavatories. The salesroom has been extended 25 feet to the rear, thus giving much more room for the display of samples. The ceiling is to be decorated and electric lights used.

O. D. Peck of Peck Bros. & Co., manufacturers and dealers in plumbers' supplies, 259 Wabash avenue, Chicago, has just returned from a business trip through Canada and Michigan.

W. H. Reeves, one of the prominent architects of Peoria, Ill., has been in Chicago looking through the hotels with a view of securing some good points regarding plumbing for the new hotel being built in Peoria.

The Rome, N. Y., Board of Plumbers have organized by electing Charles H. Jackson president and Lowell Williams clerk. The other members of the board are William E. Donohue, James Cook, Dr. T. M. Flandrau and A. J. Broughton.

Charles H. Muskenhirn of Detroit, Mich., has been granted a patent for an improvement in water closets, the object of which is to provide means for removing the foul air between the traps in a double-trap closet.

An improved form of sewer trap has been invented by Robert Newton, Providence, R. I., the object being to construct a trap in which the syphon will be broken as soon after the first inrush of water to the trap as air may enter the trap, the object being to secure at all times a sufficient quantity of water to make an efficient seal. A feature of the construction is a frame removably secured below the outlets and a horizontal partition having a depending lip secured to the frame.

A ridiculous bill is before the New York Legislature to regulate the price of coal and excites much comment in Pennsylvania. The *Philadelphia Ledger* says that if the companies could make money at the prices fixed they would sell coal at those prices, with or without the law, and if they could not make money they would not sell, and that would settle the law in short order. Another paper in Philadelphia denounces a "commercial war" waged against that State.

British shipowners and the London Board of Trade concur in asking that the Government shall arrange with the United States for the suppression of "crimping" seamen at San Francisco. The seamen on arriving are practically kidnaped and held until the ship is ready to sail, when they are sold at an exorbitant charge.

Manufactures of silk in the United States have more than doubled in value during the last decade, but it does not yet appear that silk fiber from the cocoon can be profitably grown in this country. California did well, but the results were not a commercial success.

Steam and Hot-Water Circulation

The Heating and Ventilating of Large Buildings.*

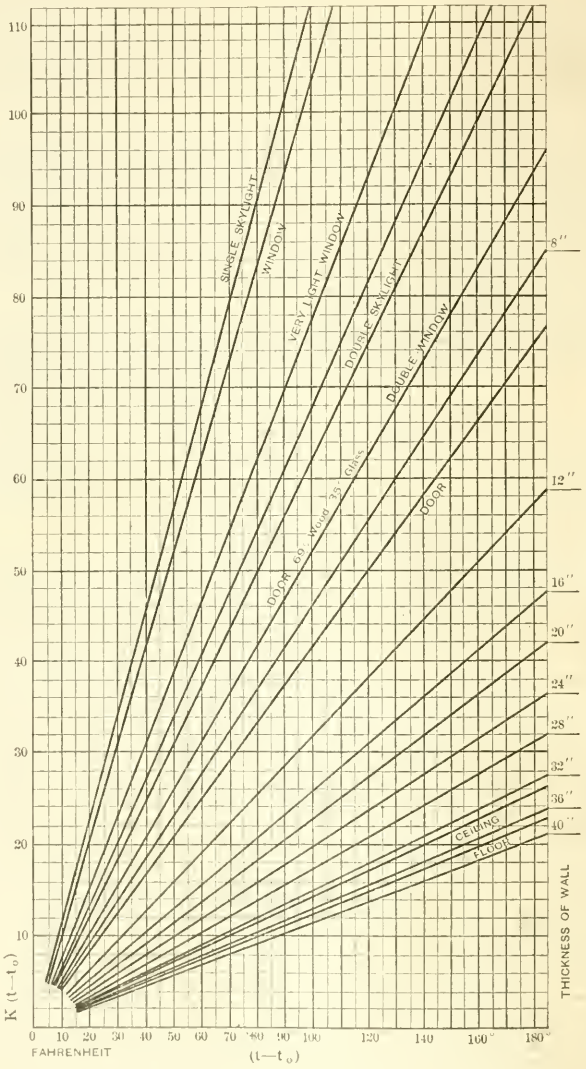
BY ALFRED R. WOLFF, M.E.

The large building of the present day, at least in America, must meet the needs and comforts of an intense, concentrated, nervous and busy "indoor" community, the product of our "rush" civilization. The very fact that both business and pleasures are indulged in on a large scale, in ceaseless haste and at high pitch, renders the community participating in them all the more sensitive to external discomforts, and unwilling to put up with any not of their own individual creation. The very "crowding" and the physical strain and nervous excitement incident thereto renders it important in the battle of existence, called "life," that the best conditions of health be artificially secured, so as to counteract if possible the individual natural neglect. But aside from this, and from a loftier point of view, the modern tendency is to demand the best attainable in every department of work. Whatever the reasons, the demand exists that the best conditions of health and comfort be secured in the large buildings, the meeting places of the multitude. Thus there must be equable temperature, pure air, excellent light and fine sanitation, obtained artificially, almost irrespective of the control, crowding, physical and nervous state of the inmates of the building, and irrespective of climatic and other conditions external to the building.

It is the solution of this problem which converts no small portion of the large modern building into a great factory for the generation and distribution of light, heat, cold and currents of air and water. It is no longer unusual for our large hotels, office buildings and auditoriums to contain a boiler plant of 1000 horse power, with a corresponding electric lighting, heating, cooling and refrigerating system, nor for the equipment of these plants to require an outlay of hundreds of thousands of dollars. And with these large machinery interests at stake it becomes important that the skill of the trained engineer be called into play to insure, in co operation with the architect, the desirable and best attainable results with a judicious expenditure of money.

During the past few years it has been my good fortune to have acted as consulting engineer in the design and erection of the engineering equipment of a number of large buildings, and more particularly of the heating and ventilating plants. On this account, doubtless, your otherwise astute committee has been deluded into the belief that a few words from me in relation to some of the principles and problems entering this specialty might be of passing interest; and if you thus become the innocent sufferers I, at least, am the gainer by having the pleasure of meeting you here this evening.

A systematic account of the various methods of heating in vogue, and their comparative merits, would, on account of the time-limits of our talk, necessarily savor too much of the elementary text book, and would also in all probability convey but few facts not already known to you, or readily secured by perusing any standard work on the subject of heating and ventilation. So I have concluded to be real unsystematic, to make no attempt to be exhaustive, and only to relate at random a few points in connection with heating and ventilating large buildings which have appeared of interest to me in my own practice.



Heat Transmitted, in British Thermal Units, per Square Foot of Surface, per Hour.

DIAGRAM OF HEAT TRANSMISSION.

I present herewith a diagram, showing, for different classes of surfaces composing buildings, co-efficients (K) of transmission

* A lecture delivered before the Franklin Institute, February 3, 1893. From advance sheets of the *Journal of the Franklin Institute.*

of heat per hour for each square foot of surface for various Fahrenheit degrees differences between the temperature of the interior of a room and its external surroundings. This diagram is the graphical interpretation, in American units, of the practice and co-efficients prescribed by law by the German Government in the design of the heating plants of its public buildings and generally used in Germany for all buildings. During the past six months I have checked these co efficients by examples of good American practice, and have found so satisfactory an agreement that it has convinced me of the soundness of the German co-efficients and their applicability to American practice; if, indeed, the well-known care and authority of publication of applied science under German Government patronage did not itself bespeak confidence. In the formula for total heat transmission, $Q = S\ K\ (t - t_0)$, K represents, for various materials composing buildings, the loss by transmission in British thermal units per hour, for each degree of difference between the temperatures on the two sides of the material; S is the amount of transmitting surface in square feet; t is the temperature in Fahrenheit degrees at the interior side, and t_0 the temperature in Fahrenheit degrees at the exterior side of the surface. The value of K varies, of course, not only with the class of surface, but also with its thickness. If, by means of the co-efficients given below and summarized in multiples of temperature differences in the diagram, the loss by transmission of heat to the outside is calculated, we obtain the heat to be conveyed to the room in order to make good the loss due to transmission. This does not, of course, cover the additional heat to be conveyed on account of change of air for purposes of ventilation, but merely represents the loss due to heat transmission through walls, ceilings, windows, floors, &c., of buildings of ordinary good construction, with such slight accidental or natural ventilation as results from the porosity of the materials and construction.

CO EFFICIENT PRESCRIBED BY GERMAN GOVERNMENT.

In detail we have the co-efficient of transmission K as above defined, and as prescribed by the German Government (transformed into American Units), for each square foot of brick wall of thickness:

Thickness of brick wall—inches.	K equals.
4	0.68
8	0.46
12	0.32
16	0.26
20	0.23
24	0.20
28	0.174
32	0.15
36	0.129
40	0.115

1 square foot, wooden beam construction, planked over or ceiled	as flooring,	$K = 0.083$
	as ceiling,	$K = 0.104$
1 square foot, fire-proof construction, floored over,	as flooring,	$K = 0.124$
	as ceiling,	$K = 0.145$
1 square foot, single window		$K = 0.776$
1 square foot, single skylight		$K = 1.118$
1 square foot, double window		$K = 0.518$
1 square foot, double skylight		$K = 0.621$
1 square foot, door		$K = 0.414$

These co efficients are to be increased respectively, as follows:

Ten per cent. where the exposure is a northerly one and winds are to be counted on as important factors.

Ten per cent. when the building is heated during the daytime only, and the location of the building is not an exposed one.

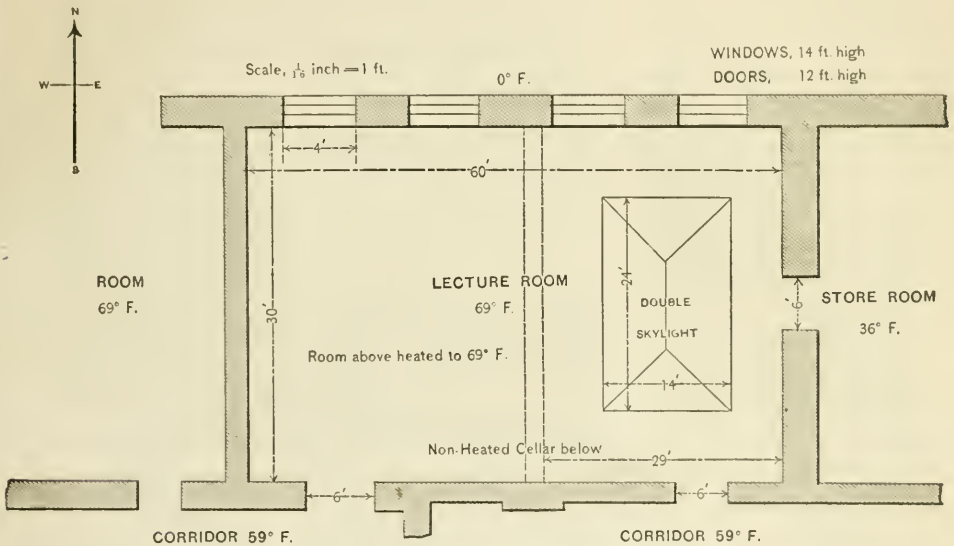
Thirty per cent. when the building is heated during the daytime only, and the location of the building is exposed.

Fifty per cent. when the building is heated during the winter months intermittently, with long intervals (say days or weeks) of non heating.

The philosophy of these increases is, of course, apparent; for the co-efficients, as given, are for heat transmission alone, in usual every-day practice, where the temperature differences in the transmitting portions have assumed a fixed relation, with a corresponding fixed rate of flow of heat. But if the building gets chilled or entirely cold, through days or nights of disuse of heating system, the exposed heat-transmitting portions must be first warmed to the staple degree referred to, which demands, for the time being, additional heat beyond the ordinary rate of supply if the period of warming up shall not be excessive. So, too, special cold winds beating on the exposed surfaces form additional heat abstracting media, besides increasing the amount of cold air entering the building through the pores of the materials and through the ordinary cracks and crevices of well-constructed buildings.

In connection with calculations for heat transmission by means of the co efficients here presented, the German Government prescribes that computations be made on the basis of the following assumed lowest temperatures:

External temperature	4° F.
Assumed lowest temperature of non-heated cellar and other portions of building permanently non-heated	32° F.
Vestibules, corridors &c., non-heated, and at frequent intervals in direct contact with external air	23° F.
Air spaces between roof and ceiling of rooms: Metal and slate roofs	14° F
Air spaces between roof and ceiling of rooms: Denser methods of roofing, such as brick, concrete, &c.,	23° F.



Plan of Room to be Heated.

As the temperature to be attained in rooms of various kinds the German Government prescribes for:

Stores and dwellings	68° F.
Halls, auditoriums, &c.,	64° F.
Corridors, staircase halls, &c.,	54° F.
Prisons, occupied day and night	64° F.

It will be noted that these temperature stipulations vary from American practice in the following particulars:

1. Our calculations, in this vicinity, are based, in general, on an external temperature of 0° F.

2. We figure on heating our corridors, staircase-halls, &c., to from 65° to 68° F.

3. 70° F. is the desired temperature in stores and dwellings, though 68° F. appears to many of us pleasanter.

As a rule, Germans are disagreeably struck on their visits to this country with the higher temperatures of our homes and offices.

Presently, a practical illustration of the method of using the co-efficients and diagram of heat transmission will be given; but inasmuch as the same example can also serve the purposes of showing the method of determining the amount of air required for ventilation, and the amount of heat and of radiating surface to be pro-

vided to meet all conditions, it will be well to first call your attention to a few other facts in relation to heating and ventilation, which enter the problem.

FACTS TO FIGURE FROM.

The external air contains 4 parts of carbonic acid in 10,000, and a room is considered properly ventilated when the proportion of carbonic acid present does not rise to above 6, possibly 8, parts in 10,000. It can readily be shown that to secure the standard of 6 parts in 10,000 means the addition of 3000 cubic feet of fresh air per hour for each person in the room; to attain 7 parts the addition of 2000 cubic feet; 8 parts, the addition of 1500 cubic feet. This air may have to be heated, in the winter months, from 0° F. to, say, 68° F., and at times higher, if it is to be the means of taking care, in addition, of the heat transmission from the room.

Furthermore, it may be well to point out that the value of radiating surfaces is about as follows:

Ordinary bronzed cast-iron radiating surfaces, in American radiators (of Bundy or similar type), located in rooms, give out about 250 heat units per hour for each square foot of surface with ordinary steam pressure, say 3 to 5 pounds per square inch; and about 0.6 this amount with ordinary hot-water heating.

Non-painted radiating surfaces of the ordinary "indirect" type (Climax or pin surfaces) give out about 400 heat units per hour for each square foot of heating surface with ordinary steam pressure, say 3 to 5 pounds per square inch, and about 0.6 this amount with ordinary hot-water heating.

A person gives out about 400 heat units per hour; an ordinary gas burner about 4800 heat units per hour; an incandescent electric (16 candle-power) light about 1600 heat units per hour.

A PRACTICAL ILLUSTRATION.

Now, for the practical illustration: Let us consider, as per accompanying sketch, a large room used, say, as a lecture room, 40 feet by 60 feet and 20 feet high, situated as shown, and with exposures noted. Referring to our diagram, and to coefficients of heat transmission, and to data named above, we obtain the following:

If we assume that the lecture room must be heated to 69° F. in the daytime, when unoccupied, so as to be at this temperature when first persons arrive, there will be required, ventilation not being considered, and bronzed direct low-pressure steam radiators in room being the heating media, about $\frac{113,550}{250}$ = about 455 square feet of radiating surface. (This gives a ratio of about 105 cubic feet of contents of room for each square foot of heating surface).

If we assume that there are 160 persons in the lecture room, and we provide 2500 cubic feet of fresh air per person per hour, we will supply $160 \times 2500 = 400,000$ cubic feet of air per hour—*i. e.*, $\frac{400,000}{48,000} =$ over eight changes of contents of room per hour.

To heat this air from 0° F. to 69° F. will require $400,000 \times 0.0189 \times 69 = 521,640$ thermal units per hour (0.0189 being the product of the weight of a cubic foot by the specific heat of air). Accordingly, there must be provided $\frac{521,640}{400} = 1304$ square feet of indirect surface, to heat the air required for ventilation, in zero weather. If the room were to be warmed entirely indirectly—that is, by the air supplied to room (including the heat to be conveyed to cover loss by transmission through walls, &c.)—there would have to be conveyed to the fresh-air supply $521,640 + 113,550 = 635,190$ heat units. This would imply the provision of an amount of indirect heating surface of the Climax type of $\frac{635,190}{400} = 1589$ square feet, and the fresh air entering the room would have to be at a temperature of about 84° F., viz., $69° + \frac{113,550}{400,000 \times 0.0189}$ or $69 + 15 = 84°$ F.

Table Showing Heat Units Transmitted from (and to be Conveyed to) Room on Account of Heat Transmission Through Walls, Ceiling, Floor, Windows, &c.

Number.	Room.	Cubic contents (in cubic feet).	t (Fahrenheit degrees).	$t - t_0$ (Fahrenheit degrees).	Kind of transmitting surface.	Thickness of wall (in inches).	Calculation of area of transmitting surface.	Square feet of surface.	K, $(t - t_0)$.	Thermal units.	Supplementary allowances.
	Lecture room.	48,000	69	69	Outside wall.	36	$63 \times 22 - 448$	938	9	8,442	10 per cent.
				69	Four windows (single).		$4 \times 8 \times 14$	448	72	32,256	10 per cent.
				33	Inside wall (storeroom).	36	$42 \times 22 - 72$	852	4	3,408	
				33	Door.		6×12	72	19	1,368	
				10	Inside wall (corridor).	24	$45 \times 22 - 72$	918	2	1,836	
				10	Door.		6×12	72	5	360	
				10	Inside wall (corridor).	36	$17 \times 24 - 72$	302	1	302	
				10	Door.		6×12	72	5	360	
				69	Roof.		$32 \times 42 - 336$	1,008	10	10,080	
				69	Double skylight.		14×24	336	43	14,448	
				33	Floor.		62×42	2,604	4	10,416	
										83,276	
							North outside wall, 10 per cent.			844	
							North outside windows, 10 per cent.			3,226	
										87,346	
							Exposed location and intermittent day or night use, 30 per cent.			26,204	
							Total			113,550	

OTHER SOURCES OF HEAT.

The above calculations do not, however, take into account that 160 persons in the lecture hall give out $160 \times 400 = 64,000$ thermal units per hour; and that, say, 50 electric lights give out $50 \times 1600 = 80,000$ thermal units per hour, or, say, 50 gas lights, $50 \times 4800 = 240,000$ thermal units per hour. The presence of 160 people and the gas lighting would diminish considerably the amount of heat required. Practically, it appears that the heat generated by the presence of 160 people, 64,000 heat units, and by 50 electric lights, 80,000 heat units, a total of 144,000 heat units, more than covers the amount of heat transmitted through walls, &c. Moreover, that if the 50 gas lights give out 240,000 thermal units per hour, the air supplied for ventilation must enter considerably below 69° F., or the room will be heated to an unbearably high temperature. If 400,000 cubic feet of fresh air per hour are supplied, and 240,000 thermal units per hour generated by the gas must be abstracted, it means that the air must under these conditions, enter $\frac{240,000}{400,000 \times 0.0189} =$ about 32° less that 84°, or at about 52° F. Furthermore, the additional vitiation due to gas lighting would necessitate a much larger supply of fresh air than when the vitiation of the atmosphere by the people alone is considered, one gas light vitiating the air as much as five men. However, we need not consider these computations more in detail, our object being mainly to point out and illustrate the methods of analysis and calculation in such a case, and to show how readily the problems can be solved by the data herein given.

SOME PRACTICAL CONCLUSIONS.

A few practical conclusions are at once apparent: That the amount of air required and the temperature of the entering air, as well as the amount of heating surface to be called into play, will vary very greatly in the same room, not only with variations in external temperature, but with any given external temperature, according to the use, occupation, method of lightning, &c., of the room. Also that the variations will often be so quick during a short period of use of room, especially in auditoriums, theaters, ballrooms public dining halls, &c., that it is important either to have automatic heat regulation or a competent engineer, who constantly and closely watches the changes in temperature and modifies the operation of apparatus accordingly. Of course, a stable condition of audience, lighting, &c., once secured the regulation is a comparatively simple matter (a fixed right condition of operation of apparatus then usually filling the need); but from the time of opening the hall until this stable condition is reached conditions will vary so much that failure is sure to result with the otherwise best apparatus, unless it be designed to regulate its heat radiation, &c., automatically, to suit these varying conditions, or a most competent engineer, of good judgment, regulate the apparatus, according to frequent thermometer readings or reports

RESULTS OF ELECTRIC LIGHTING.

From the considerations already set forth, and others to be presented, it will readily be inferred that the almost general introduction of electric lighting with isolated generating plants in large buildings has had a sensible effect on the solution of the heating and ventilating problem. On account of the economy secured it has practically conditioned the use of exhaust steam for heating. It is an interesting fact that the quantity of steam required for heating and ventilating large buildings, notably club houses, colleges, theaters, halls, &c., equals closely the amount used independently for their electric lighting. Since electric light engines convert only about 10 to 15 per cent. of the heat of the steam with which they are supplied into mechanical energy, 85 to 90 per cent. of the heat is retained in the exhaust steam, available and just sufficient, as a rule, to meet the heating and ventilating needs of the building. This means, practically, that a boiler capacity ample for the heating and ventilating will take care, in addition, of the electric lighting of a large building, or *vice versa*; and that in the winter months the electric lighting is secured at only a slightly increased fuel expense. It is this fact which makes it difficult for either city or district heating, or electric lighting companies, to supply steam or electricity, respectively, to large buildings. They cannot compete with the cheapness of generation of the composite

system of electric lighting and exhaust steam heating of the isolated plant within the building. Of course this composite system implies generally the additional wages of an extra fireman or engineer, but it can easily bear this additional expense, and still be decidedly on the winning side in competition with outside district companies. It is of importance to have the cylinder proportions of the electric light engines such that the desired power is developed with a back pressure as high as 5 pounds to the square inch; for in American practice such pressure may be required for heating in the coldest weather. This back pressure, if originally figured on, is neither detrimental nor uneconomical, and I have not been able to recognize any advantages in the vacuum systems, except where the engines or the piping were proportioned incorrectly at the outset, or where the installation of the electric lighting plant and the use of exhaust steam for heating were afterthoughts. In those cases the vacuum systems frequently perform a useful service.

Another way in which the introduction of electric lighting has affected the heating and ventilating problem is, as above already referred to, that the electric lights give out less heat and vitiate the atmosphere less than gas. Besides, there are no volatile products of combustion—representing vitiation and heat—to be taken off as far as practicable at the points of generation; nor must flicker of light, on account of air currents, be guarded against. The fact that a single gas light vitiates the air as much as do five persons, and that the electric light causes no vitiation whatever, materially affects the quantity of fresh air to be supplied to keep the atmosphere within a room at a proper standard of purity. Again, the fact that besides not dealing with obnoxious gases, no flicker of flames must be considered in electric lighting, renders it possible, when so desired, to bring in the fresh-air supply at the top of a room (either by wall registers or through perforated suspended ceilings) and to exhaust at the bottom, a reversal of the ordinary process, and one impracticable when gas lighting is resorted to.

CEILING AIR SUPPLY.

While, in my judgment, the main problem in the proper ventilation of large buildings is to secure an adequate supply to, and removal of air from, the separate rooms, I would like to call your attention to a distinct and important advantage obtained by having the air enter through perforated ceilings at the top of the rooms and exhausting at the bottom. At night, in a crowded assembly, when the electric lights aglow are giving out some heat, even though it be considerably less than gas lights would evolve, it is frequently found in practice, as the calculations of our example have already indicated should be the case, that, even in very cold weather, to keep the air within the room at a temperature of 68° F., the entering fresh air must be at a temperature considerably lower than 68 degrees. At the recent opening of the new concert hall of the Mendelssohn Glee Club Building—a room with scarcely any outside exposure, and practically dependent on an artificial air supply by means of a blower—it was found necessary, even while supplying over 3000 cubic feet of fresh air per hour for each of the 1000 persons in the audience, and with an external temperature of 40° F., to have as low a temperature as 52° F. for the entering air, to keep the hall at 68° F. Nor is this an unusual experience.

If the entire air supply enters by means of registers, or openings in or near the floor, it is very difficult, however large the openings, to obtain such a distribution and low velocity as will prevent the sensation of a cold draft when air is entering in large volume at a low temperature. It is a possibility, but usually it is impracticable structurally to secure the required low velocity and uniform distribution. But if the air enters at the top, not only can a low velocity and uniform distribution be secured by means of large perforations in decorative designs of suspended ceilings, but a low velocity is of less importance, for the cooler air is heated in transit, and by the time it has reached the audience it has attained a temperature in the neighborhood of 68° F., and is no longer cooler than the air at exhaust where the people are congregated. If the hall is very high it requires quite a powerful exhaust to insure the air reaching the floor at such times as the entering air must be heated; but this is a detail readily solved in practice. In the main auditorium of the Carnegie Music Hall, with its seating capacity of over 3000, the fresh, cooled or warmed air enters through perforations in the suspended ceiling, and travels with slow velocity a hight of about 80 feet to exhaust openings in the floor risers and an equable temperature is maintained under any external atmospheric conditions. In such a system it is specially important that the volume of air exhausted be less than the volume of fresh (warmed) air forced into the hall, so that the air within the room be under pressure; otherwise, external cold air will be drawn into the building through doors and windows and may create objectionable drafts. But the desired conditions here briefly presented are readily attainable; and, especially in case of an inclosed room, the system of supply at ceiling and exhaust at floor level is the ideal one, when the room is lighted electrically, to secure pure air and moderate temperatures, in crowded assemblies, during the winter months. In the summer time many persons like to feel a decided current of cooled or cooler air; and thus it is often considered preferable to have the air enter at bottom and to exhaust at top of room. A reversible system may then be adopted to meet the conditions of comfort all year round.

In my own practice, when air enters and is exhausted through ducts in the walls, I have found it advantageous to have both top and bottom registers for each fresh air flue and top and bottom registers for each vent flue. In this way the fresh air, when warmed, can enter at one and the same time through bottom and top register, with a corresponding desirable reduction in velocity, each flue having two outlets. When the air in the winter months, on account of crowded assembly, must enter at a low temperature, the bottom register can be closed, and in the summer time, if a current of cold air is to be strongly perceptible, the top register can be closed. In general, when air enters through top registers, the exhaust should also be by means of the bottom registers of the vent ducts, and *vice versa*, and when air enters through both top and bottom registers, the exhaust should also be through top and bottom registers.

The selection of the special system of heating and ventilating to adopt in a particular building depends, of course, in addition to the considerations already set forth, and to similar ones of a physical and engineering nature, greatly on the structural possibilities; for, important as are the heating and ventilation, owners and architects are not as yet quite ready to sacrifice other useful and artistic features to the one which has been the topic of this lecture. The engineer, therefore, if he would not have the heating and ventilating needs neglected, should be quick to recognize the system to adopt which will insure success and will, at the same time, not prove a nuisance to the specific architectural and artistic interests of the building. Frequently, such decision must be cast at a first inspection of the plans. Of course, there should be "give and take" in this matter on both sides, and the purely decorative and structural interests should occasionally yield a point too.

It is evident that the best result is achieved if the engineer who is to design the engineering equipment be consulted when the original architectural plans are drawn and before these plans have crystallized into definite and unalterable shape. For thus, in harmony of co-operation, the best is accomplished by both the architect and the engineer, and the engineering equipment, including the heating and ventilation, proves satisfactory, without encroaching on the highest architectural, structural and artistic possibilities and success. In closing, it is a pleasure to record that at the present time some of the leading architects recognize the advantages of an early co-operation in these respects with the engineer.

English Practice in Hot-Water Heating—XX.*

BRICK SET BOILERS (CONTINUED).

The description (and fixing) of the plain saddle boiler was completed in the last paper, and the next and nearest design is as Fig. 80. This is practically a saddle boiler with flue way carried through the top of it from front to back, as shown. The particular advantage of this top flue is that the flame and heat are thus brought beneath a heating surface—a horizontal surface that comes over the source of heat being of so much greater value than one that bounds it on the side, or one that comes beneath. To illustrate the method of fixing this boiler, some makers' lists show it in section, with the flame first passing through this flue from back to front and then passing over the top of the boiler to the chimney. So far as conducting the flames into this top flue at the back immediately they leave the fire, no objection can be raised, it being the best plan; but when the flame issues from this flue in front, it would be much better to carry it down and along each side, so as to benefit by the vertical surfaces. Some of the more powerful boilers have iron feathers provided expressly to do this, and it is undoubtedly the best way. In any case, the flame should go through the top flue first. This style of boiler is made with two top flues through it, one above the other, but it is not, to the best of the writer's belief, in great demand.

It should be explained that the few representative boilers now being referred to are not the only patterns worth recommending by any means. They are merely a representative few that have seen good service, and, therefore, can be safely referred to.

The next and nearest approach to the last boiler is Fig. 81, a very powerful and efficient boiler. It is practically a saddle, with waterway ends front and rear, and a flueway through the top. In fixing this it is arranged for the flame to first enter the top flue at the back, and as it leaves the front to be conducted down and along the sides under the mid-feathers provided, and as the arrows indicate. This, as already explained, has to have a top feeder, as the waterway front does not admit of feeding from this point. A boiler of this shape will, in the larger sizes, heat up to 4000 feet of 4-inch pipe, and it can be well adapted for shallow drainage (*i.e.*, when the boiler pit cannot well be made deep owing to water being found in the earth too near the surface). The top surface of this boiler is not usually made use of; the brick work rests upon it above and the feeder nozzle projects through above. A soot door would have to be provided op-

* Reprinted from the *London Builder*.

posite the top flue, for the easy removal of the dust or soot which will readily accumulate in it.

A good boiler, somewhat like the last in general character, is as Fig. 82. This, like the last, is not confined to one maker. It is to all intents a saddle boiler with waterway ends, but the flue way through the top is made in two distinct passages, as will be seen at Fig 83, which is the elevation, in section, just through the feeding nozzle. It will be noticed in this boiler that the top flues do not extend quite to the front, but have their sides cut away back some inches. This permits of the boiler front being butted tight up against the front brick work, and no intervening brick work to give direction to the flame is needed. In this boiler, as shallow drainage, but having a high power, if the chimney is suited. This must end our list of horizontal boilers, although there are very many more almost, if not quite, equally deserving of mention. It is strange how certain pattern boilers will be in favor in certain districts, but not elsewhere, and again a certain pattern may have a great demand for a certain period, then cease almost entirely. It may revive again, or it may not. Every boilermaker can give peculiar experiences in this way.

The next form of boiler to be noticed is of an upright character, quite different to those already mentioned, as Fig. 85. This is a very efficient form of boiler, and is particularly well adapted for those building works that extend up several floors, and which have an enormous press- propped up on fire bricks and a stoking aperture thus provided for. Sometimes the feeding door, which is shown on top, projects from the top edge toward the front. This latter arrangement is for such times when the fuel cannot be shoveled in at the top. This boiler is practically fixed in a circular brick-work chamber, of such a width that the feathers reach each side tightly. Waterway mid-feathers can be had if desired. They add considerably to results.

Wagstaff's segmental boiler is well worthy of notice. This is made in two shapes, the shape most known being of the ordinary saddle outline, as Fig. 86. It is a cast boiler and the sections are bolted together as shown. The form of the sections makes the interior deeply con-

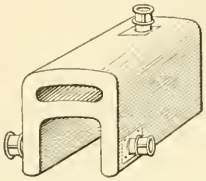


Fig. 80.—A Form of Saddle Boiler with a Flue in Top Running from Front to Rear.

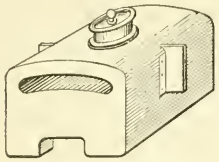


Fig. 81.—Another Form of Saddle Boiler, with Water-Way Ends Front and Rear and a Flue Carried Through the Top.

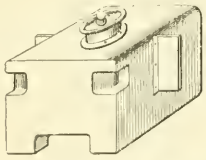


Fig. 82.—Saddle Boiler with Waterways and Two Distinct Flues Carried through the Top from Front to Rear.

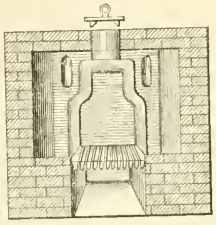


Fig. 83.—Section through Boiler Shown in Fig. 82.

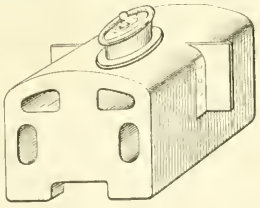


Fig. 84.—A More Powerful Boiler with Four Flues Running from Front to Rear.

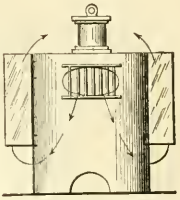


Fig. 85.—An Upright Cylindrical Boiler for Withstanding Heavy Pressures.

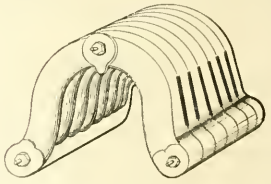


Fig. 86.—One Form of a Segmental Boiler.

ENGLISH PRACTICE IN HOT-WATER HEATING.

with the last, the flame, as it leaves the top flues in front, is taken down beneath the mid-feathers shown, so that it may operate on the vertical sides. The top is not used except to support brick work, this being all that it is good for, as before mentioned. Two top soot doors would be needed (in front) in this case

Fig. 84 represents a still more powerful boiler, owing to its having an additional pair of flues through it, but this, let it be noted, necessitates a tolerably efficient chimney, which can only be gained by having it a sufficient hight. (Chimneys will be treated separately.) With this boiler the flames, as they leave the boiler, enter the two lower side flues by an entrance provided in the fire box. From these, as they make their exit in front, they are conducted into the top flues. After passing along these and out at the back, they are brought along and beneath the feathers, and pass from there to the chimney. It is a shallow boiler suited for ure exerted in the boiler—that is, of course, at the lowest point. A cylindrical shape is best adapted to withstand a pressure. This pattern well fulfills what is so desirable in a boiler, viz.: a shape that will envelop the fire; and it nearly approaches the inverted basin shape that Hood spoke so highly of years ago. This has a top feeder, and is adapted for taking a charge of fuel. The hole shown in the front of the drawing is the flue way from the interior of the boiler, and the brick work is arranged so that the flame is caused to take the direction indicated by the arrows. The grating over the hole is merely to keep the fuel from falling through into the flues.

The lower front edge may be level with the rest of the boiler bottom, or it may have a little arched opening at Fig. 85; this arched aperture being just behind the stoking door and for the passage of the stoking tools into the fire box. If this arched way is not provided the boiler is voluted, which adds materially to the heating surface. Between each section will be noticed a vertical slot like opening, the object of this is as follows: The boiler is not intended for flues in the ordinary way, but is placed on the customary level base with fire bars suitably provided; the brick work is then carried over it corresponding to the shape of the boiler, but leaving from 3 to 4 inches between. The front and back ends come tight against the brick work.

When this boiler is in use the heated products escape through the slots or fissures at the sides between the sections, and then, in their passage to the chimney, envelop or embrace the outer surface.

HEATING NOTES.

The Capitol Heater Company, Detroit, Mich., issue a notice under date of February 6 to the effect that they have bought out the business of the Detroit

Heating & Lighting Company, so far as relates to the sale of the Bolton hot-water heaters. The managers of the Capitol Heater Company were connected with the Detroit Heating & Lighting Company from the time when they began to push the Bolton until a year ago, and are therefore thoroughly familiar with all the points of the apparatus. They mention in the notice that an important consequence of this arrangement is the abandonment of contract work, and they say that it is and will be the policy of the Capitol Heater Company to take no contracts under any circumstances and to turn over everything to the local trade, whom they will assist in every way in working up a profitable business.

The Holland Radiator & Mfg. Company, 89 Lake street, Chicago, state that they have established plants for the manufacture of their steam and hot-water radiators at Jenison, Mich., Elwood and Bremen, Ind., and Springfield, Ohio. Operations are conducted at each of these four places by a local company, in which the parent company has an interest. The latest of these projects to be established is at Elwood, Ind., where the Elwood Iron Company will conduct the business of manufacturing Holland radiators. From a local paper we learn that the DeHority Land Company at Elwood donated four acres of land to the factory for buildings and a number of lots adjacent. The buildings are to be all of brick. Four main buildings are each to be 50 x 160, while four smaller buildings are each to be 40 x 80. The foundry is expected to be in operation early in the spring. The total annual capacity of the four plants of the Holland Radiator and Mfg. Company is estimated by them at about 2,500,000 feet. T. Holland is president of the company, J. E. Holland is secretary and A. H. Fitz treasurer.

Among the orders recently taken by E. C. Merrill, 168 Second avenue, Pittsburgh, Pa., for his gas burners, was the equipment of two steam-boiler furnaces, the boilers being of 50 horse-power each, used for generating electrical currents. Other orders were for three batteries of burners for heating a hot-water boiler at residence at North Highland avenue, hot-air furnace on Irwin avenue, burners for steam-heating boiler at Edgewood and two laundry water-heating systems.

The Mason Regulator Company, Boston, Mass., manufacturers of steam-regulating devices, send out a circular to the trade in the shape of a United States mail pouch. On unbuckling the imitation the inside reveals an announcement of the Mason Regulator Company.

Clarence C. Mulford of Galva, Ill., has assigned to Wallace H. Ryon, Sycamore, Ill., a patent on a radiator. The patent covers a sectional radiator having its meeting surface at the base of the sections provided with interlocking sections with recess to prevent lateral rocking of the sections independently of each other.

The Farquhar Heating Company, 58 Dearborn street, Chicago, manufacturers of the Farquhar seamless air warmers, combination and hot water heaters, report a very successful season. Among the buildings in Chicago and vicinity in which these heaters have been placed can be mentioned: Roseland Club House, hot-water heater; residence of Geo. A. Watson, Wilmette, warm air heater; Rev. R. W. Bland, Rogers Park, hot-water heater; A. N. Townsend, Blue Island, warm air heater; Geo. Hinman, Blue Island, hot-water heater; J. J. Danforth, Hinsdale, combination heater; Benezette Williams, Western Springs, Ill., hot-water heater.

The American Radiator Company, 111-113 Lake street, Chicago, have arranged for the erection of a large warehouse in Boston, which will be especially adapted for handling and carrying a large stock of "American" radiators. The building will be completed and stocked in time for the coming season's business, and will place the company in a still better position than ever to supply immediately the wants of their New England customers. The New York branch of the same company have also secured a new warehouse, which they state is much larger and finer than any they have previously had, and which is especially adapted to their business, in which they will carry a much larger stock than ever before from which to supply their patrons in that section.

A Disastrous Explosion.

The note of warning sounded in the editorial columns of this paper in our issue of January 7, under the heading "Explosions of Gaseous Mixtures," was fearfully emphasized on the afternoon of the 6th inst., at 422 West Fortieth street, New York City. An employee of one of the gas companies visited the premises to repair a gas meter, it is said, and went into the cellar for that purpose. Exactly what occurred in the cellar previous to the tremendous explosion that shortly followed will never be known. The workman may have had a fit or have met with some accident. All that is known is that the sound of his tools suddenly ceased and that shortly after that a smell of gas began to pervade the premises. A proprietor of a saloon on the first floor of the building became alarmed and went to the door of the cellar, where his fear that something had happened to the gasfitter was at once strengthened by the strong odor of the escaping gas. Summoning help, he entered the cellar with three others, intending to rescue the fitter from his perilous position. A number of others followed the rescuing party, and it is said that some one of these idlers struck a light. A terrific explosion followed, the result of which was the killing of the gasfitter (assuming that he was not already dead) and more or less seriously injuring some 20 other persons in and around the building. Those in the cellar were badly bruised and burned. The premises took fire and the building was shortly a complete wreck in spite of all efforts of the firemen to save it. The injuries in most cases consisted of wounds from shattered and flying glass and from burning. Fortunately the explosion was not violent enough to wreck the building at once, or the death roll would have been large, as the building was a six story double tenement house swarming with people of the poor class. So far as now known no life was lost except that of the unfortunate gasfitter, and it is quite possible that his life might have been saved had the efforts made for that purpose been more intelligently directed.

James L. Chambers died at his home in Troy, N. Y., January 30. He was born in that city 70 years ago. He was a gasfitter by trade. About two months ago he suffered a stroke of paralysis and was confined up to the time of his death. He was highly respected and is survived by his widow and three sons.

A patent has been granted to Charles A. Williams and Arthur W. McAllister, Chicago, Ill., administrators for Levi K. Williams, for a pattern table for sheet metal shearing machines.

A report from Ottawa says that the French Government propose to buy the Sudbury nickel mines in Ontario, the object being to manufacture nickel steel armor plates for the navy.

House Warming.—III.

LIGNITES.

Lignites, usually known as brown coals, are the common fuel in many locations in all of the coal-producing States in this country. Their composition varies considerably, and we will, therefore, consider an average sample only. The analysis, by Professor Cox, of a sample from Bellingham Bay, Washington, gave the following results:

	Per cent.
Carbon	67.090
Hydrogen	4.555
Sulphur	1.000
Water	7.000
Ash	5.100
Oxygen, &c.	17.355

The percentage of oxygen not being given, it is impossible to give exact value of the hydrogen; but we may assume it to be, say, 3 per cent., which gives:

	Calorific value. Heat units.
Carbon 67.09 × 14,544 =	9,757.57
Hydrogen 3.00 × 62,032 =	1,860.96
Total per pound lignites	11,618 53

BITUMINOUS COAL.

Bituminous coals, such as are used for domestic purposes, vary considerably according to locality, and we can, therefore, consider only an average or approximate composition, as given by Mr. Barr, taking for our purpose, the mean of the range of percentages specified:

	Per cent.	Mean. Per cent.
Carbon	75 to 80	77.5
Hydrogen	5 to 6	5.5
Nitrogen	1 to 2	1.5
Oxygen	4 to 10	7.0
Sulphur	0.4 to 3	1.7
Ash	3 to 10	6.5
Available hydrogen = 5.5 − ⅛ =		4.625

The value, therefore, is:

	Heat units.
Carbon 77.5 × 14,544 =	10,831.6
Hydrogen 4.625 × 62,032 =	2,869.0
Total per pound coal	13,690.6

SEMI ANTHRACITE COAL.

The semi anthracite coals, though similar to the hard varieties, contain less fixed carbon and a correspondingly larger percentage of volatile matter. From the Pennsylvania Geological Survey we quote an analysis of sample from Wilkesbarre, together with the calorific values, as the quantities are not given in sufficient detail for calculation:

	Per cent.
Fixed carbon	88.90
Volatile matter	7.68
Earthy matter	3.42
	Heat units.
Carbon 0.8890 × 14,544 =	12,930
Volatile matter 0.0768 × 16,515 =	1,269
Total per pound of coal	14,199

COKE.

Oven coke, of late years, has come to be largely used for the purpose we are considering. Its composition, as shown by the following analysis, is almost pure carbon, and its calorific value is therefore high:

Carbon 96.16 % × 14,544 =	13,985.5 heat units per pound coke
Ash 3.84	
Total 100.00	

WOOD.

Wood of many varieties, both hard and soft, is almost exclusively used, in many localities where, on account of its abundance, as compared with other kinds of fuel, it is much cheaper than the latter, even though it is used in an unnecessarily

wasteful manner. It has some advantages, though, of course, on the basis of equal cost for a given unit of result, coal may be considered preferable. Rumford has demonstrated by numerous experiments that all woods have substantially the same heating power, and that the only difference in results obtained is due to the varying percentages of water. That the variation of this quantity is considerable is shown from the following results of experiments by M. Violette, which give the water driven off from the woods named, at a temperature of 437° F., to be: Oak, 44.31 per cent.; ash, 33.38 per cent.; elm, 40.56 per cent.; walnut, 36.56 per cent.

As this wood had been seasoned by two years' exposure to the atmosphere, under cover, it would appear that the normal saturation of the several varieties had been reached, and that consequently, their relative commercial values would be dependent on this factor to a great extent. Of course, where the moisture is dissipated by artificial means the equality of values is established.

The results of Rumford's experiments are very closely confirmed by chemical analysis, as shown by the following table of results obtained from several hard and soft woods by M. Eugene Chevandier:

Chemical Composition, Per Cent.

	Names of woods.	Carbon.	Hydrogen.	Oxygen.	Nitrogen.	Ash.
Hard.	Beech,	49.36	6.01	42.69	0 91	1.00
Hard.	Oak,	49.64	5.92	41.16	1.29	1.97
Hard.	Birch,	50.20	6.20	41 62	1.15	0.81
Soft.	Poplar,	49.37	6.21	41.60	0.96	1.86
Soft.	Willow,	49.96	5.96	39.56	0.96	3.37
	Average...	49.70	6.06	41.30	1.05	1.80

The respective calorific values from these quantities, we find, are as follows:

Woods.	Carbon.	Units.	Hydrogen.	Units.	Total per pound of wood. Units.
Beech.....	$0.4936 \times 14{,}544 =$	7,178.9	$0.0601 - \frac{0.4269}{8} \times 62{,}032 =$	416.6	7,594.5
Oak.....	$0.4964 \times 14{,}544 =$	7,219.6	$0.0592 - \frac{0.4116}{8} \times 62{,}032 =$	483.8	7,703.4
Birch.....	$0.5020 \times 14{,}544 =$	7,301.0	$0.0620 - \frac{0.4162}{8} \times 62{,}032 =$	620.3	7,921.3
Poplar	$0.4937 \times 14{,}544 =$	7,190.4	$0.0621 - \frac{0.4160}{8} \times 62{,}535 =$	626.5	7,816.9
Willow	$0.4996 \times 14{,}544 =$	7,266.2	$0.0596 - \frac{0.3956}{8} \times 63{,}535 =$	633.3	7,899.5
Average.....		7,231.2		555.9	7,787.1

The quantity of heat actually available from fuel containing a large percentage of water is somewhat reduced by the amount of the sensible heat of combustion absorbed by the water in raising its temperature from normal to 212°. Rumford gives the calcrific value of dry wood as 6480 units, which, being derived from actual experiment, is probably a safe standard.

CHARCOAL.

Charcoal, though not extensively used in this country, may still be considered as belonging to the class of domestic fuels. By experiment and analysis Péclet gives its composition as carbon, 93 per cent., and ash, 7 per cent., thus showing it to be practically pure carbon, or, at least, that the latter is the only combustible element present. This, however, is misleading, as it is only charcoal burned at very high tmperatures which give these quantities. The ordinary commercial charcoal is burned at from 500° to 600° F., while that of the composition given by Péclet would be at about 2500°. The physical properties of the two products are quite dissimilar—the former igniting easily and burning freely, while the latter is much more difficult to ignite. The following results of analyses by M. Violette give the respective composition of charcoals from the same wood (black alder) burned or carbonized at 572° and 2732° F.:

Temperature.	Carbon. Per cent.	Hydrogen. Per cent.	Oxygen. Nitrogen. Loss. Per cent.	Ash. Per cent.
572°	73.24	4.25	21.96	0.57
2732°	94.57	0.74	3.84	0.66
Melting point of platinum.	96.52	0.62	0.94	1.95

It will be seen from the above that the carbon increases with the temperature, as also the ash, while the volatile matters comprising the hydrogen, oxygen, nitrogen, &c., decrease in corresponding amount. The percentage of carbon for a given weight of wood also decreases with increase of temperature, being 24.61, 16.36 and 14.47 per cent., respectively, for the temperatures given. The quantities given in the first-named analysis, therefore, will represent the fuel value of the ordinary charcoal. As the percentage of oxygen is not given separately, it will be necessary to assume it, in order to calculate the calorific value. The quantity given for oxygen, nitrogen and loss, being 21.96 per cent., we will be safe in calling the maximum amount of oxygen as one-half, or say 11 per cent. Then, hydrogen $= 4.25 - \frac{11}{8} = 2.875$ per cent. We find the fuel value of 1 pound of charcoal to be:

	Heat units.
Carbon.....$0.7324 \times 14{,}544 =$	10,652.0
Hydrogen.....$0.02875 \times 62{,}032 =$	1,783.4
Total heat units per pound.....	12,435.4

	Per cent.
Carbon....	58.18
Hydrogen....	5.96
Oxygen....	31.21
Nitrogen....	1.23
Ash....	3.43

Reducing these to their calorific values, we have

	Heat units.
Carbon..... $0.5818 \times 14{,}544 =$	8,461 7
Hydrogen.. $0.0596 - \frac{0.3121}{8} \times 62{,}032 =$	2,996.0
Total per pound of peat.....	11,457.7

As the specific gravity (mean) is but 0.528 as compared with 1.25 to 1.35 for bituminous coals, and 1.50 to 1.55 for anthracite, it is, of course, quite bulky in comparison with equal weights of the latter, and, therefore, to burn it advantageously for domestic purposes it would probably be necessary to provide special facilities particularly adapted to its use.

SUMMARY.

In order to apply the data we have obtained from the foregoing calculations it will be necessary to tabulate the summaries of such quantities as may be needed in our subsequent investigations as to the results obtained from the different fuels in their application to domestic purposes.

Fuel.	Per cent.		Heat units.		
Name of material.	Carbon.	Hydrogen.	Carbon.	Hydrogen.	Total.
Pure.....	100.00	100.00	14,544	62,032.00	76,576.00
Anthracite coal	92.07	0.15	13,390.7	93.03	14,221.00
Cannel coal.....	71 10	4.47	10,340 8	2,772 80	13,113.60
Lignites....	67.09	3.00	9,757.6	1,861.00	11,618.50
Bitumin'us (mean)..	77.50	4.625	10,831.6	2,869.00	13,690.60
Semi-anthracite..	88.90	2.04	12,930.0	1,269.00	14,199.00
Woods (mean)...	49.70	0.90	7,231.2	555.90	7,787.10
Charcoal 572° F....	73.24	2.875	10,652.0	1,873.40	12,435 40
Peat, Irish, (mean)...	58.18	5.96	8,461.7	2,996.00	11,457.40

(*To be continued.*)

PEAT.

A fuel material called peat, which is almost entirely unknown as a commercial product in America, is much used in many localities in Europe. This appears somewhat strange, considering the fact that some of the largest deposits in the world are to be found in this country, and that its production in marketable form is easy as compared with coal. It burns freely and possesses a comparatively high fuel value. The following quantities are the averages of results of analyses of seven different samples of Irish peats, and may be considered as fairly representing the value of the fuel. The samples selected were all of different physical structure and density.

A simple stove pipe fastening, by which the longitudinal edges of pipe section or lengths may be united and readily disconnected, forms the basis of a patent recently taken out by Oliver S. Garrettson of Buffalo, N. Y., and Walter S. Shippe of Minerva, Ohio. The construction of the stove pipe is such that a large number of sections may be placed one within the other to facilitate shipment and compact and close storage of them.

The accumulation of "wheat in sight" constantly grows, despite the effort on the part of speculators to suppress the facts. In January, as in December, the stock in Western hands increased, contrary to all precedent. Last week there was an unexpected additional discovery of wheat in store in the Northwest, bringing the grand total of available stocks of wheat to the hitherto unattained total of 107,870,000 bushels, as compared with only 67,183,000 bushels one year ago, after we had harvested the largest wheat crop in the history of the United States.

Under the Reciprocity Treaty with Hawaii sugar grown in those islands was admitted into the United States free of duty, and the planters were making 75 to 100 per cent. on their plantation investments. The subsequent remission of duty on the part of the United States amounted to something like $6,000,000 a year. Now that not more than 10 per cent. can be made on sugar cultivation, the planter sees in annexation the advantage of the 2 cents per pound bonus.

Weekly Prize Competitions.

$25.00.

FOR MORE than six months Weekly Prize Competitions ($10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of $12.50, a second prize of $7.50 and a third prize of $5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. These competitions are open to every one, and it is hoped that there will be a general response from business men. Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers to the different questions will be favorably regarded as meeting the purpose for which these competitions are announced. We shall have the privilege of publishing any or all of the contributions received.

Weekly Prize Competition No. 5.

SUBJECT:

A Method of Securing a Reliable and Prompt Delivery of Goods.

This competition deals with the delivery of goods by retailers, and touches the following among other points, which will readily occur to our readers:

Marking name and address of purchaser on goods;

Disposition of goods awaiting delivery;

Time and method of delivery;

Form of receipt signed upon delivery of goods;

General suggestions on the subject.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

Replies are to be received not later than March 4, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96-102 *Reade street,*
New York.
Weekly Prize Competition No. 5.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 2. Closing February 11.
How to Keep the Store Neat and Clean.

No. 3. Closing February 18.
Waste in the Store and How to Avoid It.

No. 4. Closing February 25.
Suggestions as to Improvements in Putting up Goods.

No. 5. Closing March 4.
A Method of Securing a Reliable and Prompt Delivery of Goods.

Another subject will be announced in our next issue.

Our readers are also reminded of the following Prize Competitions, announced on another page, in each of which four prizes, of $50, $25, $15 and $10, are awarded:

No. 6. Closing February 18.
How Retailers Can Best Advertise and Extend Their Business.

No. 7. Closing February 18.
Travelers' Yarns.

No. 8. Closing February 18.
How to Treat Clerks.

No. 9. Closing February 18.
Shop System of Keeping Track of Jobs.

No. 10. Closing February 18.
Business Maxims—At Least 10.

No. 11. Closing February 18.
How Small Retailers May Keep a Record of Prices.

Connecticut Master Plumbers.

The third annual convention of the Connecticut State Master Plumbers' Association was held at New Britain on Thursday, February 9. The convention was called to order by J. H. Mills and routine business was transacted. Thirteen new members were admitted and the Baltimore resolutions adopted. The following officers were elected:

President, S. E. Dibble.
First vice president, James Ahern.
Second vice-president, J. B. Weiat.
Corresponding secretary, A. J. Clerkin.
Financial secretary, R. H. Stothart.
Treasurer, C. S. Eames.

The next meeting was appointed for February, 1894, at Hartford.

At 3 o'clock members and invited guests sat down to a banquet at The Russwin, after which J. B. Weiat, toast master, introduced the following gentlemen in turn and each responded in a short speech.

Alderman North, for the City of New Britain; Hon. Robert J. Vance, for the Press; S. E. Dibble, James Ahern, Robert Morton, Edward Smith, Soloman Goodsell, Dr. Punnell, Archibald Trolland, J. T. Duffy, Judge Chamberlain, president Union Mfg. Company, New Britain; W. B. Hubbard of Peck, Bros. & Co., New Haven; Samuel Bassett, W. E. Booth, B. E. Mallory of Richmond Stove Company, Norwich; James Donovan, Orville Jones and Walter C. English of *The Metal Worker*. Owing to the long list of speakers the remarks of all were brief, but the fact was brought out that there is considerable speech making talent among the Master Plumbers of Connecticut.

At the conclusion of the banquet a resolution of thanks to the New Britain Association was unanimously passed.

Among others the following attended:

L. H. Mills, Bridgeport.
S. E. Dibble, New Haven.
Jas. Ahern, Hartford.
Robert Brown, Norwich.
Lyman D. Mills, Middletown.
A. J. Clerkin, New Haven.
E. A. Rourk, New Haven.
W. E. Booth, Waterbury.
George Mahl, Hartford.
T. Cornwall, Bridgeport.
L. H. Beard, Bridgeport.
A. Trolland, Norwich.
L. H. Tracy, Waterbury.
E. B. Smith, Middletown.
F. C. Weiant, New Britain.
J. A. Wood, Bridgeport
H. B. Middlebrook, Bridgeport.
James Cook, Bridgeport.
C. S. Eames, Bridgeport.
Soloman Goodsell, Bridgeport.
T. E. Hogan, Bridgeport.
J. E. Littlefield, Bridgeport.
James Donovan, Middletown.
A. J. Beaton, New Britain.
P. J. Tormay, New Britain.
S. M. Laman, New Britain.
J. M. Page, Naugatuck.
E. Mahl, Hartford.
F. J. Reynolds, Ansonia.
Leonard Mallory, New London.
George W. Minor, Waterbury.
Thomas Oaks, Hartford.
J. G. Shearlock, New Haven.
Wm. Bonner, Bridgeport.
B. E. Cowles, Hartford.
J. F. Duffy, Hartford.
C. L. Snow, Hartford.
J. S. Craig, Hartford.
John Trolland, Norwich.
Wm. Kesne, New Haven.
Robert Morgan, New Haven.
Wm. Vanderman, Willimantic.
F. A. Curtiss, New Haven.
J. R. Garlock, New Haven.
W. J. Pruney, Hartford.
Geo. Cope, Hartford.
G. S. Bull, Hartford.

Notes.

Handsome badges made of satin, gold lace and metal, and bearing a representation of one of the Union Mfg. Company's pumps, were worn by members.

William Vanderman, in the dual capacity of plumber and manufacturer of plumbers' tools, came over from Willimantic for the occasion.

Of course, B. E. Mallory was there. What gathering of the trade would be complete without him? His speech was good, but all too short.

Peck Bros. & Co., New Haven, were well represented, and W. B. Hubbard's speech was well received.

A bill for the consolidation of New York and its environs on Long Island and Staten Island, as well as in Westchester County, is before the Legislature, and will provoke a long discussion.

A bill in the New York Legislature is intended to prevent the backlisting of delinquent debtors, practically giving to the latter the protection of the courts.

The bill leasing to an American syndicate the bituminous coal mines at Cape Breton passed both branches of the Nova Scotia legislature and has become a law.

Advices from the War Department at Washington intimate that both the sword and the saber may be abolished as obsolete weapons, short firearms having taken their place.

ROOFING AND CORNICE.

The Country Cornice Shop.

IV.

By Cornice Worker.

EAVE OR SNOW GUARD GUTTERS.

Fig. 32 is another form of hanging gutter for eaves with top and bottom braces bolted at A, as shown on diagram. This form of gutter is recommended on any steep roof, which is not provided with the patent snow guards now upon the market. When the thaw sets in after a heavy snow storm the snow will slide from a steep roof, often causing accidents. To prevent this there is shown in Fig. 32 a top and bottom brace, made of $\frac{3}{16}$ x 1-inch band iron, screwed to the eaves of the roofs with two wood screws through each brace. Between these braces the gutter is placed as shown, and a $\frac{1}{4}$ x $\frac{3}{4}$ inch bolt is passed through the bottom brace, the galvanized iron gutter and top brace, thus forming a solid joint at A. In practice, the bottom braces are divided as desired, and first screwed to the roof boards, as shown at B, Fig. 32. The gutter is now pressed firmly into the bottom brace and a hole punched through it at A and bolted to the upper brace. Two wood screws are screwed through the upper brace into the roof boards, as shown at C, Fig. 32. The method of forming this style of gutter was explained in Chapter III.

In bending the top and bottom braces, proceed as follows: Measure off the length of the brace required, which can be done by taking a strip of tin and laying it around the outside of the gutter, as shown in Fig. 32. Cut off as many pieces of band iron to the required length as there are braces

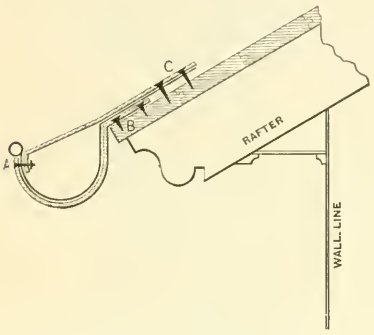


Fig. 32.—Another Form of Hanging Gutter, with Top and Bottom Brace Bolted at A.

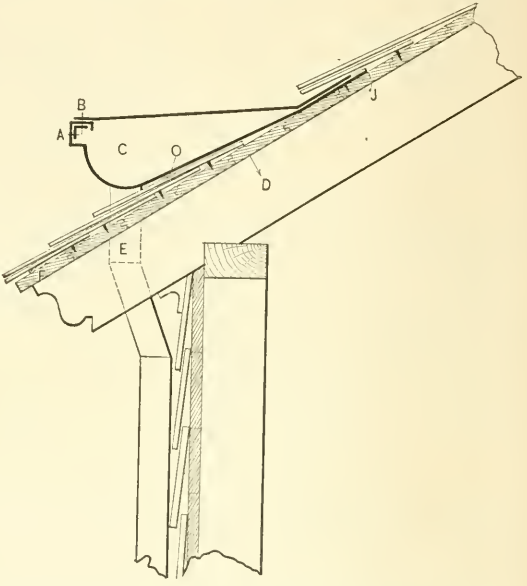


Fig. 33.—Section of Snow-Guard Gutter, Showing Method of Slating.

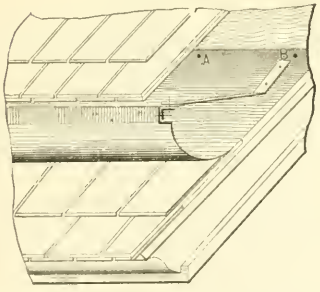


Fig. 36.—Perspective View of Roof or Snow Guard Gutter, Showing Angle Iron and Brace.

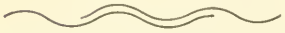


Fig. 35.—Lap on Corrugated-Iron Roof.

Fig. 34.—Angle Iron Held in Position with Hand Vise.

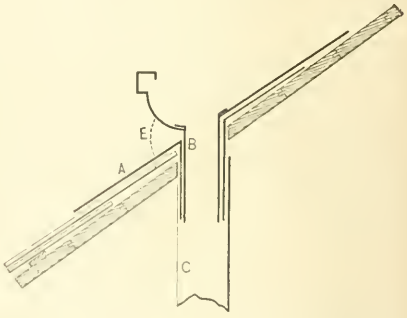


Fig. 37.—Proper Method of Making Water-Tight Joint with Sleeve, Tube and Leader.

required. In forming the bottom braces roll them through the stove-pipe former or roller until they have the required circle, after which place the brace in a vise and bend off the flange to the required angle, as shown at B, Fig. 32. One-quarter inch holes are now punched by hand or machine, at A and B, so as to admit the bolts and wood screws. The top braces are made in the same manner, and ¼ inch holes punched in them at A and C for bolts and wood screws. When this gutter is completely finished it can sustain quite a pressure. The snow sliding from the roof obtains a hold in the gutter and the braces prevent the gutter from breaking down.

SLATING IN ROOF OR SNOW GUARD GUTTERS.

In Fig. 33 is shown a section of a roof or snow guard gutter, also the method of

upon at once gives the position where the lowest point of gutter will be placed and the number of courses of slates required. Referring to Fig. 33, it will be seen that the slater must put on four courses of slate counting the course under eaves (if the leader was placed higher or lower the number of courses of slates would be more or less, respectively) After the lower four courses of slates are in place the slater must stop until the gutters are set. It is usual to give about 4 inches pitch to about 20 to 25 feet of gutter.

ANGLE IRON AND BRACES.

The style of gutter shown in Fig. 33 has an angle iron of ¼ x 1¼ x 1¼ inch in size and lighter, bolted through the galvanized iron gutter and top brace. The top braces are usually bolted about 30 inches from centers, and are made of $\frac{3}{16}$

the angle iron at B, Fig. 33, a wood screw or two is screwed through the top brace at J. The slate roof is then started again, in the same manner as described for the eaves. The method for forming the gutter, shown in Fig. 33, is done in the same manner as described in Chapter III.

ROOF COVERING OTHER THAN SLATE.

If the roof covering, as shown in Fig. 33, were to be of shingles the same rule would be followed as for slate. If tin were used, then tin up the roof as far as shown at D, Fig. 33, and set the gutter in its right position. As the gutter is to set to a given pitch, the upper edge of the gutter J, Fig. 33, would be cut on a straight line, struck by means of a chalk line and chalk, and then a lock attached, as shown by J K, Fig. 40. The tin is now

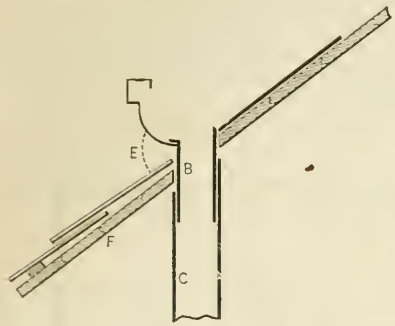


Fig. 38.—Improper Method of Making Joint.

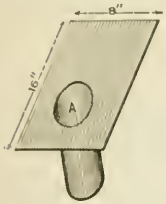


Fig. 39.—Metal Shingle with Sleeve Attached.

Fig. 41.—Wrought-Iron Leader Hook.

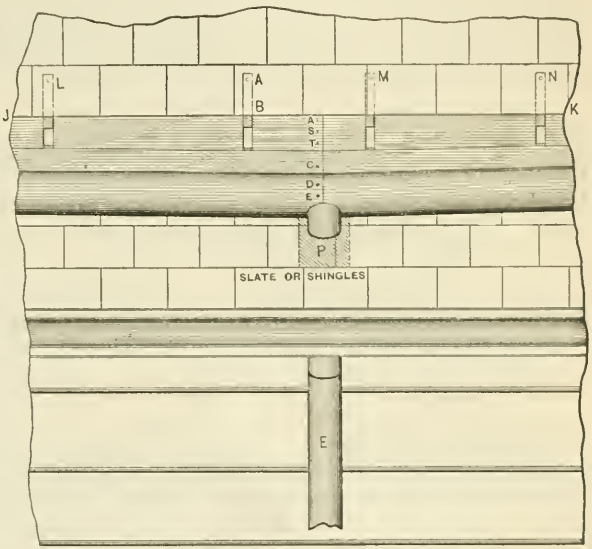


Fig. 40.—Front View of Roof or Snow-Guard Gutter.

THE COUNTRY CORNICE SHOP.

slating it. To give a better explanation of this diagram the method of starting a slate roof will be explained. As this is a little out of the line of cornice work, it is better if we understand it in case the slate roofer would desire to know how many courses he should slate before the gutter is put on. Before starting a slate roof the roofer should see that a cant strip is nailed about 1 to 2 inches above the eave line of slate, as shown at F, Fig. 33. This strip should be about ¼ inch in thickness and 1½ inches wide, the ordinary plaster laths being satisfactory. If the slates used are 8 x 16 inches in size, the first course should be laid the 16 inch way, or, in other words, the length of the slate should be laid parallel to the eave line of the roof. The second course and all others will be laid the 8-inch way. In laying 8 x 16 inch slates it is usual to lay them 6 inches to the weather, by which is meant, the second course will overlap the first 10 inches and the third course will overlap the first 4 inches. Let E, in Fig. 33, represent the leader, which we desire to place in the position as shown. The place of the leader being decided

or ¾ inch x 1¼ or 1-inch band iron respectively, and are galvanized after being made.

In putting up this form of gutter, the angle iron is left out until the gutter has been placed in its proper position on roof, and tacked with a few roofing nails, as shown by A and B, Fig. 36. After the gutter is set to the right pitch, the angle iron is pressed up into the inside top edge of the gutter and held in position with a few hand vises, as shown in Fig. 34, until the bolts are inserted, after which the hand vises are removed. If a punching machine is not at hand, the holes in the angle iron and the top braces can be punched by hand, by having a female die placed on a solid block of iron or wood, so that when the punch is being driven from the top there will be no springing.

The holes in the top braces to receive the wood screws can be countersunk by means of a breast drill if a machine is not at hand. The breast drills, including the punches and dies, can be purchased of any dealer in tinners' and cornice-makers' tools. After the top braces are bolted to

locked on to the flange of gutter and the roof tinned up.

If the roof were of corrugated iron, the sheets would be allowed to extend up as far as D, Fig. 33, and cut off square, by means of corrugated shears, which may be obtained from any dealer in tinners' tools. The gutter would now be set to the proper pitch, on the top flange of which a lock would be made as before described, it not being necessary in this case to cut the flange straight. This lock would prevent the snow from driving up under the corrugations. In laying a corrugated iron roof, as much lap should be given as is shown in Fig. 35. In tile roofing the same method would be employed as described for slating.

It is very advisable, if the roof covering is of slate, tile or shingles, to lay a sheet-rubber cushion, not less than $\frac{1}{16}$ inch in thickness, between the bottom of the gutter and top of the slate, tile or shingle, as shown at O, Fig. 33, to prevent breakage in case a large amount of snow would slide into the gutter. The rubber should be as wide as the part of the galvanized-

iron flange of gutter that lies against the slate.

Fig. 36 is a perspective view of roof or snow-guard gutter, showing the slates in position above and below the gutter, also the angle iron and brace bolted in position, and top brace screwed on the roof board, through the gutter flange.

CONNECTING GUTTER TO LEADER.

Let us assume that the gutter is to be connected to a round leader. In Fig. 37 is shown the method of obtaining a water-tight joint on roof, with the use of sleeve, tube and leader, and in Fig. 38 the improper method of making a joint, with the use of the tube and the leader only. It is of great importance that this method of putting in the sleeve be understood, as by not using the sleeve a leak is often the result. In Fig. 37, let A represent the sleeve, B the tube and C the leader. It will be noticed that both the sleeve and tube go inside of the leader, so that in case the snow drives against the angle E and thaws it must drip inside of the leader; while, as shown in Fig. 38, the snow driving against the angle E when thawing, soaks around the wood work F and rots it at every storm, because the tube B only connects to the leader C. In Fig. 39 is shown a perspective view of a metal shingle having sleeve attached. These shingles are to be cut to the size of the slates used, in this case 8 x 16 inches, and laid in with the course, where the roofs are covered with slate, tile or shingle. The sleeve shown at A, Fig. 39, should be soldered to the shingle where required; that is, just according to how the leader would be situated. In case the leader is so situated as to strike the bottom, center or upper part of slate, the sleeve A would have to be placed accordingly.

At P, in Fig. 40, is shown a shingle with sleeve attached, slated in as required, the leader having in this case cut the shingle in the center. The tube of the gutter passing through the sleeve connects to the leader below at F. In fastening the leader F the ordinary hooks are used, as shown in Fig. 41, which can be made by any blacksmith or purchased of dealers in tinners' supplies. There are different forms of leader hooks and fastenings with ornamental coverings, which will be fully explained and illustrated in another chapter.

FINISHED FRONT OF GUTTER.

In Fig. 40 is shown part of a front view of a roof, or snow-guard, gutter, finished complete, the section of which is shown in Fig. 33. L, A, M and N represent the braces of gutter, the dotted lines representing that portion of brace which is covered over with slate, tile or shingle. C, D and E represent the rivets in the joint of gutter, and R, S and T the tinned or brass wood screws screwed into the roof boards through the flange of galvanized iron and soaked well with solder.

Machine Works of Geo. A. Ohl & Co.

As makers of cornice and sheet-metal workers' machinery in general, the firm of Geo. A. Ohl & Co. of Newark, N. J., are well known to the trade. Their new machine shops and foundry, built in 1890, are located at 157–161 Oraton street, Newark, close to the Passaic River, and adjoining Woodside station on the Paterson branch of the Erie Railroad. With this line the works are connected by means of a side track. The shipping facilities by land and water are, consequently, very favorable.

In respect to general arrangements, the company's shops have been very judiciously planned, and are well adapted for the purposes of the manufacture conducted in them. We give herewith a ground plan of the machine shop, showing the general arrangement, position of the various tools, &c., in detail.

The works consist of a two story main building fronting on Oraton street, 200 x 40 feet in dimension, and a foundry building in the rear. The structures being placed on a sharp declivity, both floors are approachable directly from the outside. In the front a driveway leads into the upper story, and in the rear goods are shipped and material is received by railroad trucks on the company's private switch.

The lower floor is occupied by the machinery, the greater part of which is of home design and manufacture. A notable exception is, however, a new 20-foot planer, made in the Gleason Machine Tool Works of Rochester, N. Y. It weighs 22,000 pounds and is used for planing the 10 foot shears and brakes. Near by is placed a large 48-inch lathe, while a 3 ton jib crane handles the material for both tools.

Three other large-sized planers and half a dozen lathes of various dimensions occupy positions in the shop, besides other machine tools of different kinds, shapers, shears, drill presses, boring mills, trip hammer, &c. The position of these tools will be seen on the accompanying plan. A traveling overhead crane, which traverses the shop, and a second jib crane, provide the transporting facilities for heavy loads.

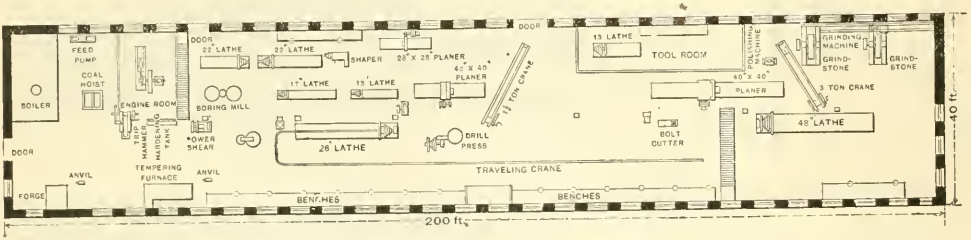
The department for grinding and polishing shear blades is a feature to which special attention has been paid. It includes two grinding wheels and one emery machine, together with a special furnace for tempering and a tank for hardening knives up to 12 feet long. The furnace is built on a plan designed for the purpose by W. Ohl.

Finished goods, if to be kept in stock, are hoisted on to the upper floor through a trap door. Those which require immediate shipment are loaded on to the cars directly from the rear end of the ground floor. A 30 horse power horizontal engine supplying the power is situated at one end of the basement.

The second floor of the building is used as a pattern shop and storeroom for material and finished goods.

The firm of Geo. A. Ohl & Co. were established in Newark in 1874, and commenced, at that period, the manufacture of the Calvin Carr cornice machinery. After the death of Mr. Carr in 1884, the patent rights in his machines were acquired by Geo. A. Ohl, who has since that time turned his attention to their improvement and to the invention of sheet-metal working machinery in general. Thirty or more different patented machines in this line are now being manufactured at the works, the latest improvement being a novel lifting apparatus for a drop press, which has just been perfected. By the device in question, a 4 x 2 foot hammer, 2500 pounds in weight, is easily and speedily operated. The sheet-metal machinery manufactured by the concern includes brakes, shears, squaring shears, miter cutters, punches, presses, rolls, benders, &c. They also turn out a number of special machines in other lines, and are makers of patent rolling steel shutters and a special line of shaking and dumping grates.

At the time the present factory was built the company was incorporated, with



Ground Plan of George A. Ohl & Co.'s Machine Works.

George A. Ohl as president, the employees, we understand, being all admitted to a share in the profits of the concern. This co-operative system has been found to work admirably after nearly three years' trial, the men taking a personal interest in their work. Beyond this, the individual interest in the concern possessed by each workman is found to obviate the frequent changes and loss of valuable help.

FLASHINGS.

AN EAVE TROUGH PROTECTOR, consisting of an extension over the upper portion of the trough of a metallic sieve having meshes of such a character that the water may readily pass through, while leaves and other *débris* would be excluded from the trough, has been patented by Newton J. Planthaber of Sterling, Ill. The sieve is bent downward at one side over the usual trough bead and at the other side over a flange formed on the exterior of the inner edge of the trough. A one-half interest in this patent has been assigned to Alexander J. McNeil of Rock Falls, Ill.

WE LEARN from Charles J. Collings, who was in New York last week representing J. M. Robinson & Co., Cincinnati, Ohio, that his firm have recently taken some large orders, among them being machinery for corrugating plants at Huntingdon, W. Va., Philadelphia, St. Louis, East St. Louis and Chicago.

THE CHATTANOOGA STEEL ROOFING COMPANY have succeeded the Cambridge Roofing Company of Chattanooga, Tenn., having purchased their factory, stock and all rights and business. The management

will be continued under J. E. Annis. The new company will make a specialty of Crowl's patent steel roofing, but will also manufacture a full line of corrugated and V crimped iron roofing and siding, standing seam iron roofing, iron weather boards, painted, galvanized and tinned. They will also carry a full stock of mixed and roofing paints.

FRIEDLEY & VOSHART are about erecting at the corner of Mather and Halstead streets, Chicago, a three-story structure for the purpose of providing additional facilities for their business. The plans, provided by architect D. H. Lapointe, call for a building 50 x 150 in size, constructed of brick and having an iron roof. The cost is placed at $16,000.

LEWIS S. SIMS of Newark, Ohio, has patented a roof gutter which is struck from a single piece of sheet metal. It comprises a hollow molding having convoluted rear side and a plain rear side or back adapted to be sprung toward or from each other. A flange is connected to the lower edge and front side, and is provided at its extremity with a facing lip. There is also a flange connected to the lower edge of the rear side for the purpose of securing the gutter to the roof and to adjust the separation of the front and rear sides of the molding.

Standard Gauge for Sheets.

Our Washington correspondent writes:

It was expected that the Speaker would recognize Representative Chas. W. Stone of Pennsylvania Monday for the purpose of moving to suspend the rules and take up his bill for "establishing a standard gauge for sheet and plate iron and steel," but the opponents of the bankruptcy bill resorted to filibustering, which prevented the Speaker from giving Mr. Stone the promised opportunity.

The following is the complete report of the Committee on Coinage, Weights and Measures on the Stone bill, which contains much explanatory matter of value and interest to the producers and consumers in the line of metallurgical products concerned:

The Committee on Coinage, Weights and Measures, to whom was referred the bill (H. R. 8099) entitled "A bill establishing a standard sheet and plate gauge," respectfully report:

Your committee have carefully considered said bill, and, while its purpose and general outline are worthy of approval, its details and modes of expression are, in the opinion of your committee, so far capable of improvement that they report the accompanying bill as a substitute for the one committed, and recommend its passage.

The purpose of this bill is to establish an authoritative standard gauge for the measurement of sheet and plate iron.

A gauge is as necessary to the manufacturer, the workman and the dealer in sheet iron and steel as a yardstick to the dry goods merchant or scales to the grocer. Contracts between the manufacturer and workmen and sales and purchases are all based upon and regulated by the terms of a gauge. This gauge designates by certain numbers the different thicknesses of the iron plates and sheets. There is, however, in this country no uniform or standard gauge, and the same numbers in different gauges represent different thicknesses of sheets or plates. This has given rise to much misunderstanding and friction between employers and workmen and mistakes and fraud between dealers and consumers.

There are probably a dozen different gauges in use in the United States and no two are alike. Those best known and in most general use are the New Birmingham, the Old Birmingham, the Brown & Sharpe and the Amalgamated Association gauge. All use descriptive numbers to designate the different thicknesses of plate and sheet, but in no two does the same number indicate the same thickness. For instance, No. 28 in the New Birmingham gauge designates a sheet .0156 inch thick and weighing 10 ounces to the square foot, while the same number in Brown & Sharpe's gauge designates a sheet .01264 inch thick and weighing 8.08 ounces per square foot. No. 27 in the Amalgamated Association gauge designates a sheet .018 inch thick and weighing 11.5 ounces per square foot, while No. 27 of Brown & Sharpe's gauge describes a sheet 0.1419 inch thick and weighing only 9 072 ounces per square foot. Here is a variation or difference of over 20 per cent. between gauges in actual and general use. No. 29 of the Amalgamated Association gauge would be only No. 27 of Brown & Sharpe's gauge. The confusion, uncertainty and injustice thus produced in business transactions can hardly be estimated. One gentleman states, as an illustration, that in a single contract made by him it would make a difference of $40,000, dependent upon what gauge regulated its performance.

The workman having in mind the Amalgamated Association gauge or the New Birmingham gauge when he made his contract would lose nearly a quarter of his wages if compelled to settle by the Brown & Sharpe gauge.

The purchaser ordering simply by the descriptive number might be forced to receive sheets thinner and lighter by one-fourth than he understood he was contracting and probably paid for.

The United States imposes tariff duties on sheet iron and steel by their descriptive gauge numbers, but there is no legal, authoritative standard for determining just the thickness of sheet their numbers describe if dispute should arise. The practice of describing the different thicknesses of sheet and plate iron by gauge numbers has been so long established and become so universal, both here and in Great Britain, that it is not deemed advisable to change this mode of designation, but these descriptive gauge numbers ought to have the same meaning and significance at all times and under all circumstances.

To accomplish this and furnish a legal guide in the collection of Government duties, the United States should establish a legal standard gauge, and that is the object of this bill. None of the existing gauge tables or scales exactly meet the requirements of accuracy and convenience, nor rest on a systematic basis, but the one submitted by your committee in the bill which they recommend as a substitute for the one referred to them is believed to fully meet these requirements.

It is based on the fact that a cubic foot of iron weighs 480 pounds. This is the same basis on which the imperial gauge of Great Britain rests, and also the New Birmingham and Amalgamated Association gauges.

A sheet of iron 1 foot square and 1 inch thick weighs 40 pounds, or 640 ounces, and 1 ounce in weight should be $\frac{1}{640}$ inch thick. The scale has been arranged so that each descriptive number represents a certain number of ounces in weight and an equal number of six hundred and fortieths of an inch in thickness, and the weights, and hence the thicknesses, have been arranged in a regular series of gradations. A micrometer for measuring the thickness of sheets and plates can be constructed to indicate six hundred and fortieths of an inch as easily as one thousandths, and thus the measurement of a sheet of iron will give the thickness in six hundred and fortieths of an inch in weight in ounces at the same time.

It is probable that the adoption of this gauge will gradually lead to the abandonment of the numbers and the use of the number of ounces in weight per square foot as the descriptive terms of the different thicknesses of sheet and plate iron. It will become as easy to order a 20-ounce sheet as a No. 22, or a 10 ounce as a No. 28, and this will cause a more general and intelligent comprehension of just what is being contracted for, and the opportunity for mistake or fraud growing out of an uncertainty of designation will be removed.

A natural consequence also will be the substitution of such weight designation for the arbitrary methods now in vogue of describing tin and terne plates as IC, IX, IXX, DC, DX, &c.

In view of the fact that the metric system of weights and measures is made lawful in the United States by statute, and the gauges in use in France and most of the European countries are based on this system, it has seemed proper to give the equivalents in the terms of that system of the different descriptive scale numbers. This is urged by the American Society of Mechanical Engineers, and is simply a matter of computation made in accordance with the law on that subject, and has been verified by the Superintendent of the Coast and Geodetic Survey having charge of the standards of weights and measures and matters relative thereto.

It is proper to say that the gauge embraced in the substitute bill recommended by your committee has been agreed upon by the Amalgamated Association of Iron and Steel Workers, the Association of Manufacturers of Sheet Iron and Steel, and the National Iron Roofers' Association as the best practical gauge, and representatives of these associations appeared before your committee urging its adoption. It has been submitted to the Superintendent of the Coast and Geodetic Survey, who is also Superintendent of Government Standards of Weights and Measures, and is approved by him, with a provision for a tolerance or variation which has been added at his suggestion. It is also approved by the Secretary of the Treasury.

Your committee therefore recommend the passage of the substitute bill herewith reported.

WASHINGTON, D. C., January 24, 1893.

SIR: Referring to the personal interview had with you in regard to the proposed bill establishing a standard gauge for sheet and plate iron, I have to state that an examination of said measure satisfies me that it will be productive of uniformity and convenience so far as it may be applicable to customs matters, and I therefore see no objections to the passage of the bill. Respectfully yours,

CHARLES FOSTER, Secretary.

Hon. CHARLES W. STONE,
Committee on Coinage, Weights and Measures, United States House of Representatives, Washington, D. C.

U. S. COAST AND GEODETIC SURVEY,
OFFICE OF THE SUPERINTENDENT,
WASHINGTON, D. C., January 23, 1893.

DEAR SIR: I return herewith the proposed bill for establishing a standard gauge for sheet and plate iron, with such corrections in the table of weights and thicknesses as are required to remove any inconsistency in the several equivalents. In its present condition I see no objection to its becoming a law and, as far as I am informed, no practical difficulty in its enforcement, provided a small, reasonable tolerance is allowed in the application of the table.

I am still of opinion, however, that it should be in the interests of justice to have such tolerance defined and fixed by law.

I am, very faithfully,

T. C. MENDENHALL, Superintendent.

Hon. CHARLES W. STONE,
House of Representatives.

The following is the text of the bill referred to in the report:

A BILL ESTABLISHING A STANDARD GAUGE FOR SHEET AND PLATE IRON AND STEEL.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of securing uniformity, the following

is established as the only standard gauge for sheet and plate iron and steel in the United States of America, namely:

Number of gauge.	Approximate thickness in fractions of an inch.	Approximate thickness in decimal parts of an inch.	Approximate thickness in millimeters	Weight per square foot in ounces avoirdupois.	Weight per square foot in pounds avoirdupois.	Weight per square foot in kilograms.	Weight per square meter in kilograms.	Weight per square meter in pounds avoirdupois.
000 000	1-2	0.5	12.7	320	20.00	9.072	97.65	215.28
00 0 0	15-32	0.46875	11.90625	300	18.75	8.505	91.55	201.82
00000	7- 6	0.4375	11.1125	280	17.50	7.938	85.44	188.37
0000	13-32	0.40625	10.31875	260	16.25	7.371	79.33	174.91
000	3-8	0.375	9 5 5	240	15.	6.804	73.24	161.46
00	11-32	0.34375	8 73125	220	13.75	6.237	67.13	148.00
0	5-16	0.3125	7 9375	200	12.50	5 67	61.03	134.55
1	9-32	0.28125	7.14375	180	11.25	5.103	54 93	121.09
2	17 64	0.265625	6.746875	170	10.625	4.819	51.88	114.37
3	1-4	0.25	6 35	160	10.	4 536	48.82	107.64
4	15-64	0.234 75	5 95 125	150	9.375	4 252	45.77	100.91
5	7-32	0.2 875	5 56625	140	8.75	3.969	42.72	94.18
6	13-64	0.203 25	5. 59375	130	8.125	3.685	39.67	87.45
7	3-16	0.1875	4 76 5	120	7.5	3.402	36.62	80.72
8	11-64	0. 71875	4 36 625	110	6.875	3.118	33.57	74.00
9	5-32	0.156 5	3.968 5	100	6.25	2.835	30.51	67.27
10	9-64	0.14 625	3 571875	90	5.625	2 552	27.46	60.55
11	1-8	0.125	3.175	80	5.	2 268	24.41	53.82
12	7-64	0.1 0937 5	2 77 8125	70	4.375	1.984	21. 6	47.09
13	3 32	0.09375	2 38125	60	3.75	1.701	18. 1	40.36
14	5-64	0.078 25	1.984 375	50	3.125	1.417	15 24	33.64
15	9 128	0.070 3125	1.7859375	45	2.8125	1.276	13 73	30.27
16	1-16	0.0625	1.5875	40	2.5	1.134	12.21	26.91
17	9-160	0.05625	1.42875	36	2.25	1.021	10.99	24.22
18	1-20	0.05	1.27	32	2.	0.9072	9.765	21.53
19	7-160	0.04375	1.11125	28	1.75	0.7938	8.544	18.84
20	3-80	0.0375	0.9525	24	1.50	0 6804	7.324	16.15
21	11-320	0.034375	0.873125	22	1 375	0.6237	6.713	14.80
22	1-32	0.03125	0.793750	20	1 25	0.567	6.103	13.46
23	9-320	0.028125	0.714375	18	1.125	0.5103	5.493	12.11
24	1-40	0.025	0.635	16	1.	0.4536	4.882	10.76
25	7-320	0.021875	0.555625	14	0.875	0.3969	4.272	9.42
26	3-160	0 01875	0.47625	12	0.75	0.3402	3.662	8.07
27	11-640	0.0171875	0.4365625	11	0.6875	0.3119	3.357	7.40
28	1-64	0.015625	0.396875	10	0.625	0.2835	3 052	6.73
29	9-640	0.0140625	0.3571875	9	0.5625	0.2551	2.746	6.05
30	1-80	0 0125	0.3175	8	0.5	0.2268	2.441	5.38
31	7-640	0.0109375	0.2778125	7	0.4375	0.1984	2.136	4.71
32	13-1280	0.010156625	0.25796875	6½	0.40625	0.1843	1.983	4.37
33	3-320	0 0103 75	0.238125	6	0.375	0 1701	1.831	4.04
34	11-1280	0.0085937 5	0.21828125	5½	0.34375	0.1559	1.678	3.70
35	5-640	0.0078125	0.1984375	5	0.3125	0.1417	1.526	3.36
36	9-1280	0.00703125	0.1785937 5	4½	0.28125	0.1276	1.373	3.03
37	17-2560	0.006640625	0.16867 1875	4¼	0.265625	0.1205	1.297	2.87
38	1-160	0.00625	0.15875	4	0.25	0.1134	1.221	2.69

And on and after July 1, 1893, the same and no other shall be used in determining duties and taxes levied by the United States of America on sheet and plate iron and steel.

Sec. 2. That the Secretary of the Treasury is authorized and required to prepare suitable standards in accordance herewith.

Sec. 3. That in the practical use and application of the standard gauge hereby established a variation of 2½ per cent. either way may be allowed.

Representative Stone has an interesting collection of gauges showing the differences between the thicknesses in vogue among English and American manufacturers.

BUSINESS ITEMS.

William Reisinger & Son, 612 Columbia avenue, Baltimore, Md., send to the trade an attractive calendar for the current year. The publication is a handsomely-decorated card, which calls brief attention to the firm of Messrs. Reisinger & Son, besides carrying calendar sheets for the year. On the back of the card are lists of goods which the firm keep in full assortment, and, what is of further local interest, the directions for reaching their store from different parts of Baltimore.

Alonzo and Edward Bedell have succeeded to the stove and tinware business of John Turnbull at 87 Main street, Haverstraw, N. Y., and will continue the business under the firm name of Bedell Brothers. An announcement, which bears date of February 6, calls attention to the changes which have been made in the ownership of the establishment.

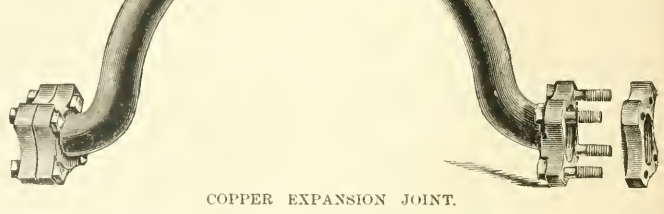
The hardware firm of Chedell & Co. of Auburn, N. Y., have retired from business, and have been succeeded by the Dunning Hardware Company. The head of the new concern is Henry S. Dunning, formerly a partner in the hardware firm of Dunning & Co. Clarence U. Chedell and Goldsborough C. Smith are the retiring members of the firm. This change obliterates one of Auburn's oldest business landmarks. It was started away back in the '30's by Joseph Hyde and J. L. Watrous, under the name of Hyde & Watrous. It was afterward continued by Mr. Watrous alone. The late D. M. Osborne became a partner about 1850, when the firm was changed to Watrous & Osborne. L. H. Baldwin entered the store as clerk in 1851, and one year later was admitted to partnership under the firm name of Watrous, Barker & Baldwin. Mr. Watrous was the next to retire, and the firm changed to Osborne, Barker & Baldwin. Mr. Osborne next disposed of his interest and went to Buffalo to engage in the manufacture of mowers. He was succeeded by Mr. Barker, and the title was again changed to Barker & Baldwin. The next change took place a few years later, when the firm became Baldwin & Co., the company consisting of E. D. Woodruff and John H. Chedell. After a few years Baldwin & Chedell succeeded to the business. Mr. Baldwin died in 1864, and Chedell & Co. became the title. Upon Mr. Chedell's death he was succeeded by William Williams, who died in 1885, and then the firm name reverted to Chedell & Co. again, and continued until the latest change, the Dunning Hardware Company.

F. O Alsop, Syracuse, N. Y., announces that after 20 years' experience in the hardware and stove business he is prepared to furnish the trade directly, as manufacturers' agent, with all goods in those lines. Mr. Alsop states that he handles a full line of ranges, parlor and globe stoves, including the Popular and New Daisy oil stoves and the Daisy lamp stove, as well as stove repairs of all kinds and mica, rubber hose and belting, &c. He makes a specialty of water fronts for all the standard makes of ranges.

William A. Requa, formerly with Maurice E. Viele, the Albany, N. Y., hardware dealer, has purchased an interest in the hardware business of J. H. Cornell of Middleburg, N. Y. He is an experienced man in the Hardware line and has many friends who wish him success.

Copper Expansion Joint.

The Dame & Townsend Company of 76 John street, New York, are now making the copper expansion joint, of which an engraving is presented. The joint is made of annealed copper pipe, with a patent cast-iron reversed flange union expanded on each end. The expanding of the copper in the recess of the flange forms the packing.



COPPER EXPANSION JOINT.

In Ohio the labor unions, by addressing circulars to workingmen, have induced so many to leave military organizations that some of the regiments of National Guards are much weakened, particularly the First Regiment from Cincinnati, and they might not be very efficient in quelling disorder.

Some of the Canadian Government organs are not as amiable as they were. Last week a dispatch was telegraphed from New York that Professor Goldwin Smith of Toronto intended to call on Mr. Cleveland to obtain, if possible, "a better market" and "freer trade." The government organ in Toronto, referring to this circumstance, speaks of the "renegade Englishman," and is "not sure but even in these days of leniency he has gone far enough to bring him within the law of treason." Clearly enough Mr. Smith's efforts are not appreciated.

Manufacturers in Findlay who had contracted for natural gas supplies disregarded a notice served upon them to substitute oil wherever it was possible. So last week when a secret tour was made by the natural gas superintendent a charge followed that 50,000,000 feet had been stolen during the past month. Now there is trouble.

"The Metal Worker" Competition in Skylight Pattern Cutting.

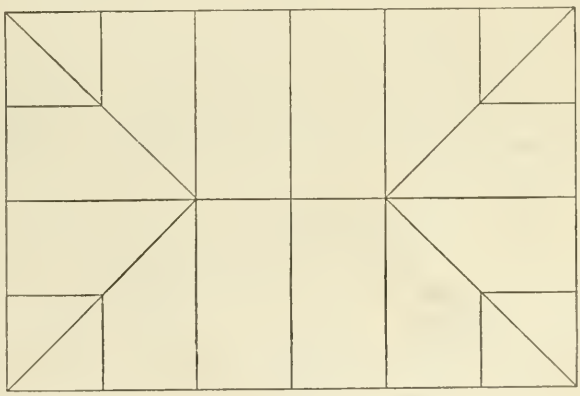
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

THE LETTER BOX.

Pumping Sulphuric Acid.

From A. D., *Montreal, Canada.*—Will some brother of the solder pot give me a pointer as to the best kind of pump to use to pump sulphuric acid? I want to raise it 14 feet and the compressed air method is not available. Are there glass or other suitable pumps made for such work?

Note.—We have heard of lead pumps made for the work of raising sulphuric acid, but where they are manufactured or whether they are regularly on the market we cannot discover. The usual method is compressed air, but this, it appears, is not available. It is barely possible that our correspondent can make use of an Archimedes screw made of lead pipe. An Archimedes screw, as our readers know, is merely a pipe wound in the shape of a spiral, or, more properly speaking, a helix, and supported at an inclination. By inserting one end of the pipe in a liquid and revolving it the water or other liquid travels up the tube and finally overflows at the top end. Another suggestion is that our correspondent use an ordinary wooden pump, replacing the valves with hard rubber. This would give satisfactory results for a little while at least, and may be the work in hand is not to extend over any long time. If our correspondent is an ingenious workman we suggest that he manufacture a pump for himself out of lead, using different sizes of pipe for the cylinder and plunger rod, &c. We wish some of our readers who have had experience in this line and who may be in a position to offer serviceable suggestions would loan their experience for the benefit of our correspondent.

Estimating Cost of an Article.

From B. C., *Hamilton, Ont.*—What is the best method for arriving at the percentage of expense to be added to an article when estimating the cost?

Answer.—The cost of doing business is generally from 10 to 25 per cent. of the gross sales per year. If the exact cost of doing business for the previous year is not known, it is safe to estimate it at 20 or 25 per cent. This includes interest on capital, rent, clerk hire, light, fuel, stationery, postage, &c. Whatever percentage of the sales these expenses are must be added to the cost of the goods. In addition to this the cost of freight, drayage and boxing must be added to the cost of each article. The percentage of freight to be added to each article of an invoice may be determined in either of two ways: First, by determining what percentage the freight is of the whole invoice; second, by determining the percentage of freight on each class of goods in the invoice. The invoice cost of the goods, plus the percentage cost of doing business, plus the percentage cost of freight dray and boxing, represents the cost of goods on shelf in the store. The selling price marked on the goods should represent a legitimate profit.

Material for Gutter.

From S. S., *Marcellus, N. Y.*—I intended to send you a letter in reply to "W. L. M.," Sunbury, Pa., whose inquiry appeared in *The Metal Worker* of January 7, but somehow I did not get to it, so instead of writing you I am reading the replies. There is one thing that strikes me in these. I see a number recommend using paper under the tin. I did once, but I changed my mind some since. As a matter of fact, a tin roof is supposed to be tight—that is, water tight. Some are, more are not, though leaks occur in all at some time or other; some from accident, some from wear and tear or other causes too numerous to mention. Now, paper that is used under tin is one of two kinds—it is either of the sort that absorbs water or is the so-called water proof. If a gutter be lined with paper of the waterproof nature and a leak occurs at some spot in the run, the water is held by the paper under the tin, and this may extend the whole length of the gutter. Here we have a tin gutter laid in water, and the point is, what is going to happen to it? The paper keeps the air away from underneath, the tin keeps the air away on top, so the water has no chance to get out. Is it likely that the tin will not rust under such conditions? Upon the other hand, you put down paper of an absorbent nature, it holds water like a wet blanket and is worse than none. The same criticism may be made of matched sheeting boards—the tighter they fit the more resistance to water should they get under the tin.

I have found that where gutter seams break by contraction and expansion that the narrower the boards and the more open the joints, say ¼ inch or so, the better condition the gutter was in. If they laid the boards close it held the water and the gutter soon was worthless. You may talk about painting tin underneath; it is far easier to talk about it than to do it, and in fact it is almost impracticable. In some jobs of a plain nature and straight work it might be done and, in fact, I have done it, but I cannot say I like it. All things considered, I condemn the practice of using paper under tin.

Put your paper under the rafters and then ceil it over with matched lumber inside. It forms an air space. This will prevent condensation much better than placing the paper on top and under the tin. I once had occasion to place a ventilator on a new building heated by steam. The roof was of tin, rather flat, close boarded, two thicknesses of rosin-sized sheeting paper on it and no ceiling below. I found the boards so wet that I could scarcely see the hole, and the paper so wet it it could not absorb any more water, and the tin was as rusty on the under side as it was on top, where it had not been painted. I then and there made up my mind that the conditions could not be worse if no paper had been used. The roof did not leak and it was the condensation that raised the trouble.

Flux for Soldering Roof.

From B. E. H., *Philadelphia.*—A party called to see me the other day regarding a building on which a new tin roof was required about every three years. The only reason the owner could assign was, that the parties who lived in the house some years previously had used the roof to empty slops on until the tin rusted out and the roof boards had become saturated. After new tin had been on awhile it would turn white on the under side and corrode through. As a new roof was again required, the owner asked my advice regarding what material to use.

A few days previously an agent had been talking to me regarding lead coated iron, which he claimed would withstand the action of gases, &c., without detriment to the metal. Accordingly I suggested to the owner that he allow me to cover the roof with lead-coated iron, to which proposition he consented. My men took the old roof off, and by night had the new one laid, but did not get it soldered. The next day it snowed, which prevented further operations for a time. A few days afterward they went to solder the roof and found the surface of the metal covered with a dry white powder which had formed on the surface of the lead. The men had tried to solder the roof by using rosin and failed. Acid was tried with a similar result. When I arrived at the scene of (in)action the men were using language not at all complimentary to lead-coated iron. As neither rosin nor acid could be used for soldering, the idea struck me to try grease as a flux. Accordingly I procured a quantity of candles, and they worked like a charm, the entire roof being soldered by their aid. I would be pleased to have the readers of *The Metal Worker* inform me of some better way of soldering lead coated iron, under the same conditions, should I have the misfortune to be caught in the same fix again.

Paint for Oil Tanks.

From A. R., *Ohio.*—What kind of paint is used for painting 60-gallon oil tanks?

Answer.—A manufacturer of oil tanks to whom the above question was submitted replied as follows: When sheet-metal oil tanks are to be painted, first give them a coat of mineral paint. After this has dried apply one or more coats of lead paint, using such color as may be required. If it is not desired to finish with varnish, mix a little varnish with the last coat of paint applied.

Removing Japan from Castings.

From A. G. S., *Hannibal, Mo.*—How can the japan be removed from old gasoline stove frames so they can be rejapanned?

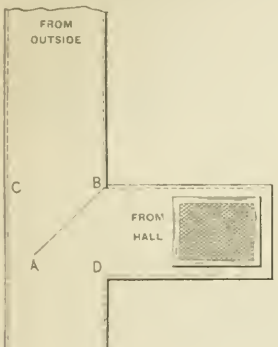
Answer.—If the article is of such a shape as not to be injured by heat, the old japan can be removed by holding the article over a fire and heating until the

japan scales off. If it is not desirable to use heat, then the japan can be removed by means of a sharp scraper or file, the object being to secure a smooth surface.

Air Supply for Furnace.

From F. V. P.—When a house is to be heated by means of a warm-air furnace, and the cold air supply is derived from a lower room or hall, will the air be as pure and the furnace give as good satisfaction as when the air is taken from outside?

Answer.—When the air supply for a furnace is taken from a lower room or hall of a house, and the only source of fresh air is that derived from the cracks about windows or doors, or from the occasional opening of them, the supply of fresh air is of course very uncertain, and with houses as usually constructed would hardly be sufficient. On this account the air might not be as pure as desired. When outside air is conveyed to the furnace by means of a properly constructed duct a



Cold Air Supply for Furnace from Hall or from Outside.

constant supply of fresh warm air should be delivered to the rooms above, providing proper provision has been made for the removal of foul air. This should be done in either case. By continually reheating the air in a house, as done when the air supply is taken from a room or hall, less fuel would be required than when the fresh cold air is taken from outside. This condition would perhaps be satisfactory to many. It would appear that by the first method we would secure economy of fuel and by the second an abundant supply of fresh air. It is the practice with some furnacemen to put in a cold-air duct in such a manner that either of the above methods can be used as desired. This may be found convenient, as it is difficult to maintain as much fire during the night as during the day. As shown in the accompanying engraving, the cold-air duct leading from outside to furnace has a branch extending to register face placed in hall. The valve A B is so constructed as to swing at B. When the valve is swung to C, the air is taken from hall. By turning the valve to D, the air is taken from outside. By having the valve hung in the above manner the air supply to furnace cannot be shut off, as might be the case if each opening was provided with a separate valve.

Cash Handling System In Retail Stores.

From M. C. & Son, *Plymouth, Mich.*—We would like to know the most satisfactory system for handling cash in a small retail store. We use a receipt like the one inclosed for payments on account. They are bound four on a page, and we give one to every one who pays on account. We find this method a very good one for that part of cash.

Note.—The form of receipt forwarded by our correspondent is as printed below:

Date..... $....

Received of

.....

.....

.....

.....

No.....

HARDWARE MERCHANTS.

$.... .....

Plymouth, Mich......189....

Received *of* ....

....*Dollars*

.....

.....

No...... .. *M. C* * * & SON.*

Per.....

We shall be glad to receive from any of our readers suggestions on this subject, or information as to cash-handling methods pursued by them in their retail business which they may find to work well.

Size of Flues.

From E. L. J., *Brooklyn, N. Y.*—How large need a flue be to make a good draft for an 8-inch pipe, also is it an advantage to have flue pipes made of copper rather than of galvanized iron. Will copper corrode?

Answer.—Flues, as ordinarily built, either square or rectangular in shape on the inside, to meet the requirements of an 8-inch round pipe, should be no smaller than 7 x 8 inches, or nearly square. An 8 x 10 inch flue provides an abundant area for the full capacity of such a pipe. A narrow flue, as, say, 4 x 14 inches, or a flue with a much larger area than that of the pipe, will not in most instances prove as satisfactory and give as perfect a draft as one built nearly square in section within the measurements as stated. We do not see any particular advantage to be gained by making flue pipes of copper if used for no other purpose than to convey smoke. If our correspondent should intend to make a smoke stack on a chimney, we would advise him to use galvanized iron rather than copper. A chimney stack made of copper exposed to wind and weather would cool more rapidly than one made of galvanized iron, and would chill the ascending current of heated gases, and so retard the draft to a greater extent than would be the case with galvanized iron. As to the lasting qualities of the two metals, the copper stack would probably outlast the one made of galvanized iron, the action of the various gases in contact with the metal corroding the iron to a greater degree than it would the copper. Copper, however, is not imperishable, but is also subject to corrosive influences.

Radiator and Water Front.

From F. P., *East Fairfield, Vt.*—Please inform me, through the columns of *The Metal Worker*, if a radiator may be connected with a water front on a range where the radiator is on the same floor with the range and where the pipe has to run under the floor from the range to radiator? A boiler is used likewise in connection with the range. The water is taken from a large tank in a room 10 feet above the range and radiator.

Note.—A radiator placed on the same floor as a range, and connected to the water front of the range, with the pipes passing under the floor from range to radiator, will not circulate. There is no way, under such conditions, to make a satisfactory working arrangement, and we would suggest that we do not think it worth the trouble for our correspondent to try to do it, assuming that we have correctly inferred the surrounding conditions from the meager explanation given.

Painting Conductor Pipe.

From M. T. Cummins, *Yazoo City, Miss.*—In answer to "G. R. C.," Mansfield, Pa., whose letter appeared in *The Metal Worker* of January 21, about painting down spouts on the inside, I would state that the method I employ I find to be very easy and clean. It is to paint the piping before getting ready for the rollers.

From T. A. D., *Everett, Pa.*—In reply to "G. R. C.," Mansfield, Pa., would say that I paint nearly all my work on both sides and my conductors I paint by dipping. I make up the stock in 5-foot sections, three joints, at a distance of 20 inches apart, in one piece. Then I have made for the purpose a trough 6 feet long out of 14-inch tin, formed up the same as a gutter. I then mix the paint and put about 3 gallons in the trough. Then take one section at a time and lay it in and give it one turn and stand it up on end in a trough made for the purpose. By this method a lot of conductors can be painted both sides in a very short time. It will be found, however, that mixing the paint is the most particular part of the job. I am confident that if "G. R. C." will try this plan he will find it a very satisfactory one.

Lines of improved barges adapted to the transportation of all kinds of merchandise are to be run from New Orleans to St. Louis, Cincinnati and Pittsburgh in the belief that imported goods from Europe can be distributed in this way through the country as cheaply as from New York.

STOVE TRADE NOTES.

The Stove Exhibit.

It will probably be some time before the question of the stove exhibit at the World's Columbian Exposition is satisfactorily settled. The allotment of 20,000 square feet to the stove trade is found to mean something different from what had been originally supposed. The intention of the World's Fair authorities is to concentrate within this space not only the exhibits of stove manufacturers, but also all other kinds of cooking and heating apparatus of whatever fashion or character, without regard to fuel used or methods employed. This covers an enormous variety of products, when it is considered that almost every manufacturer of heating or cooking apparatus has some distinctive feature which he would like to make prominent on such an occasion. But, as if this group were not enough for such a limited space, room must be reserved in it for exhibits of house-furnishing goods, which opens up another almost boundless field of aspirants for recognition. Attempts are being made, we learn, to ascertain at the earliest possible day the exhibitors who are sufficiently satisfied with the space they can get to go on and make preparations for a display. They will then be asked to contribute *pro rata* to a fund for the erection of an artistic pavilion or building to inclose the whole space. It is possible that some may prefer to drop out altogether, rather than pay any considerable sum toward the erection of a pavilion, deeming the expense incurred in preparing their individual exhibit as large as they care to invest for such a purpose. There would then be space to reallot, and perhaps considerable changes may take place in this way before everything is in good shape for the exposition. At present little can be said with regard to this matter, although the rapid flight of time and the now near approach of opening day render it desirable that all particulars should be settled irrevocably.

ODD PLATES.

The Brand Stove Company of Milwaukee and Chicago are bringing out a full line of steel-plate French ranges. Specimens are now displayed on the floor of the company's Chicago sample room. They are handsomely made, finished with broad nickel bands and nickel towel racks, or guard rails, drop oven doors, water fronts of extra capacity, shaking and dumping grates, and furnished either right or left as desired. The high warming closet is made with a rolling door, which hangs on eccentric side supports so that its own weight keeps it open. A neat device appreciated by tidy housekeepers is furnished with each range. It is a tin pot lid with a small pipe attached to the top, of sufficient length to pass into a hole in the smoke pipe, and will thus carry away odors of victuals while cooking. This hole in the smoke pipe when not in use is covered by a neat lid, which hangs over it. These ranges are made to meet the demand for wrought ranges of moderate price.

The Michigan Stove Company favor us with a novelty in the form of a chiromantic chart, setting forth rules by which an individual's character, mental temperament, business aptitude and fortune are to be told from the lines and markings of his hand. We have already studied our fortune from it, but what it will be "we dinna choose to tell." On the reverse side of the card bearing the chart, which may perhaps be the principal side in the estimation of most people into whose hands it falls, is a very quaint and pretty picture in colors, entitled "Childhood's Pleasures." The Garland trade-mark is visible, but not obtrusively so.

W. J. McKay & Co., wholesale dealers in stoves, ranges and furnaces, Chicago, send us with their compliments one of the pretty calendars with which they are favoring their customers. Leaflets for the months are attached to a white card with a gilt border, at the top of which is a colored picture of a dog of evidently good breeding. The dog's portrait is on a panel, back of which are representations of colored envelopes with their ends showing postmarks, stamps, &c. The leaflets for the months are printed in black, with Sundays and holidays in red, the distinction thus made being an excellent idea.

The Milwaukee Gas Stove Company of Milwaukee, Wis., have issued, under date of January 27, an announcement referring to the fire which burned their new factory on the night of January 25. They state that it was their intention to resume operations on February 6, temporary quarters having been secured. Their Perfection gas range for 1893 is a very pretty stove, and is shown connected with a range boiler on a sheet just at hand. It has four burners in the top plate and two boiler holes at the end carrying the water back.

Charles A. Bateman, who has been for several years with the Dighton Furnace Company, is now associated with the Smith & Anthony Stove Company of Boston, Mass. Mr. Bateman is one of the best known stove men in New England, and we are sure his many friends will receive a hearty welcome when they call on him at the headquarters of the Hub goods.

John B. Jones, secretary of the Carton Furnace Company, Utica, N. Y., is now in the West visiting their various agencies. He reports that the severe cold weather of the past winter has had no effect on the merits of the heating powers of the Carton furnaces and that all sent out during 1892 by the different agencies seem to be doing more than was expected of them.

The cupola in the new works of Noyes & Goddard, Waterville, Me., was warmed up for the first time on Wednesday, January 25, and a number of stove castings made. The company are rapidly getting in shape for business, and are looking forward to a gratifying volume of trade during the new year.

The Corning Mfg. Company of Corning, N. Y., are the assignees of a patent for a hot-air furnace granted to E. R. Stasch of that place. Provision is made for the escape of accumulated gas, the arrangement of parts being such that the air is claimed to be more readily heated, while the space occupied is small. The combustion chamber is extended laterally over a radiating chamber and provided with a vertical partition, so as to compel the products of combustion to pass first upward and then downward into the radiating chamber. The latter has a horizontal diaphragm, with an outlet beneath it for the products of combustion to pass into the flue and then escape to the chimney. Above the diaphragm is an outlet for the escape of the gases, this outlet being provided with an automatically operating valve, which is forced open by the accumulated gases and then automatically closes after the gases have escaped.

At the annual meeting of the Bellaire Stove Company, Bellaire, Ohio, on January 19 the old officers were re elected as follows: H. Roemer, president and treasurer; E. C. Boyd, vice-president; Robert Johnston, manager, and E. H. Rider, secretary. The company state that their sales during 1892 were nearly double those of the preceding year, and that the prospects for 1893 are very encouraging. Frank Shuttleworth will represent the company on the road during the ensuing year.

The Peninsular Stove Company are sending out from their Chicago office a postal card, on the back of which is printed in red in bold-faced type the following: "The tip is out. The Monarch Peninsular range for 1893, the greatest profit maker on earth. Why don't you handle it?"

In a recent issue of *The Metal Worker* we gave some information in regard to the Carpenter system of cooking and heating by electricity, with illustrations of some of the appliances used for these purposes. An article in a foreign exchange shows that the employment of electricity in these domestic offices is not confined to the United States, but has made considerable progress in England. Speaking on this subject the writer observes: Quite a large number of domestic appliances, heated by the same electric current that is supplied to houses for lighting, are now manufactured in England. Kettles, saucepans, flat irons, hatters' irons, curling tongs, were to be seen at the Crystal Palace Electrical Exhibition, but stoves for heating rooms by electricity are, we believe, a recent production. So is a detached heater, which can be put into any dish to warm the contents, from a glass of water to a basin of soup. In every instance the heat is derived from a wire of high resistance through which the current is passed, and there is neither smoke, ash nor fumes. The electric heater is as cleanly as the electric lamp, and must prove a great convenience in houses already provided with the electric current.

The Phillips & Buttorff Mfg. Company of Nashville, Tenn., will be represented the ensuing year by John W. Dill,

who will travel in their interest in the State of Texas; John B. Webber, who will cover the States of Georgia and Florida; W. W. Chappell, who will visit the trade along the Tennessee River; Whitten Duncan, who will cover Mississippi; A. B. DeBow, who will solicit orders from dealers along the Cumberland River; J. M. Adams will cover Southern Kentucky; H. C. Clark, Western Tennessee; W. H. Cox, Northern Alabama; W. H. Harley, Southern Alabama; W. M. Bennet and T. M. Jones, the middle section of Tennessee; while W. L. Clarke and J. H. McClure will cover territory not otherwise provided for.

THE SUPERIOR FURNACE COMPANY'S WORKS, at Little Falls, N. Y., have begun operations with a full force of employees. The company have secured the services of W. S. Robb, who has been connected with the Richmond Stove Company of Norwich, Conn., for many years, to take charge of making their castings.

THE DURAND STOVE COMPANY of Medina, Ohio, have resumed operations. The negotiations looking to a reorganization of the company, and which had been pending for some time past, came to a conclusion recently, and immediate steps were at once taken to put the works in running order. The size of the building occupied is 100 x 40 feet and 2 stories in hight. The ground owned by the company is, we understand, 2¼ acres, and a switch has been graded and ties laid by the P. A. & W. Railroad directly up to the works. The form of stove turned out by the company has been changed, adding greatly to its appearance, and the new management has also improved the power of the burner, which is said to increase its safety and desirability. At a meeting of the stockholders, S. H. Bradley, A. Munson, O. C. Shepard, F. M. Ashley, George Shepard, George H. Foster and James Atchinson were elected directors. At a subsequent meeting of the board A. Munson was selected to act as president; James Atchinson, vice president; George Shepard, secretary; O. C. Shepard, treasurer, and A. J. Blackford, manager.

THE IRWIN MFG COMPANY of Louisville, Ky., send us a copy of what is known as their "Illustrated Catalogue No. 2." It comprises something over 70 pages of letterpress, profusely illustrated with engravings of stoves with which they are prepared to supply the trade. The company have added to their extensive line a number of new patterns, while making improvements and additions to others. Attention is invited to the Progress, a line of steel-plate ranges embodying the modern features. Under the same name is made a line of double-oven ranges for use in hotels, boarding houses, public institutions and private residences. The D series of the Progress steel-plate range has been brought out to meet the demand for a construction of moderate size and cost. This range is the same in construction as the F series brought out by the company, and embodies the essential features for satisfactory operation. Under the name Progress is also offered a cook stove for hard coal, soft coal or wood; also one intended for soft coal or wood, and the Irwin Regal, a four-hole cook, made in three sizes and a number of varieties. Other goods include the Good-Luck Progress, for wood only; Nancy, Irwin Queen, the latter being the latest addition to the company's assortment; the Indiana, Relief and Kentuckian. The heating stoves are creditably represented in the catalogue by the Progress Todd, for burning wood, made in one size; the Wilton, a neat cottage parlor; the Oak, an attractive box stove; the Irwin Oak, for coal; the Success, Ruby, Ceres, Gem, Fulton and New Laundry. An interesting feature of the volume is a chapter on the method of obtaining the best results in the use of cook stoves.

THE NOVELTY MFG COMPANY of Jackson, Mich., are manufacturing a very extensive line of gas stoves. They are also equipped to do electro plating on a very large scale, having recently installed one of the Zucker & Levett Chemical Company's, New York, plants for this class of work.

JACOB D. GOLDSTEIN of New York City, is the patentee of an oil stove possessing many features of interest. The oil fountain has an open top which is closed by means of a removable cover, to which is attached the wick tube. There is also an upper water section which has a horizontal plate attached to the wick tube and provided with a surrounding perforated rim or flange extending downward and resting on the oil tank so that when the water section is removed it carries with it the wick tube and the cover of the oil tank.

CHARLES M. HOLLINGSWORTH of Cleveland, Ohio, is the patentee of a vapor stove comprising a closed vaporizing chamber and suitable means for delivering to it a regulated supply of liquid hydrocarbon. A conducting pipe extends downward from the vaporizing chamber, the lower edge communicating with a metallic burner shell. An inverted hood, entirely open on its under side, has one end adjacent to the burner shell and is in contact therewith below the burner cap. From this end it inclines upward toward the opposite end, while a pipe connecting with it extends upward, forming a communication with the upper portion of the vaporizing chamber.

THE ELECTRIC OIL AND GAS STOVE WORKS of 295½ Pearl street, New York City, have recently issued from the press a catalogue of 24 pages, in which illustrations are given of many of the leading goods manufactured. In offering this catalogue to the trade the company direct attention to many improvements which have been made and also to their increased assortment. The business of the company has increased to such an extent that they have been compelled to occupy more commodious quarters, and with their present facilities and large stock they are in a position to promptly fill orders. In the catalogue before us attention is invited to the New Electric oil stove, made in several sizes; the Star, made of tin and so constructed as to be readily taken apart; the Comet lamp stove, made of iron and ornamented with japan and nickel plated; the Liberty oil stove, made of cast iron; the new Rocket gas stove, made in a number of styles and sizes; the Parlor Queen, a neat heating stove fitted with burners which are said to be so constructed that they will burn without smoke or odor, and the Electric oil stove, made in sizes adapted to heat rooms varying from 12 feet square up to those measuring 15 x 20 feet.

NORTH DIGHTON CO OPERATIVE STOVE COMPANY, North Dighton, Mass., are Pushing their latest production, the prize oak range, which completes their line of first-class medium-priced ranges. W. C. Leonard succeeds W. B Hathaway as general manager of this concern.

AT THE ANNUAL MEETING of the stockholders of the Pittston Stove Company, held on Tuesday, January 31, at Pittston, Pa., the following board of directors was elected for the ensuing year: George Mitchell, Thomas Orchard, Alex. Sloan, T. F. Penman, A. C. Monies, Andrew Wyllie, E. E. Thomas. At a meeting of the above board, held subsequently, the following officers were elected: President, George Mitchell; vice-president, Thomas Orchard; treasurer, Alex. Sloan; secretary, T. F. Penman.

THE BLACKMORE HEATING COMPANY of Newark, N. J., are the assignees of a patent just granted to Joseph J. B. Blackmore of that place for a tubular hot-air furnace. In the construction of this heater the bottom of the radiator drum is set below the bottom of the fire pot, where its inner portion is protected from direct radiation from the fire pot by the outer edge of the ash box and where it is sufficiently removed from the fire pot to avoid the wide range of expansion at the joint which would result injuriously. Smoke outlets are extended through the casing from the radiator near its top and bottom, the top one furnishing the direct draft when kindling the fire. The arrangement of parts is such that the air is prevented from passing directly from the fire pot to the lower outlet by means of a deflecting plate or diagram of special construction which is inserted between the tubes at the top of the fire pot within the rear side of the radiator. This forces the heated gases to circulate around the front tubes in their escape to the lower outlet. The water box is cast integral with the lower edge of the ash box, the exterior lower portion of it forming one side of the water pan. The radiator is made in detachable parts so as to render the apparatus more portable.

PRESIDENT E. S. BARBOUR of the Detroit Stove Works, stated in an interview with a representative of a local paper that their striking stove mounters were still out, but that the company were going on as usual with a full force in all departments. He stated that they had 20,000 stoves on hand, a sufficient number to meet the requirements of their customers for some time. He said the company had made no attempt to secure new men, as they were in no present need of them. Referring to the wages they received, he said the mounters made from $2.80 to $4.50 a day, which he was sure "is as much as any stove works in the country pays men in that department."

THE HOWARD FURNACE COMPANY of Syracuse, N. Y., have established a permanent branch at 254 Water street, New York City. This step has been taken for the purpose of supplying the company's rapidly increasing trade in Eastern Connecticut, Massachusetts, New Jersey, Long Island and the territory along the Hudson River, as well as the building and jobbing trade of New York and Brooklyn. W. B. Wilkinson is manager of the New York office, as well as for the Howard Thermostat, which is controlled and managed by the Howard Thermostat Company. This interesting automatic heat regulator is shown in operation at the office of Mr. Wilkinson. The New York branch will be represented on the road by G. A. Stevens, well known to the trade as a furnace salesman, and who is now visiting his friends in the States of Massachusetts and Connecticut.

THE TOLEDO STOVE COMPANY, which are a reorganization of the Leonard Stove Company, have recently been incorporated at Auburndale, Ohio, with a capital stock of $100,000. We understand that the works at the place named are to be enlarged to double the present capacity. The incorporators of the new concern include J. C. Leonard, G. G. Metzger, H. C. King, T. Schuuck and T. H. Tracy.

ALBERT W. ALGER of Kansas City, Mo., has patented a heating stove adapted to use oil as a fuel. The parts of the device are so arranged, it is claimed, as to greatly increase the radiation of heat, while means are provided for a safe and convenient method of feeding oil to the burner.

CHARLES ADAM CHRISTIAN KORETKE of Belvidere, Ill., is the patentee of a heating stove, in which hot-air flues or pipes

are provided to increase the heating capacity. The fire pot is formed practically of pipes or flues, the bottom being an annular flue, the top a similar pipe and the side walls vertical flues connecting and communicating with the top and bottom. An annular flue is also provided near the top of the stove, and with this upper flue communication is established from the fire-pot flues.

A LARGE NUMBER of the New York State agents of the Fuller & Warren Company of Troy, N. Y., were entertained at the Troy Club February 1. Among those present were representatives of the company from New York City, Oswego, Syracuse, Rochester, Auburn, Utica and Rutland, Vt.

ASSOCIATE MANAGER EDMOND RAFTERY of the Chicago branch of Rathbone, Sard & Company is at Albany, N. Y., for a week or so. He is much better in health since his trip abroad.

THE ANNUAL REPORT filed with the Secretary of State by the Perry Stove Company of Albany, N. Y., shows the present directors to consist of Nathan B. Perry, John T. Perry, George W. Hobbs, William E. Perry, Garrett Y. Lansing and Edward R. Perry.

WE LEARN from one of the daily papers that J. A. Lansing of the Scranton Stove Works, Scranton, Pa., was enjoying himself at Niagara last week, in company with a party of friends. They were coasting down the side of the mountain below the falls when the coaster came in contact with a huge cake of ice, throwing Mr. Lansing off and badly bruising him. He was taken to the Prospect House, where his wounds received proper attention.

THE RICHMOND STOVE COMPANY of Norwich, Conn., resumed operations on Monday, January 30, after a brief shutdown.

IT IS WELL KNOWN that women in the New England States are more generally engaged in pursuits heretofore monopolized by men than in any other part of the country. Massachusetts particularly has an army of bright women scattered through its business world. It is not often, however, that one meets with women as manufacturers, but in Fall River there is a stove foundry in charge of a bright young woman, who has been drawn into her present responsibilities by circumstances rather than from inclination. The Eagle Stove Foundry at Fall River, Mass., was established some ten years ago by John Davis and conducted by him until his death in 1891. Then the management devolved upon his son, J. Holland Davis, who has for some time been incapacitated by illness. Since then the foundry and office have been presided over by his sister, Miss Davis, who is following the lines laid down by her father, and while attempting nothing radically new, is continuing the business very successfully. Trade, both in New England and the West, is reported satisfactory, and the outlook for 1893 is regarded as promising. C. L. Fisher, as traveling salesman, will visit the trade in New England this year.

THE SAUGATUCK FOUNDRY COMPANY of New York City have just been incorporated with the Secretary of State at Albany. The company are organized for the purpose of manufacturing and selling stoves, ranges, fire place goods and general iron castings. The capital stock is said to be $30,000. The directors include C. A. Filley of Lansingburg; Mark H. Filley of Saugatuck, Conn; and James D. Lincoln, C. L. Carpenter and Henry de Rivera of New York City.

SOUTHARD, ROBERTSON & COMPANY of Water street and Peck Slip, New York City, have issued an announcement to the trade to the effect that having purchased at a recent sale of the National Stove Company a number of patterns, they are now prepared to furnish repairs for the Live Oak and Mutual Friend cooks, the Saturn and Polo heating stoves and the Nelson hard coal furnace.

THE DEMAND for oil stoves promises to be enormous this year, judging by the way orders are being received by those engaged in that line of business. The past winter has developed an extensive use of oil-heating stoves and this year will probably see a still greater increase. Sam S. Utter made full preparations to meet the demand for the Game and Summer Girl stoves, and up to date the orders and deliveries are said to have been double those of last season, necessitating a still further increase of manufacturing facilities, which we learn are being pushed forward rapidly.

SOME OF THE MANUFACTURERS of steel ranges are showing very great enterprise in pushing the sale of their goods. Not long since, we are advised, fourteen teams arrived at a town in the Northwest, and after loading up with ranges at the freight depot, scattered throughout the surrounding territory, canvassing for trade from house to house. We are familiar with the fact that steel ranges have long been sold in this way, but were not aware that it was being done on such a comprehensive scale and in such a thorough manner. The results of this method of seeking customers must be satisfactory or it would not be followed up with so much vigor.

THE MICHIGAN STOVE COMPANY'S latest reminder to the trade takes the form of a cardboard puzzle, a four sided figure of irregular shape being given as a specimen. Four similar pieces are to be cut, and they are then to be formed into a perfect square—with patience and the requisite ingenuity. This puzzle is printed on a piece of fine paper, on the reverse side of which is a very pretty picture in colors of a child with wild flowers. A postal card circular from the same company refutes the charge that Garlands are higher in price than other goods of equal quality.

THE ENERGETIC ADVERTISER loses no opportunity to let the public know the merits of his goods. An illustration of this comes to hand in connection with a very neat card of invitation to a ball in Armory Hall, Sterling, Ill. The announcement is made on a leaf of the invitation card, doubtless as a stronger inducement to attend, that the building "is heated by the famous Peninsular furnaces, sold only by Meister & Rohrer" of Sterling.

The last fair of the American Institute yielded only a trifling margin of profit, less than for several years. The total value of the Institute property is $235,000, and it is proposed to spend $150,000 in improvements.

The exports from the United States to Argentina of agricultural implements for 1892 were valued at $1,910,747, against $527,585 the previous year. The grain harvest in that country, which began early in December, promised great abundance.

The report is revived, by way of Panama, that the Rothschilds and Baron Hirsch are at the head of a new canal syndicate and will each subscribe 25,000,000 francs, provided an extension of the canal concession can be obtained.

Consul Astwood at San Domingo reports that the reciprocity treaty with that country has not improved commercial relations, and that the people are much dissatisfied.

The Hardware Club of New York.

The accessions to the membership of the Hardware Club being sufficient to insure the success of the project, the officers are concluding negotiations for the rental for a term of years of premises in the Postal Telegraph building, corner Broadway and Murray street, and it is regarded as practically settled that the club will occupy them on the completion of the building. The number of members who have connected themselves with the club is regarded as sufficient to carry the club financially, while the fact that the largest and most representative houses are identified with it gives promise of its success and influence. It is a matter of special satisfaction that the club includes the leading houses in the trade located in New York and has among its non-resident membership many representatives of jobbing and manufacturing interests in other places. It is expected that there will be a large development of the non-resident membership, and that the club will be in a large measure representative of the Hardware and Metal interests of the country.

According to the provisions of the constitution of the club, the annual meeting will be held on the third Saturday of March, at which time 15 members will be elected, which shall constitute the board of governors.

A committee consisting of

DAVID WILLIAMS,
H. C. MARSHALL,
V. P. HUMASON,
JOHN H. GRAHAM,
U. T. HUNGERFORD,

was elected at a meeting last week to make such nominations in accordance with the provisions of the Constitution, article 4, section 2.

SEC. 2.—A committee to nominate governors for election at the annual meeting shall be chosen by ballot by the Board of Governors at a regular meeting a month preceding the annual meeting. Such committee shall consist of five members, not governors, and they shall nominate in writing members who have consented to serve as governors to be elected at the annual meeting, and at least ten days before the annual meeting shall place the names of such nominees on the bulletin board, and shall report the nominations in writing to the Board of Governors. But any other five members, not governors, may nominate members who have consented to serve as governors to be elected at the annual meeting, and may put such nominations over their signatures on the bulletin board of the club at least five days before the date of the meeting.

It will be remembered that at a former meeting of the club the office of the secretary, J. L. Varick, 105 Chambers street, was designated as the official headquarters of the club, where the nominations above referred to are to be officially posted.

THE DINNER.

On account of the financial embarrassment of the Manhattan Athletic Club, it has been found necessary to change the place of the Hardware dinner, which will be held at Sherry's, Fifth avenue and Thirty-seventh street, on Tuesday evening, February 21, at 7 o'clock, instead of in the rooms of the Manhattan Athletic Club, as originally intended. The dinner committee suggest that if any further tickets are desired application may be made at once, as but few remain. It is the intention of the committee not to sell more seats than the room will comfortably accomodate, so as to avoid overcrowding of tables. Arrangements for the dinner are progressing satisfactorily, and it is expected that it will be an exceptionally pleasant occasion.

Governor Murphy of Arizona claims a population of between 70,000 and 80,000 for that territory.

PRIZE COMPETITIONS.

WE HEREBY ANNOUNCE a series of six prize competitions relating to trade matters in which our readers are interested. Four prizes of $50, $25, $15 and $10 will be awarded in each competition.

The competitions are open to all and a general participation on the part of the trade is invited.

We shall have the privilege of publishing any or all of the contributions received.

The committee of award in assigning prizes will take into account the merit of the different contributions and their suitability for publication.

PRIZE COMPETITION No. 6.

How Retailers Can Best Advertise and Extend Their Business.

The object of this competition is to obtain practical suggestions as to the methods which the retail dealer in Hardware, Stoves, Tinware, &c., can advantageously adopt in building up his business, and is intended to cover such points as the following:

Advertising in the local papers, with suggestions as to how such advertising should be done and to what extent;
The manner in which circulars and other printed matter may be used;
A description of any special or unusual methods of attracting and holding trade; and
General suggestions in regard to ways in which the business can be extended.

An account of any methods which have been found useful in building up trade will be suitable under this competition.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 6.

PRIZE COMPETITION No. 7.

Travelers' Yarns.

The traveling salesman is proverbially happy in the stories which he narrates, and this competition is for the purpose of calling out a collection of good yarns for publication. While the attention of travelers is specially invited to this competition, it is open to all. Stories relating more or less closely to trade or business matters will be preferred.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams 96–102 Reade street, New York, and marked Prize Competition No. 7.

PRIZE COMPETITION No. 8.

How to Treat Clerks.

Under this competition, beside a general discussion of the subject, such questions as the following may be considered:

The extent to which clerks should be given an opportunity of obtaining a knowledge of the business, and of price-lists, prices, &c.;
Whether it is desirable to have formal rules for the regulation of employees and for the management of the store. If so, a set of rules should be submitted;
To what extent clerks should be held responsible for their mistakes;
Suggestions as to how clerks should be treated in order to secure their most intelligent and efficient work;
Mistakes made in the treatment of clerks.

This competition opens an important subject and it is hoped that it will be discussed fully by merchants and by their clerks from their different points of view.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 8.

PRIZE COMPETITION No. 9.

Shop System of Keeping Track of Jobs.

This competition is intended to call out information in regard to methods of keeping account of the cost of labor and material on tin-shop work, repairing and new work, inside and outside. In connection with the general subject such points as the following may be touched upon:

Whether blanks or forms are used in connection with such work. (If so, samples should be submitted);
What record is kept of orders, costs of jobs, charges, &c.;
How time occupied in going to and from the job is covered;
Suggestions in regard to the profitable conduct of the shop.

To illustrate the system it is desirable that a specific job (as for example, repairing down spouting and eave trough, or other job of repairing in which new material is used) be referred to and the method of keeping track of the costs in such job fully explained.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 9.

PRIZE COMPETITION No. 10.

Business Maxims—At Least 10.

Those entering this competition will send at least ten maxims relating to the conduct of business, presenting in a brief and pithy manner practical suggestions which may advantageously be followed.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams 96–102 Reade street, New York, and marked Prize Competition No. 10.

PRIZE COMPETITION No. 11.

How Small Retailers May Keep a Record of Prices.

The object of this competition is to call out information or suggestions in regard to the best methods to be adopted in keeping a record of prices, showing cost or selling prices, or both cost and selling prices, of Hardware, Stoves, Tinware, &c., in a small retail store employing not more than four persons in the selling and bookkeeping departments, including the proprietors. Those entering the competition are expected to give a concise and clear explanation of their system, and if a price book is used, to submit as illustrating the system at least three specimen pages. If a price book is referred to it may be of any design or arrangement best adapted to the purpose, and may be original with the contributor or may be one of the different price books on the market. Fictitious names should be used instead of the real names of jobbers and manufacturers.

The committee in awarding prizes will take into account the merit of the different systems described, the character of the descriptions given, and the general utility and interest of the contribution.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business, February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 11.

Egg Holder and Egg Tongs.

George E. Fahnestock & Co., Lancaster, Pa., are putting these goods on the market as shown in Figs. 1 and 2. The holder, Fig. 1, contains the egg at the

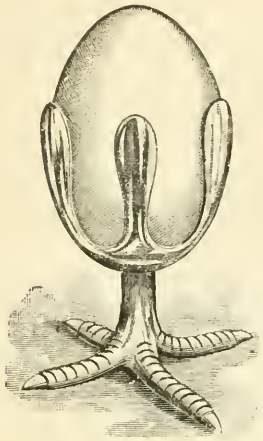


Fig. 1.—Egg Holder.

table, and allows of the upper portion of the shell being removed when preparing it for eating. The tongs are used for taking the egg from the dish and holding it while it is being prepared. The advantages claimed by the makers for these devices are that they obviate burnt fingers, soiled table cloths and napkins. The

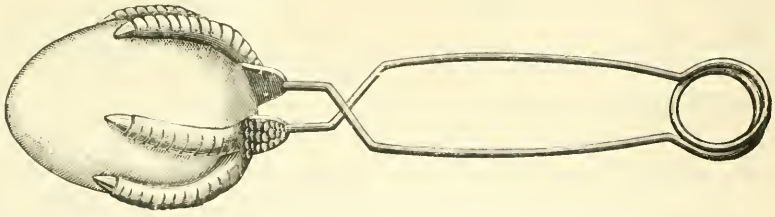


Fig. 2.—Egg Tongs.

goods are nicely finished and attractive in appearance.

Glass-Tube Cutter.

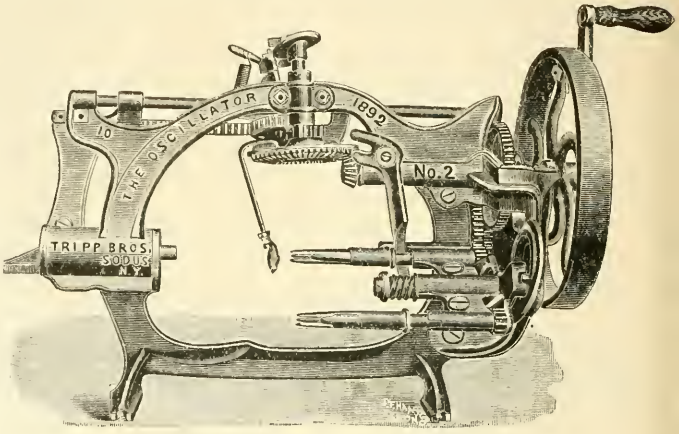
H. A. Rogers, 19 John Street, New York, is introducing the Favorite glass-tube cutter, as here shown, which is an improvement on a similar article brought out some months ago. The tool is 7¾ inches long and $\frac{3}{16}$ inch in diameter. At the end is a small beveled revolving steel wheel on one side of the instrument, and a circular movable gauge with thumb screw. The gauge may be set as far as 5½ inches from the cutting end. In operation, the glass tube is placed on a board or table, the rod inserted and the wheel brought in contact with the glass. By bearing down lightly on the cutter, and at the same time

The Rogers Favorite Glass-Tube Cutter.

imparting a rotary motion to the tube with the palm of the other hand, the cutter wheel will mark a circle on the inner surface of the tube, when a gentle tap will cause it to part with a clean, smooth fracture.

The Oscillator No. 2.

The accompanying cut represents a power apple parer and corer, put on the



The Oscillator No. 2.

market by Tripp Bros., Sodus, N. Y. The wheel to which the crank is attached is also adapted for the use of a belt, and by the addition of a friction clutch and lever it is made ready for power use. The forks are operated and held in position by a simple yet ingenious plan, and paring as they do two apples at the same time, make the machine almost equal in capacity, it it is stated, to two one fork machines. The capacity of the machine is from 30 to 38 apples per minute. Three turns of the wheel are required to pare and core an apple. The point is made that the skins, cores and fruit are all separated, and that on reasonably fair fruit the machine will remove every particle of peeling and core. The machine has bearings lined with brass, the mechanism for operating the parts is simple and the entire construction of the machine is such as to secure strength and durability. It is particularly designed to prepare apples for evaporating. The above firm continue to manufacture the No. 1 Oscillator, which is a one fork parer and corer, in which the same mechanical principles are embodied as in the No. 2.

Six Screen Door Frames.

The W. J. Kelley Company, Greenville, Ohio, and 345 Rookery, Chicago, are crating the Kelley adjustable screen door frames for shipping, as shown in the accompanying illustration. This forms a neat and compact package for handling

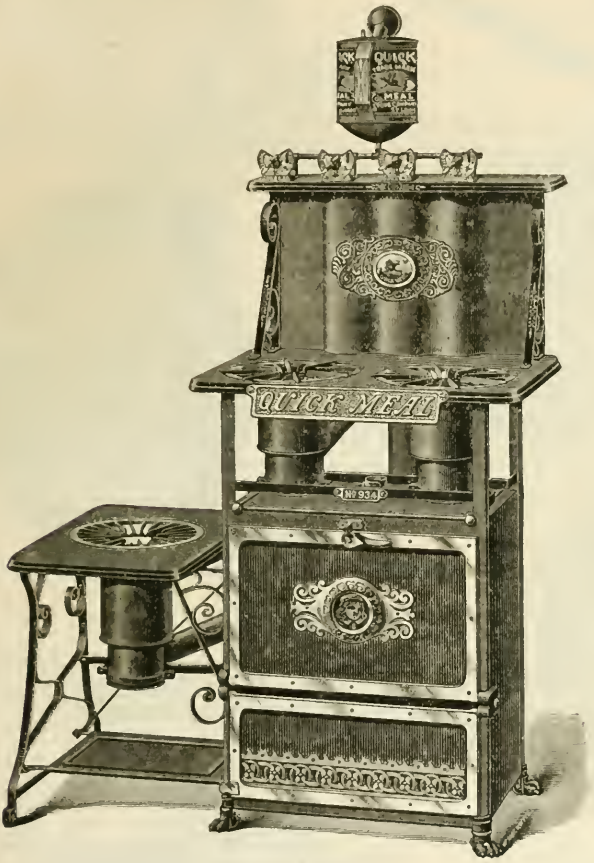
Six Screen Door Frames.

and storing, and preserves the frames from injury until wanted. The frames are made in four sizes, from which it is stated any sized screen door ever called for can be made.

Touching the silver question, a prominent banker has prepared a list of United States railroad bonds exceeding three thousand millions of dollars, the principal and interest of which are payable in gold. As given in Poor's Manual, the total bonded debt of our railroads last year was $5,235,295,000.

The Quick Meal Evaporating Stove.

The evaporating style of gasoline stove which we illustrate in the accompanying engraving is known as the Quick Meal No. 934 and is being offered the trade

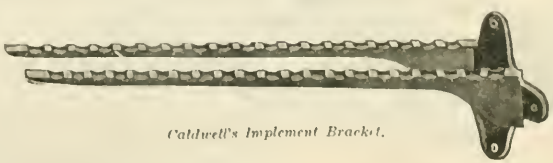


Quick Meal Evaporating Stove.

by the R'ngen Stove Company of 414 North Broadway, St. Louis, Mo. The stove is of neat finish and attractive appearance, the effects being enhanced by the use of a nickel shield and name plate. Below the tank are dials which show whether the burners are opened or closed. The tank is so constructed we are informed that it cannot be filled unless removed from the stove. The arrangement of parts is such that the dripping of the gasoline from the tank to the burners when the valves are opened can be readily seen. The oven flame is lighted by lifting the hinged cover. The manufacturers state that all the flames are blue, the one under the oven being especially powerful. In the construction of these goods the company state that for the season of 1893 the perforated brass for the evaporator is two gauges heavier than heretofore employed. They have also added to the value of these goods by adopting an automatic lock for the benefit of those who are yet unacquainted with the operation of evaporating stoves. It is stated that without this lock the tank might be put on the stove with the drip valves several turns open, and in trying to close them the pointer would strike the top pin on the dial, the valves continue the dripping and the operator be in a quandary how to stop them. As now made the pin on the lock allows the pointer to pass close to the valve, but will not permit the valve to be reopened further than required. This improvement is said also to be useful in case the drip valve is partially clogged. In that case the stop pin can be lifted and the valve opened as far as desired, when the obstructions may be washed out without removing the tank from the stove. The top surface of the Quick Meal No. 934 here shown measures 22 x 27 inches; the oven is 14 x 19 x 12 inches and the hight of the body of the stove 36 inches. The top of the step is 21½ inches from the floor and measures 15 x 23 inches.

Caldwell's Implement Bracket.

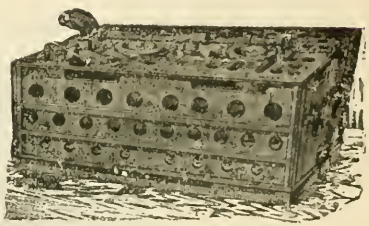
The accompanying illustration is of an implement bracket manufactured by the Heckel Hardware Company, St. Louis, Mo. The bracket consists of a base and two parallel arms, the upper side of the arms being provided with notches. The base plate is fastened to the wall or rack by screws. The projecting arms are of sufficient length to hold half a dozen or more rakes, hay forks, manure forks, hoes, &c., or any other tools of this character. This bracket has advantages over harness hooks or other devices not strictly intended for the purpose of hanging and displaying tools and implements.



Caldwell's Implement Bracket.

The Standard Gas Generator.

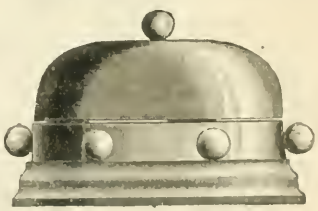
In the illustration presented herewith is shown the Standard gas generator, a device for converting kerosene oil into gas. It can be placed in any stove or heating apparatus, and is claimed to produce a gas that burns like natural gas, without smoke or odor. In cooking stoves the consumption of oil is said to be 1 gallon in five hours for a fire that will do all that coal is capable of doing. Refined petroleum costing 6 cents per gallon is used with this device. The generator is placed upon the grate of the stove, the only alteration necessary being the drilling of a hole for ¼-inch supply pipe to enter the stove from the side. The apparatus includes one 10-gallon can, 10 feet of pipe and fittings, more than 200 of them, we understand, being now in use. The makers of the device are the American Oilgas Company, George H. Gregory, secretary, care of Cyrus Carpenter & Co., 44 Hanover street, Boston, Mass.



The Standard Gas Generator.

Revolving Table Bell.

Hardware Specialty Company, 61 and 63 Mulberry street, Newark, N. J., have recently put on the market the bell illustrated herewith. They call attention to the simplicity of its construction, inasmuch as it has no springs or delicate parts and requires no winding. It is finished in nickel plate or quadruple silver plate, as desired, and is furnished in two sizes, 3 and 4 inch.



Revolving Table Bell.

Deposits in Massachusetts savings banks last year increased $9,130,000.

The Coldwell Lawn Mowers.

The Coldwell Lawn Mower Co., Newburg, N. Y., have made several improvements in lawn mowers during the past season. The Imperial mower, Fig. 1, is made in 8 and 10 inch wheels and of the general sizes in width of cut. Two ordinarily weak points, the manufacturers claim, have been made the strongest ones, namely, the ratchet and the adjustment of the knives. The ratchet used in the Imperial is a triple one, Fig. 2, such as is used in horse lawn mowers and heavy roller mowers. It is claimed that the ratchets have been known to wear over 15 years, and in all this time, while many thousands of them have been in use, there is no record of one either breaking or wearing out, which, it is remarked, is an exceptional record. Other features of the ratchet is the almost entire absence of noise, and also that the lost motion practically amounts to nothing. Instead of moving the knife bar to adjust the knives in the Imperial, the knives are adjusted to each other by moving the revolving cutter. The knife bar and side frames are bolted rigidly and permanently together, these with the front rod forming a strong immovable frame. The adjusting is done by means of an ingenious revolving cutter hanger which swings directly in the center of the driving gear and is securely bolted to the side frame by two bolts. The revolving cutter is moved to or from the bed knife by means of two set screws in the end of the hanger, by which the most delicate adjustment of the knives can be made. When the hanger is securely locked between these two set screws it is stated that there is no possibility of the adjustment jarring out of place by being knocked about in boxing and transportation, and that dealers will have no trouble readjusting their mowers when taken out of the cases. The hanger is also arranged so that all the wear can be instantly taken up by turning one screw. This adjustment is referred to as being simple and secure.

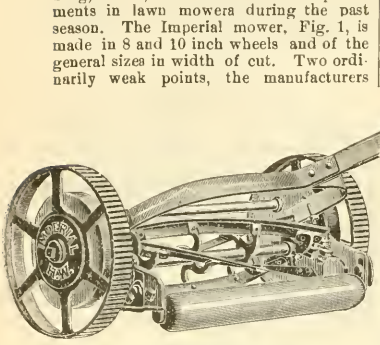


Fig. 1.—High Wheel Imperial Mower.

The arrangement of the driving wheels and gears is also spoken of as a new feature. The drive wheels are independent of the gears and connected to the large gear by the triple ratchet. By this means the ordinary small ratchet and loose pinion on the revolving cutter shaft is done away with, and when the machine is reversed the gears are stationary, thus avoiding a great amount of wear on them, and doing away with the usual clatter and noise when running backward. Another advantage of this arrangement of the gears is that in sharpening the mower a nail or piece of wire can be inserted in a hole in the large gear, and the knives can be reversed without taking off the driving wheels or pinions on reversing the ratchets.

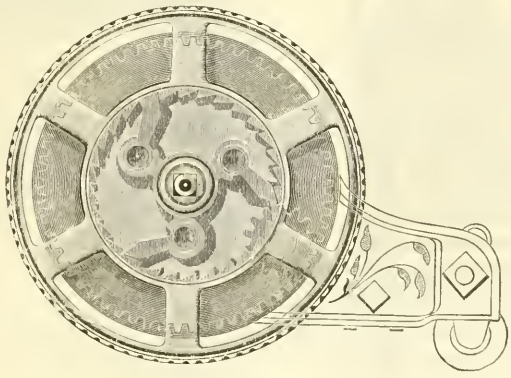


Fig. 2.—Triple Ratchet.

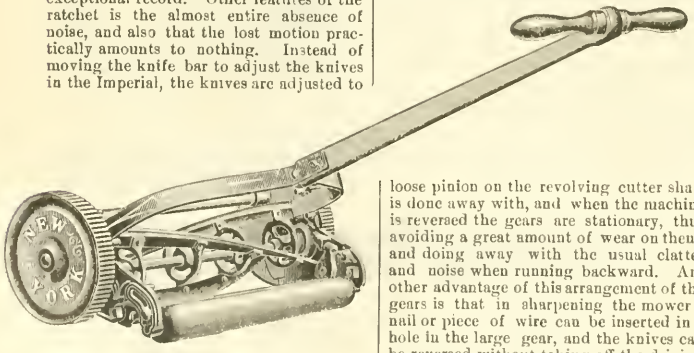


Fig. 3.—New York Mower.

The Imperial has on it also a terrace cutting arrangement for cutting terraces equally as well as level lawns.

The New York mower, Fig. 3, is designed to meet the demand for a good substantial machine at a medium low price. It has several of their latest improvements in ratchet, back roller hanger, handle adjustment, &c. It is made in medium sizes, 12, 14 and 16 inches, with 7-inch driving wheels. It is adapted for small city plats, especially when the children or a lady does the cutting. It is referred to as light running and as doing excellent work.

Auger Mortise Pulleys.

Shepard Hardware Company, Buffalo, N. Y., are offering the trade sash pulleys as shown in Figs. 1 and 2. They are made with wheels drilled and polished, steel axles and marking points on the sides. These fit the same mortise as the Empire and Common Sense pulleys. The pulleys shown in the cuts are made in 1¾ and 2 inch.

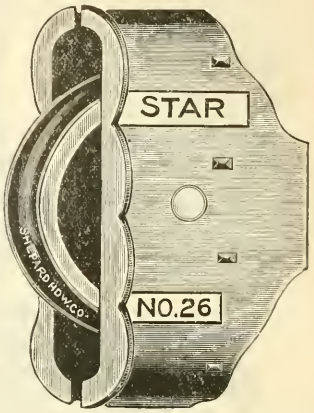


Fig. 1.—Star Mortise Pulley.

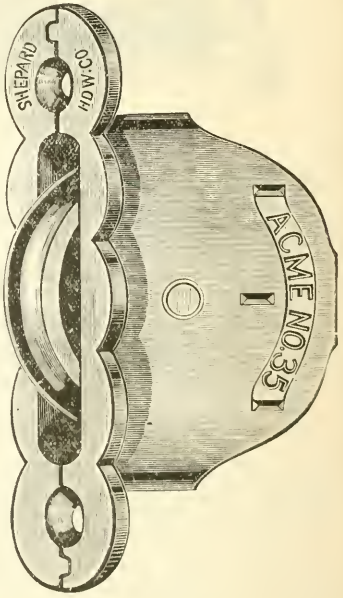


Fig. 2.—Acme Mortise Pulley.

The Perfect Lawn Rake.

F. E. Kohler & Co., Canton, Ohio, now have ready for market the line of rakes herewith shown. The rakes are made with a hard wood head, in which, it is stated, only the very best pieces are used and will never wear out, and the handles of turned white ash, perfectly dry. The teeth are made of the finest and stiffest spring steel wire and are driven diagonally through the head, and lie almost flat on the ground when in raking position. It is remarked that the rake cannot catch or dig into the ground; that it will take up all dirt or dead leaves, instead of only the stuff lying loosely on the top of the grass, and that on account of its peculiar construction it need only be pushed backward without raising or lowering the handle to clean itself perfectly. The hood is made of No. 22 sheet steel, and is designed for gathering a large load. The socket in which the handle is attached is of the best malleable iron, bolted to the head with two stove bolts, making it possible to leave the sockets off for shipping, thus making a compact crate. The point is made that there is nothing about the rake to break or wear out, and that it is light. The rakes are made in two sizes, 18 and 22 inches, with and without hoods.

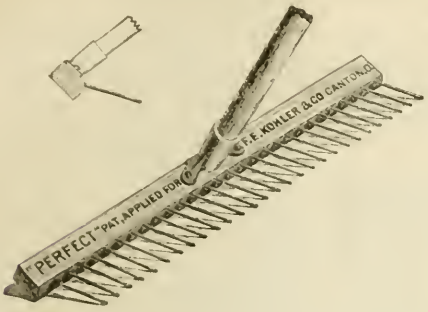


Fig. 1.—The Perfect Lawn Rake.

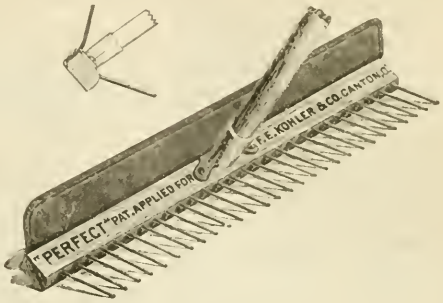


Fig. 2.—Perfect Lawn Rake with Hood.

Cutting off the supply of labor by restricting immigration is liable to embarrass Western farmers, both in planting and gathering their crops. Last autumn heavy losses of grain were reported from the impossibility of obtaining men to do the work. One effect is likely to be a more urgent demand for agricultural machinery.

Household Folding Wash Bench.

The American Wringer Company, 99 Chambers street, New York, are introducing the Household folding wash bench, as illustrated in Figs. 1 and 2. The bench open, Fig. 1, will hold two tubs and a clothes wringer at one time. Any wringer may be placed on the standard and clothes may be wrung from either tub into the other. The board or trough at the top is so arranged that it may be tilted in either direction instantly. By using this bench the tubs are relieved of the strain incidental to wringing and also the injury wrought by the screws in fastening the wringer on the tub. The tubs are free to be emptied at any time, and there is no time lost changing the wringer from one tub to the other. Fig. 2 shows the bench folded in compact form, to be put away until required. Attention is called to the standards, which permit of its standing upright instead of leaning against something else. The bench is constructed entirely of hard wood.

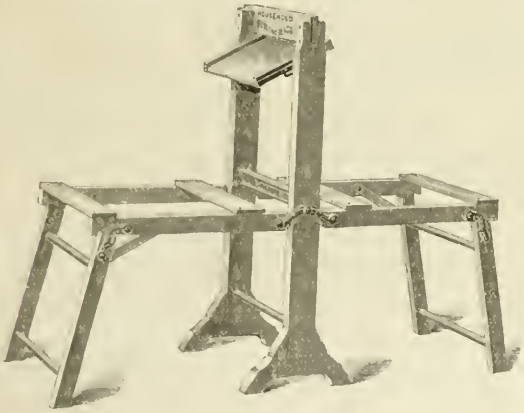


Fig. 1.—Wash Bench Open.

Fig. 2.—Wash Bench Folded.

Duplex Rat Trap.

The F. J. Meyers Mfg. Company, Covington, Ky., Eastern agent, F. J. Mattison, 69 Beekman street, New York, are introducing the Duplex rat trap, as here shown. It is made of No. 16 iron wire and japanned. The interior space is divided horizontally by a wire floor 4 inches from the bottom. There are two entrances and two trap doors. The bait is placed in the center of the trap in the upper section, and two partitions are so arranged that they may then be raised to an acute angle and fastened by a link on the outside. This permits the rat to see the bait but prevents him from touching it. On approaching the bait he steps on a cast-iron trap door weighted at the back, which precipitates him into the compartment below and at once automatically resumes its normal position ready for the next one. The bait may be seen from all points either in or out of the trap, but cannot be touched. The trap is made in two sizes, 30 x 11 inches and 24 x 9 inches.

The Duplex Rat Trap.

Trade Notes.

THE JOHN A. BROWN NOVELTY COMPANY were recently incorporated at Decatur, Ill., the incorporators being John A. Brown, J. L. Thayer, L. S. Bonbrake and H. C. Harmon of Decatur. The capital stock is $18,000, and it is the intention of the company to manufacture a line of Hardware specialties, the inventions of L. S. Bonbrake. Work will be begun at once upon a two-story building 25 x 80 feet, to be erected near the Wabash tracks, and the building will be fitted with a large press and dies and special machinery for manufacturing the goods. The articles to be turned out will include various novelties in the Hardware line; 3 and 5 gallon Oil Cans in two styles; the Simplicity Oil Can, which is operated on the compressed air and syphonic principles; the Decatur Rotary Can, which automatically atops the flow when the lamp is filled, being three of the specialties to be made. The firm will also manufacture Convertible Step Ladders, Animal Traps, Neated Stove Pipe, the Fire Witch Stove Back Wall, a plastic material which hardens when in contact with a fire; Stove Polish, &c., altogether some 20 specialties.

ONE OF THE most tasteful catalogues of the season comes to us from the Tuttle & Bailey Mfg. Co., New York and Boston. It consists of a 42 page book, illustrating and describing the company's Warm-Air Registers, Ventilators, Screens, Borders, &c. A cream colored cover bears in relief a medallion portrait of Columbus, with the name of the company, &c., surrounded by a handsome scroll-work design. Paper and printing are alike good, and the illustrations clear. The catalogue contains a number of new designs in Registers and Ventilators, including the Brilliant, Florentine, Plain Lattice, Indian Lattice, Japanese, Renaissance and Moresque patterns, together with tables of sizes and prices. The Registers are furnished in black or white japan, bronze, brass, enameled white porcelain, rustless iron, nickel plate, or silver plate; and the Ventilators comprise every form of ornamentation combined with efficiency, giving a good idea of the artistic capabilities possessed by these devices. A feature of the catalogue which is effective is the insertion of black leaves upon which designs of Registers are printed in their natural colors, silver and bronze.

DEAN MFG. COMPANY, Taunton, Mass., manufacturers of Tinware, advise us that they have recently added a number of new goods to their line, including Blue and White Ware, which they are offering at low prices. Their factory was open every working day last year and the outlook for 1893 is reported as favorable. A constantly increasing demand for their heavy, hand-made Tinware is noted, also an increase of 20 per cent. in January business over that of last year.

THE SMITH & ANTHONY STOVE COMPANY, Boston, Mass., have received some very strong testimonials on their Hub Steam Heater, and they claim for it remarkable rapidity in getting up steam, which implies a consequent saving in fuel In an announcement elsewhere two illustrations are presented of the Hub Steam Heater and attention is drawn to its merits. The same firm also make the Hub Hot-Water Heater.

THE ATLAS TACK CORPORATION in this city, finding their quarters at 116 Chambers street inadequate, have leased and are now occupying a portion of the building 31 Warren street, running through to 31 Murray street. They have the street floor and two basements, each being 175 x 26 feet. The office and salesroom will be on the Warren street end, the receiving and shipping of goods being done at the Murray street entrance. Their largely increased capacity will enable them to carry a much greater assortment and stock.

ROME MFG COMPANY, 135 and 137 South James street, Rome, N. Y., in their advertisement in this issue call attention to their Seamless Copper Tea Kettles, which are made from 14-ounce and 18-ounce copper, polished and nickel-plated.

TAEGE BROTHERS, Arlington Hights, Cook County, Ill., direct attention elsewhere in this issue to the Dubuque Pattern Style Milk Can. They also refer to their general assortment of Tinware in the line of creamery supplies, of which goods they make a specialty of manufacturing all styles and shapes.

FRED. F. BISCHOFF & Co., 24 West Lake street, Chicago, direct attention to the Bischoff Sheet Steel Enameled Bath-tub, and note briefly points of merit. An illustration of the tub is shown in an advertisement elsewhere.

THE DIXON CRUCIBLE COMPANY of Jersey City, N. J., send us a copy of an exceedingly neat little catalogue just issued from the press, which relates to Dixon's American Graphite Pencils, and is printed in black upon a good quality of paper. It is bound in paper covers, the front being embossed in gilt letters, and carrying a *fac-simile* of a No. 2 Lead Pencil. The illustrations are numerous, showing the leading lines of goods with which the company are prepared to supply the trade, and also giving a view of their graphite mines at Ticonderoga, N. Y., as well as of their works and general office in Jersey City. We understand that this catalogue is not intended for general distribution, but that the company will be glad to send a copy to all dealers in stationery.

THE HARTMAN MFG COMPANY of Beaver Falls, Pa., have made a change in their Chicago office, at 508 State street. F. S Atherton, who has been in the employ of the company as selling agent for nearly five years, has been promoted to the position of general Western sales agent in place of T. Dewitt Ganse, who has held this position for two years past. Mr. Ganse has removed to Marshall, Mich., where he owns a stock farm, and is at present devoting his time to the interests of same. Mr. Atherton will have entire charge of the territory west of Chicago to the Pacific Coast, and also the Southern States west of Louisiana and including that State. He has also made arrangements with the Union Drawn Steel Company of Beaver Falls, Pa, to represent them in this same territory as general Western sales agent.

NOTWITHSTANDING this being the dull season of the year, it is reported that the works of James B. Scott & Co., Pittsburgh, Pa, are running to full capacity and putting out a large volume of Terne Plates. The sale of the company's special brand, Scott's Extra-Coated Roofing Plates, is said to be very satisfactory, and a greatly increased demand for these Plates is looked for during the present year. The firm are prepared to increase their factory output in proportion to the growth of demand for their productions.

THE ESTABLISHMENT of an Anti-Rust Tinware factory at Honeoye Falls, N. Y., is almost assured. The capital stock will be $10,000, and $5500 has been taken The enterprise, when run at its full capacity, will employ 20 men and pay about $9000 a year in salaries.

A CIRCULAR over the signatures of F. B. Devendorf and S. E. Hunting informs the public that the copartnership heretofore existing under the firm name of Devendorf & Hunting, manufacturers of and dealers in Tin, Copper and Sheet-Iron Ware, Iron Pipes, Pumps, &c., at Watertown, N. Y., has been dissolved by mutual consent. The concern has been reorganized under the firm name of Hunting & Weekes, and will carry on the same line of business, making a specialty of Pipe Fittings and Plumbing Goods.

THE W. DEWEES WOOD COMPANY of the McKeesport Iron Works, at McKeesport, Pa., and sole manufacturers in this country of Patent Planished Sheet Iron, have recently purchased considerable ground adjacent to their works, which will probably be utilized for extending the plant.

RANDOLPH & CLOWES of Waterbury, Conn., recently shipped a lot of Seamless Drawn Copper Tubes, 38 feet long, 3-16 inch thick, 2 inches inside diameter, and weighing 152 pounds each.

S. OBERMAYER COMPANY, Cincinnati, Ohio, Foundry Facing and Supply manufacturers, report the volume of business as being excellent with them. Among late orders and inquiries received is one from Manchester, England, and one from one of the islands in the Indian Ocean. The company contemplate establishing a branch in a prominent city East of Cincinnati at an early date.

THE HITCHCOCK LAMP COMPANY of Watertown, N. Y., have elected the following officers: President, J. B. Taylor; vice president and treasurer, Robert Hitchcock; secretary, George B. Massey; directors, J. B. Taylor, George B. Massey, J. W. Moak, Mrs. J. W. Moak and Robert Hitchcock.

W. A. ROYCE of Newburg, N. Y., is placing on the market a patent agate enameled Drive Well Point. The gauze strainer and perforated plate are held away from the enameled surface of the perforated pipe by a spiral coil of wire wound around the pipe. A circular states that a 1¼-inch pipe, 24 inches long (exclusive of the cone to pierce the earth) yields 5½ gallons of water per minute to a steam driven pump, equal to 8000 gallons every 24 hours.

MATTHAI, INGRAM & Co., recently at 64 Reade street, New York, have moved to new and more commodious quarters at 42 Cliff street, where they will be more in the trade center with which they are connected. They have secured three lofts, the first of which will be used as an office and sample room. The second and third lofts will be devoted to the storing of stock. The increased room will allow of carrying a larger and much better assortment of the line made by this house at their factory in Baltimore, which will be availed of. The branch in this city still continues under the management of Edward H. Brooks.

DUFFY & LOVELOCK TOOL COMPANY, 154 Lake street, Chicago, has been formed for the purpose of making a line of fine Steel Tools, consisting of Crate Openers, Blacksmiths', Tinners', Bricklayers' and Carpenters' Tools, including a line of very fine quality of Carpenters' and Blacksmiths' Pincers; also a full line of Concrete Tools for use in making concrete sidewalks. It is their intention to add to their line from time to time as business may demand. The principal stockholders of the company are Arthur Brittan, A. W. Bond and George M. Lovelock, three old Hardware traveling men well known to the buyers in the country. The quality of the goods they are making should insure them a large and successful business.

THE W. DEWEES WOOD COMPANY, proprietors of the McKeesport Iron Works, at McKeesport, Pa, have recently put in operation a system by which prizes are given to the workmen on the hammet turning out the largest amount and best quality of iron in six months. Recently a cash prize of $1500 was thus divided.

TRADE REPORT.

The Iron Market.

There is somewhat of a more hopeful feeling throughout the Pig Iron market, as indicated by the business of the past week; and while prices have shown an advance in but few cases, the hope is entertained that the downward tendency has been arrested, and that the prospects are favorable for a turn in the condition of the market. Orders for Iron and Steel have been placed quite liberally during the past week, which has had a tendency to stiffen the market generally. The hand-to-mouth buying policy has been pursued for so long that buyers have been left with practically no Iron on hand, and when the market showed symptoms of a slight advance, hurried efforts were made to cover future requirements. As to the immediate future of the market, little or nothing can be said with certainty. Some makers state that the conditions surrounding the market are extremely favorable, and that the advance will not only be sustained, but that even better prices will prevail before long. On the other hand, buyers claim that the spurt in price is only of that kind which comes periodically, and in view of the large productive capacity now idle, but which can be blown in on short notice, the advance cannot be maintained for any considerable length of time. The unsettled condition of the market makes reports hard to understand. Some claim to meet with a good demand at full prices, others say that business has been taken from them at prices and on terms which show a most unusual condition of affairs. But as regards regular standard brands, business is done at the old figures, and when there is any serious shading it is either for new brands, forced sales or off-grade Iron, although unfortunately there has been a good deal of that kind of business within the past two or three weeks. As a rule furnaces appear to be pretty well sold up, but there has evidently been some unloading somewhere —either from first or second hands. It may be all the better for the market in the long run. In former times a cleaning up of odds and ends was generally the signal for a movement along the entire line, and while no one seems to look for any very decided improvement now, it is just possible that the outcome may be in the nature of another surprise. Buying in the territory tributary to the New York market continues from hand to mouth, buyers showing no disposition to contract for delivery far ahead. The market continues in buyers' favor. We quote Northern brands at $14.75 @ $15.25 for No. 1; $14 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 75 @ $15 for No. 1; $13 75 @ $14 for No. 2 and No. 1 Soft; $13.25 @ $13.50 for No. 2 Soft.

In the Philadelphia market there has been a considerable amount of Pig Iron changing hands; standard brands at quoted rates, others at such figures as circumstances would permit. There is nothing, however, to indicate any great confidence among either buyers or sellers, what strength there is being due to the fact that prices are little, if anything, beyond first cost, and solvent concerns are determined to either maintain prices or stop production. General quotations for Philadelphia and near by deliveries are about as follows:

American Scotch, No. 1X.....	$17.00	@ $17 25
American Scotch, No. 2X.....	16.00	@ 16 25

Ten days ago Bessemer Pig was quoted freely in the Pittsburgh market at $13.25 and in some instances even this remarkably low price was shaded, reports going that one lot changed hands on a basis of $13.02, Pittsburgh. These low prices brought a number of buyers into the market, and persistent attempts were made to force the price down to $13, Pittsburgh, but in only one case with success. Furnacemen who had refused to accept 25¢ less for their Iron commenced to look about, and after thoroughly sizing up the situation, announced the withdrawal of all offers below $13.25. When buyers discovered the independent attitude of furnacemen, and further saw that the next move would be in the nature of an advance, buying commenced pretty freely, and in less than 48 hours the market scored a clean advance of not less than 25¢ ₱ ton, sales having been made during the latter part of last week at $13.40 @ $13.50, Pittsburgh. The fact that one of the largest Pig Iron making concerns in this district has retired as a seller and appeared as a buyer has had considerable to do with the sudden turn taken by the market. Nos. 1 and 2 Foundry are only in moderate demand, and quotations have been slightly reduced. We quote as follows:

No. 1 Foundry.....	$13.75 @ $14.00,	cash.
No. 2 Foundry.....	12.75 @ 13.00,	"
Charcoal Foundry No. 1....	19.00 @ 20.00,	"
Charcoal Foundry No. 2 ..	18.50 @ 19.00,	"

Heavy consumers in the vicinity of Chicago seem at last to have made up their minds that Iron is cheap, and therefore have decided to anticipate their requirements for the year if able to buy at existing prices. The transactions of the past week are the largest that have taken place so far this year. Prices are now down to the lowest point ever noted in this market, and are perhaps lower than in any other Northern market for the same grades of Iron. The active condition of trade and the ease with which sales have been made recently, together with the very heavy consumption of Iron, cause manufacturers to feel that they have now seen the depth of the depression and a reaction is looked for, which may not come this month, but is expected about the time spring opens, if not before. The smaller foundries out of town are constantly in trouble, as they have recently purchased only from hand to mouth and the railroads are not delivering promptly, so that they find themselves frequently out of Iron. Complaints on this score are becoming more numerous every day. This is expected to lead to larger orders from this class of consumers to guard against occurrences of that kind. Quotations are as follows, cash, f.o. b. Chicago:

Local Coke Foundry, No. 1.....	13.25 @	13.75
Local Coke Foundry, No. 2.....	12.75 @	13.25
Local Coke Foundry, No. 3.....	12.50 @	12.75
Local Scotch...	14.00 @	14.50

During the week under review the Southern market has been extremely weak and prices are lower in consequence. Sales were not large, but on the whole fairly satisfactory. Consumers are taking advantage of the present condition of the market, and are buying in limited quantities, and each purchase helps to drive prices lower. A few furnaces are holding their prices, but as a consequence are not doing any business. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry,	$14 00 @	$14.50
Southern Coke, No. 2 Foundry,	12.75 @	13.00
Southern Coke, No. 3 Foundry,	12.25 @	12.50

Billets and Rods.—The principal event of the week has been the sale of 5000 tons of Foreign Billets to an Eastern Pennsylvania Wire mill, for re-export trade, at private terms. It is understood that there was very sharp competition among importers for the parcels of 3000 tons and 2000 tons into which the order was divided.

Steel Rails.—One Eastern mill is reported to have taken some good orders, aggregating about 20,000 tons, including 4000 tons for export to Cuba. The other works have not booked anything of consequence during the week.

Manufactured Iron and Steel.—The Plate orders for Gas Tanks referred to recently prove to have been larger than was then reported, involving as they did about 2000 tons. The Lincoln Safe Deposit building has been taken, the Beams and Structural Material for it, including about 650 tons of Beams, going to a Pittsburgh mill. The contract for the Astor residence has also been awarded. The Manhattan Life building, the largest now on the market, will be given out this week.

As yet there has been no stiffening in any of the lines.

Metal Market.

Copper.—The position of the market remains practically the same as it was a week ago. At all events, orders do not appear to have become more numerous, nor is there evidence of greater pressure to sell on the part of producers or outside holders. The fact that several thousand tons of French Syndicate Copper were unearthed in Europe not long ago is not lost sight of, nor is the probability that more may be discovered in America overlooked. In point of fact there is reason for more than a vague suspicion that the intended effect of the regulation of output and the curtailment thus far is discounted in a great measure by cautious buyers. While one side of the market may thus be somewhat uncertain, a counteracting influence exists in the fact that manufacturers of the general line of Copper and Brass on this side of the Atlantic are well employed and that prospects are favorable for increased consumption of Copper in various lines as the spring season advances.

Pig Tin.—Uncertainty as to what may be done in the way of legislation at Washington on the matter of duty on foreign Pig Tin seems to stand in the way of speculative movement, and the plain fact that leading operators have a considerable burden to take care of is also a drawback to outside venture as well as to trade purchases not dictated by imperative wants. That the latter are fully up to or above the average for the season is generally admitted, but statistics go to show that the stock on spot and afloat is unusually heavy and warrant the deduction that outside of the McKinley tariff there is nothing to prevent the natural outcome of present heavy visible supply. Harney Peak mine news suggests a tendency on the part of the managers of the enterprise to hold aloof for all the advantages that may be gained by keeping out of the market until something definite is learned as to the fate of the McKinley tariff, and thus add to the complications surrounding the market. Despite the several uncertain and not altogether favorable influences, the leading operators have succeeded in holding prices up remarkably well.

Pig Lead.—The tone of the market continues fairly strong, considering the fact that stocks in Eastern consumers' hands are apparently below the average. Speculative interest in this quarter is extremely tame; the jobbing trade are conservative buyers also, and, upon the whole, present prices appear to be quite as high as trade conditions would fully warrant.

Spelter.—The volume of business is uncertain, yet believed to be considerable. Some late advices indicate an improvement latterly in the tone of the primal markets, but most accounts go to show that the production is excessive, although low prices seem likely to lead to curtailment of output in some of the least favored sections ere long. Export outlet is narrow, and the chances for profit on shipments between present cost here and selling basis in Europe are extremely vague.

Antimony.—In a jobbing way there has been about the usual business, but dealings otherwise continue on a very moderate scale and prices remain almost stationary.

Tin Plate.—Additional large orders have been placed for ordinary Bessemer Steel Cokes, spring season delivery. In some instances a further advance of 2½¢ per box was paid, making a rise of 5¢ since the beginning of the month. Similar class of Plates has been taken on the spot rather more freely also and holders now ask about 2½¢ advance on former prices for 95 lb and lighter weights. Otherwise business continues moderate and the changes in prices are few and unimportant. No changes in prices have been made in small quantities, and there is no perceptible change in the demand for Plates.

Coal.

The Coal trade in all departments is much deranged on account of the active demand and inadequate supplies. The scarcity of Bituminous Coal since January 1 has never been so marked except when there was a general strike some years ago. In fact, the market is bare, so that many dealers attempt nothing beyond the supply of customers and in some instances are glad to get fuel of any description wherever it can be found. The price may be quoted $3.75, alongside. Anthracite of all kinds is in good supply except the steam sizes, which are difficult to get. Pea and Buckwheat really have no market price, but Pea is fairly quoted at $3.50, alongside and Buckwheat $2.50, alongside. The former has sold as high as $3.75, depending on the supply of the seller and the wants of the buyer. The combine prices hold good for all sizes, with the exceptions noted, but f.o.b. prices are no criterion, so long as prices at the point of delivery are so variable. Bituminous dealers are behind, even on their contracts.

A combination of all the railroad Coal mines in Western Pennsylvania, to be known as the Western Pennsylvania Coal Company, is being organized. It is said that 100 operators and $15,000,000 capital are already in the pool, the purpose of which is to establish uniform prices, curtail expenses and to enter into competition with the Hocking Valley pool. Only Western consumers are interested.

Financial.

The most important event of the week is the decisive defeat in the Senate of a motion to take up the bill to repeal the Sherman silver-purchasing act, a result that at once revives the question of an extra session and suggests a doubt whether anything better would follow. The latest Treasury statements are referred to as showing the urgent need for the suspension of silver purchases. The Government net gold fund is reported at $108,181,713 on January 31, a loss of $13,000,000 during the month, and reducing the surplus to the smallest figure reached since specie resumption in 1879, while gold exports are still in progress. A fact of significance in this connection is the complete falling out of gold receipts for customs duties on the part of New York, something which has never before occurred at this season of the year. Referring to prospects, Treasurer Roberts said: "When the surplus is exhausted the reserve will be drawn upon, as that is what it is there for." One of the largest exporters of gold is reported as saying, if the United States Government would give some positive assurance of preserving a parity between gold and silver, there would be less demand for gold from Europe. The Anti-Option bill having passed the Senate, now goes to the House for concurrence in numerous amendments. If the bill becomes a national law Henry Clews says: "The dealing in options will be superseded by the dealing in storehouse certificates in the same way that gold was dealt in during the war period. We can deal in wheat, corn and cotton on just as large a scale as now done in options by adopting the same method. There will, therefore, be no need of either the cotton or grain exchanges disbanding." Despite the uncertain future, business is surprisingly active for this season of the year, as indicated by the large distribution of products to consumers, the activity of the industries, the volume of bank clearings and the very heavy railway movement, some of the trunk lines being compelled to refuse freight from inability to forward it.

The Stock Exchange market was spasmodically active, the heaviest trading and the wildest fluctuations being in distilling and cattle feeding, the recent sharp decline seeming to have been only a partial check on speculation. Richmond Terminal was bought largely on the news that Messrs. Drexel, Morgan & Co. are likely to take up the reorganization. The activity in the Reading New England group was based upon news of the probable early acquisition of the Old Colony system by the Boston & Maine and Reading party, and also by a well-defined rumor respecting the future of the New England road. The decrease in the surplus bank reserve was hardly noticed. On Monday an advance in exchange had a slightly disturbing effect, until it was stated that the rise did not indicate early shipments of gold, when the movement grew stendier and then stronger, with an advance in St. Paul, in Northern Pacific preferred and in Louisville and Nashville as the feature. Gradually the whole market fell off, and selling became more liberal all around on news that the motion to take up the repeal of the Silver Purchase bill had been defeated in the Senate by 22 yeas to 42 nays and the whole list was carried downward. London houses bought some stock on the decline.

United States bonds were quoted as follows:

U. S. 4½s, 1891, extended	100
U. S. 4s, 1907, registered	113¾
U. S. 4s, 1907, coupon	113¾
U. S. currency 6s	107½

Chicago Report.

Scrap.—The improving outlook has caused a better demand for stock. Dealers quote the following buying prices:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12.50	13½¢
Machinery Cast	10.00	..
Malleable Cast	8.00	..
Stove Plate (free of burnt)	7.50	....
Burnt Iron and Grate Bars	5.50	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single		....
Sheets and Rings	12 00	....
Old Gas-Pipe and Boiler Tubes	9.00	..
Cast Borings	5.00	....
Turnings	7.00	....
Horseshoes	13.00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	5¾¢

Anthracite.—Bituminous Coal grows still scarcer and at one time last week a famine seemed impending. More factories were obliged to shut down. Anthracite has consequently been in greater demand and prices are very firm. The moderation of merchants in withstanding the temptation to advance prices is highly creditable to them. Quotations on carloads of 12 net tons are as follows:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

In response to a resolution of the House calling for information on the subject of the transit of merchandise from one port in the United States to another port in the United States, through Canada in bond, President Harrison sent in a message stating that the law did not contemplate the passing of sealed cars to any place not "a port," and that a policy adapted to the new conditions growing in part out of the construction of the Canadian Pacific Railroad should be declared.

The report to the New York Legislature of the State Board of Mediation and Arbitration argues that arbitration for the settlement of grievances and disputes should be made compulsory upon all corporations.

The Mexican treasury authorities have an arrangement that operates like a trap when deposits are made, and forfeited on account of non compliance with the terms agreed upon. Many thousands of dollars have lately been scooped into the Treasury where concessions have been canceled.

CONDITION OF THE

Hardware Trade.

OUR ADVICES generally indicate a fair movement of business, which, however, to some extent has been interfered with by the severe weather. January orders were certainly up to the average and February has opened well. Prices are without important change, and there are not as yet many indications of increasing strength. In some lines, however, there is a slight reaction from the extremely low prices which have ruled, and there is among the trade a feeling that if the volume of business for the season is as large as anticipated there must be something of an advance on certain lines.

Notes on Prices.

Wire Nails.—The last few weeks have witnessed the placing of many orders for Wire Nails, the trade taking advantage of the low prices ruling. This fact, together with the narrow margin of profit, has had the effect of giving the market a slightly better tone, and manufacturers are unwilling to quote prices which they made a few weeks ago. Small lots from store in New York are quoted at $1.75.

At a meeting of Wire Nail manufacturers, held in Chicago, February 3, the following resolution was offered and unanimously adopted:

Whereas, it has become the prevailing custom for manufacturers of Wire Nails to make sales and contracts so worded, and with such condition in favor of the buyer, that they are simply options, enabling the buyer to control the product of the manufacturer. Therefore be it

Resolved, That on and after this date no sales or contracts shall be made except for immediate specifications, or for a definite tonnage to be taken within a definite time, and subject to no guarantee nor readjustment of any sort, thus holding the buyer to his part of the agreement as well as the manufacturer:

Resolved, That this shall be published as the uniform action of all manufacturers of Wire Nails.

The following are the names of the manufacturers who unite in taking the above action:

HP Nail Company, Cleveland, Ohio.
Braeckes Wire Nail Company, Cleveland, Ohio.
Oliver & Roberts Wire Company, Pittsburgh, Pa.
Consolidated Steel & Wire Company, Chicago, Ill.
Salem Wire Nail Company, Salem, Ohio.
Newcastle Wire Nail Company, Newcastle, Pa.
A. R. Whitney & Co., New York, N. Y
New Philadelphia Wire Nail Company, New Philadelphia, Ohio.
California Wire Works, San Francisco
American Wire Nail Company, Anderson, Ind.
Arrow Company, Anderson, Ind.

Action was also taken at the meeting in regard to price. As to stocks on hand and contracts which manufacturers now have, as far as could be ascertained at this meeting, there were nearly 50,000 kegs more Nails sold than on hand. In the aggregate there were about 225,000 kegs of Nails in stocks and 275,000 kegs on contracts.

Advices from Chicago.—Manufacturers report a fair movement in Wire Nails, with increasing inquiries. They are gradually absorbing a great deal of the business which has hitherto been controlled by jobbers, and consequently do a larger proportion of the trade in single carloads and in mixed carloads with Barbed Wire. Prices were advanced at a meeting of the trade here on the 3d inst., and quotations are now made at $1.57½, Chicago, on all factory lots. The manufacturers not present at the meeting have since sent in their ideas of the action taken, the only criticism made being the very slight advance, as a higher price was wanted. This advance, however, stands a better chance of being maintained than if it was higher. Jobbers quote $1.60 to $1.65 from stock.

Cut Nails.—The market for Cut Nails has been somewhat affected by the announcement of the new price-list which was published in our last issue and which is given in a convenient form for reference in another column, inasmuch as it introduces a certain element of uncertainty owing to the fact that it is adopted by some manufacturers and not as yet by all, while the trade are unfamiliar with it and have scarcely had opportunity to consider it in all its bearings. The Eastern manufacturers with substantial unanimity have adopted it and are making it the basis for quotations. There has been, however, little business done on the new basis. The price from store in New York is $1 off list, but there is as yet no definite quotation as to the price for lots at mill, manufacturers being conservative in regard to making a price. The Western mills have not adopted the new list nearly as generally as the Eastern mills and are waiting to see how the matter is regarded by the trade. There is, however, a disposition to regard the new list favorably, and approval is expressed of the object sought to be gained—namely, the doing away with the system of averages. Expressions from some of the large dealers are in the main satisfactory to the new card, but some would prefer a card similar to the old one on which a base price should be quoted on 10d or 60d instead of having a list with a discount, as is now proposed. In another column reference is made to the views of the trade on this subject, and a comparison is also made as to the price of Nails on the old and new basis respectively.

Advices from Chicago.—The new Cut Nail price-list has not yet been used in this market as a basis of quotations so far as the writer is able to learn. Manufacturers are not believed to be adverse to it, but are waiting to ascertain how it is being accepted further East. They continue to quote on the basis of $1.60 for 30-cent average and report an unexpectedly good trade considering the inclemency of the weather, outdoor work having been almost suspended since the third week of December. Jobbers quote $1.65 to $1.70 from stock.

Barb Wire.—The Barb Wire Market is in a somewhat better condition, and manufacturers have withdrawn their extreme quotations. Prices are represented by the quotation of $2.40 to $2.45 for carload lots of Four Point Galvanized. There is also an improvement in the demand and the volume of business is referred to as good for this time of the year. Small lots from store in New York are held at $3.10

for Four Point Galvanized, or $3 for carload lots.

Advices from Chicago.— The largest manufacturers are understood to have agreed that carload prices of Painted shall not be under $2.20, Chicago. Smaller concerns have agreed to support this price, but desired the rate made $2.25. Orders continue to improve from day to day. A shortage of Rods is also beginning to be felt by the Wire trade, owing to the stoppage of two or more mills. These circumstances favor the attempt to get an advance. Jobbers here have changed their standard of quoting Barb Wire and take Galvanized, which constitutes about three-fourths of the trade. They quote it from stock at $2.60 @ $2.65 with 40 cents off for Painted.

Lawn Mowers.—The trade in Lawn Mowers continues active and it is evident that large quantities will be sold during the present year. Prices, however, continue low and irregular and have a wide range, according to the standing and quality of the different machines. The condition of business in this line is reflected in advices received from manufacturers, one of whom writes as follows:

Altogether the prospects for the coming season are very promising. Up to the present time the demand is far in excess of last year's business, and with weather favorable to this trade the business in these goods for the year will be very large.

Another manufacturer, allnding to the very general demand for cheap Mowers, writes:

The large volume of the trade on Lawn Mowers is supplied by the low-grade cheap Mowers, what we term "toy machines," but there is a substantial demand for first-class Lawn Mowers, particularly for use in parks, cemeteries and large lawns, and also from other customers who want the best Mower in the market.

Referring to the advantages of handling good Mowers and the demoralization in prices of cheap grades, we have the following from another manufacturer:

A first-class, high-grade Mower insures a feeling of security among the trade that handle it. The prices on all grades of Mowers throughout the country are being reduced year by year until little is left for the manufacturer. There will be a survival of the fittest some day.

An intimation that the manufacturers are responsible for this condition of things and a suggestion that more conservative action on their part would be advantageous are given in the following letter:

The greatest trouble with the Lawn Mower trade now appears to be the prices at which so many factories are selling. In fact, it looks to us as though the price of Lawn Mowers had pretty much gone to pieces. This strikes us as being very foolish. All the factories might just as well make a fair profit on them as to sell them without profit, and we should be glad if you were able to encourage the various Lawn Mower builders to make the prices fair, so that we can all make a little money, instead of so many selling without any profit, and compelling us all to do the same thing. This is unnatural, and should be changed.

Axes.—In mentio ning the prices of the Axes put on the market by the Standard Axe & Tool Works, Ridgway, Pa., in our issue January 21, the price of their Standard Double Bit Axe was erroneously given as $8.50 per dozen. The trade will please note that the correct price on this Axe is $10.50.

Indurated Fiberware.—As we have already announced, the catalogue of Indurated Fiberware, January 25, 1893, for the sale of which Cordley & Hayes, 173 and 175 Duane street, New York, are sole agents, gives reduced list prices on many of their goods. The revised list is given below, and is subject to a discount of 25 per cent.:

	Per dozen.
Star Pails, 12-quart	$4.20
Buggy Pails, 6-quart	3.60
Ladies or Weaver's Pail, 6-quart	3.60
Deep Fire Pail, 10 quart	4.80
Deck or Masons' Pail, 12-quart	4.80
Railway or Factory Pail, 14-quart	5.40
Milk or Dairy Pail, 14-quart	5.40
Round Bottom Fire Pail, 12-quart	5.40
Stable Pails, 14-quart	$6.00
" " 16 "	7.20
" " 18 "	8.40
" " 20 "	9.00
Pail Covers, 2 dozen in crate	3.00
Wash Tubs, No. 0, 13 inches deep, 23½ inches diameter	$21.00
Wash Tubs, No. 1, 12 inches deep, 20½ inches diameter	18.00
Wash Tubs, No. 2, 10½ inches deep, 19 inches diameter	16.00
Wash Tubs, No. 3, 9½ inches deep, 18 inches diameter	14.00
	Per nest.
Nested, No. 0 Nest, one each 0, 1, 2, 3 Tubs	$5.75
Nested, No. 1 Nest, one each 1, 2, 3 Tubs.	4.00
" " 2 " " 0, 1, 2 "	4.60
Nested, No. 6 Nest, one each 0, 1, 2 Tubs, 1, 2, 3, 4 Keelers	6.65
Nested, No. 8 Nest, one each 0, 1, 2, 3 Tubs, 1, 2, 3, 4 Keelers	8.30
	Per doz
Sitz Tubs, No. 0, 23½ inches diameter.	$24.00
" " 1, 20½ " "	21.00
" " 2, 19 " "	18.00
¼ dozen in crate, or nested one of each size.	
Keelers, No. A, 7 inches deep, 20 inches diameter	$10.80
Keelers, No. B, 7 inches deep, 18½ inches diameter	10.20
Keelers, No. C, 7 inches deep, 17½ inches diameter	9.60
Keelers, No. 1, 6½ inches deep, 17 inches diameter	9.00
Keelers, No. 2, 6 inches deep, 15 inches diameter	8.40
Keelers, No. 3, 5 inches deep, 13 inches diameter	7.20
Keelers, No. 4, 4 inches deep, 12 inches diameter	6 00
A, B, C, ¼ dozen in crate. 1, 2, 3, 4, 1 dozen in crate.	
	Per nest.
Nested, No. A Nest, one each A, B, C (3 nests in crate)	$2.55
Nested, No. 1 Nest, one each 1, 2, 3, 4 (3 nests in crate)	2.55
Nested, No. 3 Nest, one each 1, 2, 3 (3 nests in crate)	2.05
	Per doz.
Wash Basins, 12½ inches diameter, with rings	$2.80
Dish Pans, 14-quart, 5 inches deep, 16½ inches diameter, half dozen in crate	$7.80
Knife Cleaners, 5½ inches deep, 7½ inches diameter, 1 dozen in crate	$3.60
Butter or Bread Bowls, 15-inch, one dozen in crate	$4 80
Butter or Bread Bowls, 17-inch, one dozen in crate	6.00
Butter or Bread Bowls, 19-in ch	7.20
	Per nest.
Nested, 4 nests in crate	$1.50
	Per doz.
Milk or Vegetable Pans	$3.00
Chamber Pails, No. 1, 9 inches deep	10.20
Slop Pails, 11 inches deep	8.40
Slop Jars, No. 2, 12 inches deep	10.20

Spittoons.

Hight outside.	Diameter outside.	Per doz.
No. 0, 8 inches,	16 inches	$10.00
" 1, 5½ "	12 "	6 60
" 2, 5½ "	11½ "	6.00
" 3, 4½ "	9½ "	5.40
		Per nest.
Nested, Nos. 1, 2 and 3 (4 nests to crate).		$1.50
No. 0, one-third dozen in crate; others, one-half dozen.		
Spittoon Tops, No. 0, one-third dozen in crate		$4.80
Spittoon Tops, No. 1, one dozen in crate.		3.20
" " " 2, one " " "		3.00
" " " 3, one " " "		2.80
		Per doz.
Slop Jar and Spittoon Mats, 21 inches diameter		$6 60
Slop Jar and Spittoon Mats, 17 inches diameter		4.80
Trays, 11 inches in diameter, one dozen in crate		2.40
Champagne Coolers, 9½ inches deep, 6 inches diameter, half dozen in crate		4.80
Champagne Coolers, style A		6.00

Refrigerator Drips.

Hight outside.	Diameter outside.	Per doz.
No. 0, 6 inches,	23 inches	$12.00
" A, 6 "	20 "	10.80
" B, 6 "	19 "	10.20
" C, 6 "	18 "	9.60
" 1, 6 "	17½ "	9.00
" 2, 6 "	16 "	8.40
" 3, 6 "	13½ "	7.20
" 4, 5 "	12 "	6.00

First four sizes, half dozen in crate; others one dozen.

	Per doz.
Florists' Vases, No. 0, 8 inches diameter, 13 inches deep	$4.80
Florists' Vases, No. 1, 5½ inches diameter, 10 inches deep	4.20
Florists' Vases, No. 2, 4½ inches diameter, 9 inches deep	3.60
Florists' Vases, No. 3, 4 inches diameter, 6 inches deep	3.00
Florists' Vases, No. 4, 3 inches diameter, 4½ inches deep	2.40
Half dozen in crate.	

Ice water bucket, 5 gallons capacity, extreme diameter outside, 14 inches; extreme hight outside, 14 inches, crated singly $24

Handy Dishes.

Plain, or with handles or with one brass ring.

Deep.	Diameter.	Plain. Per doz.	With ring or handles. Per doz.
No 1 5½ in.	10¼ in.	$3.60	$4 00
" 2 5½ in.	10 in.	3.20	3.60
" 3 4½ in.	9¾ in.	3.00	3.35
" 4 3⅝ in.	8 in.	2.80	....

One dozen in crate.

	Per doz.
Mill Dippers, for handling dyes, etc. Two quart	$5.40
One quart	4.80

Liquid Measures.

	Per doz.
Gallon Measures	$6.00
Two-quart "	4.80
One-quart "	4.20
Pint "	3.60
No. 2 Funnel	3.00
Half dozen in crate.	
	Per nest.
Gallon nest, complete set of 5 pieces	$1.70
Two-quart nest, set of 4 pieces, including all but gallon measure	1.20
	Per doz.
No. 1 Funnel. Gallon size. 7¾ inches across at mouth, will go into 1¼-inch bunghole. Half dozen in crate	$3.60
Store Show Tubs. No. 0, 13 inches deep, 23½ inches diameter	$21 00
No. 1 12 inches deep, 20½ inches diameter	18.00
No. 2 10½ inches deep, 19 inches diameter	16.00
Quarter dozen in crate or nested.	
Pickle Tubs, for grocers' use. One size, 2 gallons	$3.60

Glass.—The National Window Glass Company is an assured fact, arrangements having been completed and the organization formed last week at Chicago. The officers of the new concern, as selected in Milwaukee and incorporated under the laws of Wisconsin, are J. A. Chambers, Pittsburgh, president; T. F. Hart, Muncie, Ind., vice-president; Geo. F. Kimball, Chicago, treasurer; F. H. Fox, Chicago, secretary. Among the manufacturers on the Board of Directors are T. F. Hart, Muncie, Ind.; William Loeffler, Pittsburgh; N. T. Depauw, New Albany; H. Sellers McKee, Pittsburgh; J. A. Chambers, Pittsburgh; T. D. Cattlin, Ottawa, Ill.; A. L. Conger, Akron, O. The jobbers selected as directors are G. F. Kimball, M. Campbell, Kansas City; Charles Baumbach, Milwaukee; Albert Drey, St. Louis; E. W. Palmer, Cleveland, and William Reid, Detroit.

Fully 93 per cent. of the manufacturers and jobbers of American Window Glass are included in the company, and the capital represented exceeds $50,000,000.

The company are incorporated under the laws of Wisconsin with a capital of $200,000, which has been subscribed to by manufacturers of Pittsburgh, Wheeling, Ohio, Indiana and other Western States, also by jobbers in different parts of the country. A forfeiture clause has been inserted in this new agreement by which each manufacturer who joins the company must post a forfeit of $100 for each pot in his factory. Jobbers were called upon to subscribe in proportion to their stock, the money deposited, otherwise capital stock subscribed, being held as forfeit. It is understood that over $200,000 in forfeits has been posted by members of the company. This money has been paid to the treasurer of the company, and it is agreed that the forfeits shall lapse into the general treasury whenever a manufacturer or jobber is found cutting prices. It is the purpose of the company to control and maintain prices, and the company will fix prices and negotiate terms with organized labor; but the management of plants and sale of Glass will be left to the factory owners. The company will not have power to order any plant or plants to cease operations at any time that the condition of the market might seem to warrant closing down. New prices were adopted at the meeting, to take effect immediately, applying to the present list, as follows: Two thousand boxes in one order and at one shipment, 80 and 10 and 10 per cent. discount; carloads of 400 boxes, 80 and 15 per cent. discount; 100 boxes or over, 80 and 10 per cent. discount; less than 100 boxes, 80 and 5 per cent. discount. A committee was appointed at the same meeting to revise the Glass list. The volume of business in American Window Glass shows no increase since our last report. French Window Glass is also quiet and price weak. It is reported that imported Glass can be bought at from 80 per cent. discount to 80 and 5 per cent. discount. American Plate Glass is unchanged in price and is in limited demand. Present quotations are as follows:

American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; 100 boxes or over 80 and 10 per cent. discount; less than 100 boxes, 80 and 5 per cent. discount. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	@	.03
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔ lb.	@	.04½
Wringer Wire Rolls, ℔ lb. .01	@	.02
Syringes, ℔ lb.	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb	10¢
Light and Tinned Copper	℔ lb	9¢
Heavy Brass	℔ lb	7¢
Light Brass	℔ lb	6¢
Lead	℔ lb	3½¢
Tea Lead	℔ lb	3½¢
Zinc	℔ lb	2½¢
No. 1 Pewter	℔ lb	14¢
No. 2 Pewter	℔ lb	7¢
Wrought Scrap Iron	℔ gross ton,	$17.00
Heavy Cast Scrap	℔ gross ton,	10.00
Stove Plate Scrap	℔ gross ton,	7.00
Burnt Iron	℔ gross ton,	5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No 1 White Rags	℔ lb	4 ¢
No. 2 White Rags	℔ lb	3 ¢
Mixed Rags	℔ lb	1¼ @ 1¾¢
Blues and 3ds	℔ lb	1¾ @ 2 ¢
Hard Sized White Shavings	℔ lb	2¾ @ 3 ¢
No. 1 White Book Shavings	℔ lb	2½ @ 2¾¢
No. 2 White Book Shavings	℔ lb	1½ @ 1¾¢
Light Book Shavings	℔ lb	⅞ @ 1 ¢
No. 1 Mixed Shavings	℔ lb	1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @ ⅞¢
No. 1 Printed Books	℔ lb	1⅝ @ 1½¢
Ordinary Mixed Books	℔ lb	¾ @ ⅞¢
Newspapers	℔ lb	½¢
No. 1 Manila Paper	℔ lb	1½ @ 1¾¢
No. 2 Manila Paper	℔ lb	⅞ @ 1 ¢
Bogus Paper	℔ lb	⅝ @ ¾¢
Common Paper	℔ lb	½ @ ⅝¢
Straw Chips	℔ lb	½ @ ⅝¢
Binders' Clippings	℔ lb	½ @ ⅝¢
Jute Butts	℔ lb	1½¢
No. 1 Jute Bagging	℔ lb	1¼ @ 1⅜¢
Mixed Bagging	℔ lb	1 ¢
No. 2 Bagging	℔ lb	¾¢
Hemp Twine	℔ lb	2½¢
Manila Rope	℔ lb	2½¢
Jute Rope	℔ lb	1¾ @ 2 ¢
Mixed Rope	℔ lb	¾ @ ⅞¢

THE ANSONIA BRASS & COPPER COMPANY, New York, have issued a general price-list of Brass and Copper, Tobin Bronze, &c., for 1893. While comparatively few changes have been made in the lists, the catalogue is larger than their former editions, and contains much valuable matter in tabulated form of weights, sizes, &c. The company have made extensive additions to their mills during the past year, including new and improved machinery, which will enable them to execute orders promptly for special goods They will also carry larger assortments of sizes in stock than heretofore.

The Price-List on Cut Nails.

From the Merchant's Point of View.

THE MATTER of determining the advantage and disadvantage of the price-list of Cut Nails is a somewhat complicated one, and merchants are in many cases unwilling to express themselves on the question. A leading jobbing house in the East refer to the list as a good thing for the manufacturers and are disposed to regard it favorably, although they feel it will lessen the jobbers' profit, but as it saves the annoyance of obtaining a memorandum of sizes before making quotations they are, on the whole, pleased to have it adopted. A jobbing house in Western New York say:

While we have looked over the new price-list, we can hardly as yet form a correct opinion as to how it will act. We believe it will take some time to educate our trade to its use, but we are inclined to believe that after we become familiar with it it will prove entirely satisfactory.

One of the leading jobbing houses of the country state that while they may have a positive opinion on the subject after they have had an opportunity to test the price-list practically, they can at present only speak generally. They regard a change in the card as a good thing, because the Cut-Nail trade has for a long time been in a rut, and almost anything in the way of a change is preferable to the existing condition of things, even if the benefits derived should eventually prove to be only slight.

A prominent Western jobbing house criticise the classification adopted, which puts all heavy Nails from 10d to 60d at the same price. This is an arrangement which they think will be found in practice to work badly. At the same time they are strongly in favor of the adoption of a new price-list, which will do away with the very objectionable practice of quoting prices based on averages.

A leading Chicago jobbing concern declare that they are not strongly opposed to the old card, and reserve an opinion as to the new one until they find that it will give the jobber some advantages which he does not now possess. They state that they have not experienced any special annoyance from the practice of selling Cut Nails on averages.

Another prominent Chicago jobbing

National Price-List of Cut Nails.

January 31, 1893.

Subject to Discount $.... Per Keg on All Sizes Alike.

	2	3	4	5	6	7	8	9	10	12	16	20	30	40	50	60
Common, Fence, Heavy Brads, Sheathing	$3.75	3.55	3.35	3.35	3.20	3.20	3.10	3.10	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Fine Blued and Fine Finishing	4.35	4.00	3.60	3.60	3.45	3.45	3.30	3.30	3.20	3.20	3.20	3.20				
Casing, Flooring, Box, Slating and Eastern Finishing	4.25	3.65	3.50	3.50	3.35	3.35	3.20	3.20	3.10	3.10	3.10	3.10	3.10	3.10		
Tobacco Box Nails, lining			3.35	3.35	3.20	3.20										
Tobacco Mfgs. Box Nails, caddy	4.00	3.75	3.75													
Warehouse Cooper and Tobacco			3.65	3.65	3.50	3.50	3.35	3.45	3.25							

Cut Spikes, all sizes, $3.10.

Inch	¾	⅞	1	1 1/16	1⅛	1¼	1⅜	1½	1¾	2	2¼	2½	2¾	3	3½	4
Clinch								3.90	3.90	3.75	3.75	3.60	3.60	3.50	3.50	3.50
Light Barrel and Lining	4.25	4.00	3.75	3.75	3.50	3.50	3.40	3.40								
Barrel	4.15	3.90	3.65	3.65	3.40	3.40	3.30	3.30								

10 cents extra for each half keg.

house advise us that they do not favor the new price-list, because it attempts to establish a special price on each size of Nails. This, they think, will result in buyers splitting up their orders among sellers whenever there is close competition for business and parties are asked to submit prices. In order to conduct business under the new price-list, it will be necessary for buyers to submit their specifications in advance so that prices may be made intelligently. Nevertheless, they hope the manufacturers may be able to do something to put the Nail trade in better condition than has so long prevailed.

In order to illustrate the bearing of the new price-list on the price of Nails we give below the cost of an assorted carload on the old and the new basis. It is obvious that the price will depend on the discount taken from the list, and it is as yet undetermined what this discount will be. In the calculation which follows the price is supposed to be discount $1.25 on a carload lot, f.o.b., but some manufacturers express the opinion that the discount on such lots will be $1.20. The following is the cost of an assortment of 250 kegs at $1.40 basis, f.o.b. mill, upon a 35-cent average:

3d Fine,	10 kegs....	$1 50 extra		$15.00
4d Flat,	5 "	.60		3.00
4d Common,	5 "	.60		3.00
5d "	5 "	.60		3.00
6d "	25 "	.40		10.00
8d "	60 "	.25		15.00
10d "	70 "	.20		14.00
12d "	30 "	.15		4.50
20d "	10 "	.15		1.50
40d "	5 "	.05		.25
8d Finishing,	10 "	1.00		10.00
10d "	10 "	.85		8.50
60d Common,	5 "	....		....
	250 "	at 1.40 basis		350.00
				$437.75

The following is the cost of the same assortment purchased at a discount of $1.25 from list, January 31, 1893, f.o.b., mill:

3d Fine,	10 kegs.....	$4.00		$40.00
4d Flat,	5 "	3.35		16.75
4d Common,	5 "	3 35		16.75
5d "	5 "	3.35		16.75
6d "	25 "	3.20		80.00
8d "	60 "	3.10		186.00
10d "	70 "	3.00		210.00
12d "	30 "	3.00		90.00
20d "	10 "	3.00		30.00
40d "	5 "	3.00		15.00
8d Finishing,	10 "	3.20		32.00
10d "	10 "	3.10		31.00
60d Common,	5 "	3.00		15.00
	250			$779.25
250 kegs at $1.25 per keg.				312.50
				$466.75

It will thus be seen that on the assortment named above, which is perhaps a fairly representative one, the Nails under the new list at the discount named cost $29 more than on the former basis.

The matter is regarded from the retailer's standpoint in the following letter:

In looking over the national price-list of Cut Nails from a retailer's point of view we are pleased with the idea of buying Nails at a discount—or, more properly, at a rebate—as this plan is right in line with buying other Hardware, so it will not take long for us to become educated to the new price-list. It will also be convenient in selling a bill of Nails, as we can hand the price-list to a customer and say, "We will sell you all the Nails you want at 25 cents off of the prices." It does away, also, with the trouble of figuring averages, which we never could remember about from the time we bought one carload until we needed another. Then, too, at the same discount each kind of Nail will cost us the same, whether bought now or in six months. With this price-list there will be no temptation to purchase a lot of fancy Nails, which locks up capital, to secure a high average and low prices on a carload. So much for the advantages. The manufacturers claim that the price-list is honestly figured on the actual cost of manufacturing each size, and that the arrrangement has proved such that averages cannot be figured and make money. We are not prepared to say in so short a time how the new prices are going to work with our customers. The 8d and 10d Nails, which constitute two-thirds of the Nails sold, are higher than before; and whether the fact that fancy Nails are lower will console them for paying more for the larger quantity of Nails used or not, remains to be seen. Then those of us who have a quantity of fancy sizes, enough to last us for a year or two, have to pay more for the common Nails to work the fancy sizes off. As far as we have compared the old card and the new price-list we find that on the new basis prices will be lower on a former low average, and higher on a former high average. We think on the whole that a change is desirable, and trust that this may be found practical.

Trade Notes.

F. E. MYERS, of the firm of F. E. Myers & Bro., Ashland, O., manufacturers of the Myers Pumps and Hay tools, left Tuesday on a trip that will be full of interest and enjoyment. He goes on an excursion of business men to Mexico and Cuba, and will remain a month. The excursion was originated by the Australasian Publishing Company of New York. Mr. Myers will join the excursion at Columbus, O., go with the party to St. Louis, from there to Mexico, spend a week or more there, then visit Cuba and return by way of ocean steamer to New York. Mr. Myers will combine business with pleasure.

THE FIRM OF MELDRUM & JONES, Room 407 Commerce Building, Louisville, Ky., was recently established for the purpose of acting as sales and purchasing agents in the Iron, Metal and Hardware lines. The young men composing this firm have been for the past nine years in the employ of one of the best known Hardware and Iron houses in Louisville, and they have an extensive acquaintance among dealers in their line in Louisville and the South. They would like to open up correspondence with dealers in the lines they represent who are desirous of representation in that section.

IRON CLAD MFG. COMPANY, 22 and 24 Cliff street, New York, in a circular to the trade, under date of February 3, 1893, state that the Habermann Mfg. Company are offering for sale a variety of Gray Ware, which the Iron Clad Mfg. Company are advised by their counsel is an infringement of patents owned by them, and that they shall immediately commence proceedings to protect their interests and enforce their rights by due process of law.

WRIGHT & COLTON WIRE CLOTH COMPANY, Worcester, Mass., have in operation, in addition to their wire weaving business, a plant for the manufacture of Wire, which they are prepared to furnish, including Annealed and Bright Market, Annealed Stone or Weaving Wire, Tinned, Stone, Broom and Matress Wire; also Steel Spring and Coppered Wire. A specialty is made of Market and Stone Wire, also of Straightened and Cut Wire. Their Hard Steel Galvanized Wire Poultry Netting is meeting with large demand, and it is expected that their mill will have to be run nights very soon in order to furnish the requisite amount of Wire for Poultry Netting and Wire Cloth.

Englishmen have cleared 18,000 acres of land for a sugar plantation in the island of Lambasoe, of the Fiji group.

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THE TIN SHOP.

Triangulation in Pattern Cutting.—XX.

By Triangle.

(*Conclusion.*)

PATTERN FOR THE FRUSTUM OF A HEXAGONAL PYRAMID.

In Fig. 150 is shown the finished article which the pattern is for. In Fig. 151, let E F G H represent the elevation, M N is drawn the corresponding plan. By extending the side lines of the two elevations until they meet we have the apex of the pyramid of which either elevation is the frustum. As shown by Y and Y″, which are connected by the broken line Y Y″, the two pyramids are of the same hight. The pattern for one of the sides could be obtained from the plan and elevation as follows: Place the T-square at right angles to any side of the plan, as R Q, and drop lines indefinitely from the points necting *r x w f* the pattern for one of the faces would be the result. The pattern can be proved to be right by erecting the perpendicular E F, which should be of the same length as E F of elevation A, which gives the slant hight of one of the sides. If the pattern for the entire article is required, a convenient method for obtaining it is shown in Fig. 152. With Z as center, and Y″ M′ as radius, describe an arc indefinitely, as *m m′*, and with the same center, another arc, with Y″ S″ as

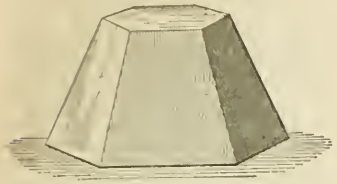


Fig. 150.—*View of the Finished Article.*

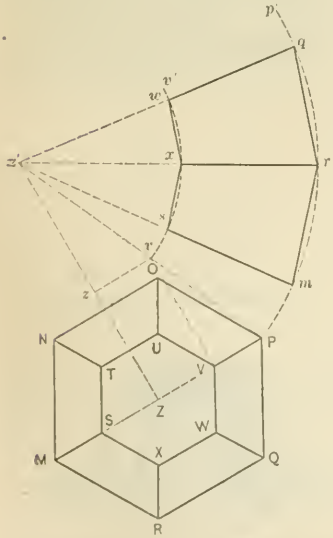


Fig. 153.—*Section Drawn on Miter Line.*

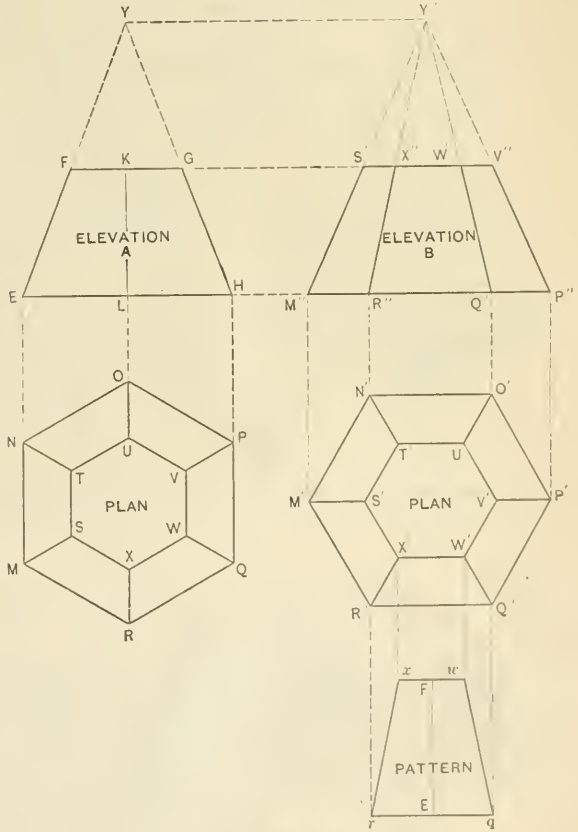


Fig. 151.—*Plan, Elevation and Pattern.*

PATTERN OF FRUSTUM OF HEXAGONAL PYRAMID.

O P Q R the plan of base, and S T U V W the plan of top. In elevation A, the figure is so placed that one of the angles, as L K, is to the front, while E F gives the slant hight of one of the sides. By drawing the elevation as shown in elevation B, we have the length of one of the angles shown by M″ S″, or the distance as measured on the finished article from M′ in the base to S′ in the top. Under elevation B in plan, as from R′ Q′ and X′ W′. With the T square placed parallel with R′ Q′, at a convenient point, draw the line *r q*, cutting the lines drawn from R′ Q′, as shown. As M″ S″ of elevation B gives the length of one of the angles, with *r* and *q* as centers, and M″ S″ as radius, describe arcs cutting the lines dropped from X′ W′, and connect the points by a line drawn through them, as shown by *x w*. By con- radius, as shown by *s s* of pattern. Through one extremity of each, to the center, draw a straight line, as shown by M S Z. Set off on the arc *m m′* spaces equal to the sides of the plan of the base of the article and connect the points with chords. Thus make M N of the pattern equal to M′ N′ of the plan, and so on. Also from these points in the arc draw lines to the center, cutting the arc *s s′*, as

shown. Connect the points thus obtained in this arc by chords, as shown by S T, T U, &c. Then M S S° M° will be the required pattern. As previously stated, M″ S″ of elevation B gives the length of one of the corners, and E F of elevation B the slant hight of the sides. By taking drawn from the center of the plan through one of the angles of the figure, as shown by Z P. Erect the perpendicular Z z, in length equal to the straight hight of the article (shown by L K in elevation A), and at V erect another perpendicular, V v, of the same length. Draw z v and v P. We z' as center, and z' P as radius, describe an arc indefinitely, as shown by P p, and with the same center, and z' v as radius, another arc, shown by v v'. The pattern would then be completed as in the previous example.

In Fig. 155 is shown a duplicate of the plan, from which by the aid of triangles we will proceed to describe the pattern by triangulation. In practice, the half plan or the plan of one of the sides, as R X W Q, would be all that would be necessary for describing the pattern by the aid of triangles. For the triangles proceed as follows: At right angles to R X draw X x', in length equal to the straight hight of the article, and connect R x', which gives the distance from R in the base to X in the top. We will require the distance from X in the top to Q in the base, which we procure by drawing the diagonal X Q and erecting the perpendicular X x, equal to the straight hight of article, and connecting Q x. A diagram of triangles similar to those drawn on plan is shown in Fig. 154.

For the pattern shown in Fig. 156 proceed as follows: Draw the line R″ x'', in length equal to the hypotenuse R′ x'. With R″ of pattern as center, and R Q of plan as radius, describe an arc (Q″), which intersect with one struck from x'' of pattern as center, and the hypotenuse Q x as radius, thus establishing the point Q″ of pattern. With x'' of pattern as center, and X W of plan as radius, describe another arc (w''), which intersect with one struck from Q″ as center, and R x' of triangle as radius, thus establishing the point w'' of pattern. Lines drawn through the points obtained, as shown by R″ x'' w'' Q″, will form the pattern for the face of article shown on plan by R X W Q. As the other faces of the article are alike, it is quite evident their patterns can be obtained in a similar manner, as shown by the pattern contained in O″ u'' $u°$ O°.

As has been previously explained, models can be made of cardboard by pricking

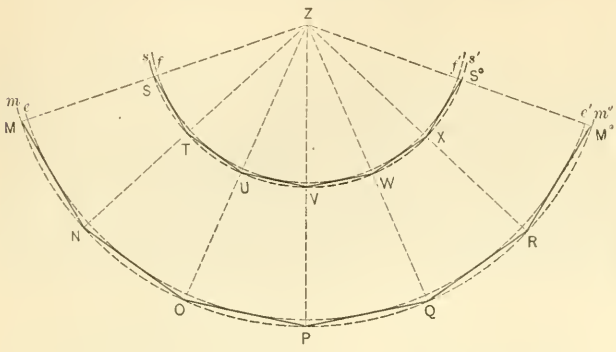


Fig. 152.—Envelope of Frustum of Hexagonal Pyramid.

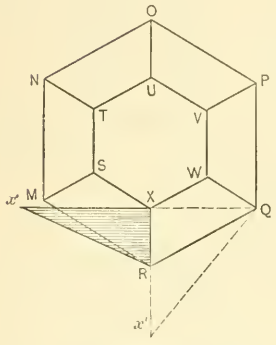


Fig. 155.—Triangles Drawn on Plan.

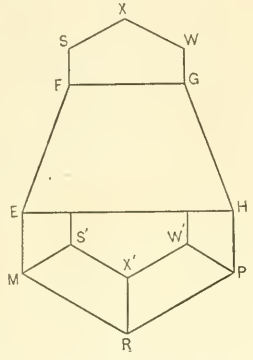


Fig. 157.—Pattern for the Model.

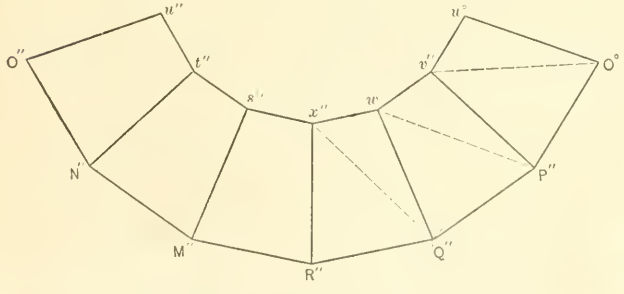


Fig. 156.—The Pattern Shape.

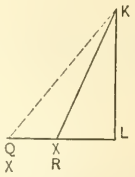


Fig. 154.—Diagram of Triangles.

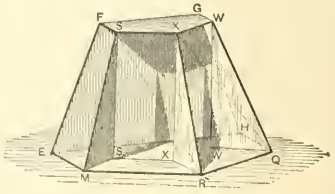


Fig. 158.—Model Derived from Pattern Shown in Fig. 157.

PATTERN FOR FRUSTUM OF A HEXAGONAL PYRAMID.

Y E as radius, and striking an arc from the center Z, as show by e e', we see that the arc touches the chords previously drawn. The same result is obtained by striking the arc f f', with Y F as radius.

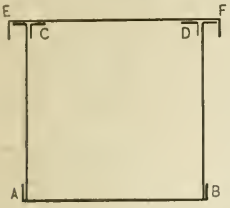
Another method for obtaining the pattern and without the elevation is shown in Fig. 153. The first step would be to construct a diagonal section, the base of which shall correspond to one of the lines have now produced a section of the article as it would appear if cut on the line Z P. Produce Z z and P v until they intersect at z'. Then z is the apex and P z' the side of a right cone, the plan of which, if drawn, would circumscribe the base of the frustum. P v z' is the same as P″ Y″ Y″ in elevation B.

To describe the pattern from the plan and diagonal section thus obtained: With through the points in pattern, drawing the required lines, cutting out the cardboard pattern, and after cutting half way through the cardboard on bending lines, it can be formed as desired. The joining can be done by means of a hot wire and pieces of sealing wax. In Fig. 157 is shown the pattern for the model in Fig. 158. To draw the pattern: Make E F G H equal to elevation B, below which draw

the half plan, as shown. Above F G draw the half plan of top. The pattern is to be bent at right angles on F G E H. Three triangles similar to V *v* P in Fig. 153 can be cut out and placed with their bases on the base lines M *s'*, R *x'*, P *v'* of plan, as shown in Fig. 158. The dotted lines S R and X Q in model, which correspond with Q *x* in Fig. 155, can be represented by means of colored thread.

Construction of Incubator Tank.

From J. C., *Factoryville, Pa.*—I have a "square" incubator tank to make that is to be 3 feet long, 15 inches wide and 15 inches high. There is to be no opening in the tank except a small one for a faucet.



Construction of Incubator Tank.—Fig. 1.—First Method of Forming.

I would like to be informed of some method for keeping the sides of tank in position while putting on the top after the bottom is on. While the bottom can be double seamed, a stake could not be held inside for securing the top in a similar manner. If the top is paned on, the sides are liable to spring in, especially while being soldered.

Answer—There are a number of methods by which the top can be joined to the body of tank after the bottom has been

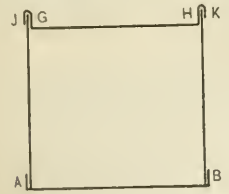


Fig. 2.—Second Method of Forming.

put on. In Fig. 1, which is a sectional view of tank, it will be supposed that the bottom has been joined to body by double seaming or any other convenient method, as indicated at A B. Suitable edges are

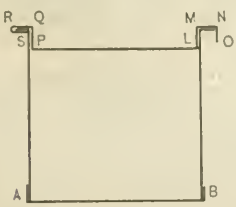


Fig 3.—Third Method of Forming.

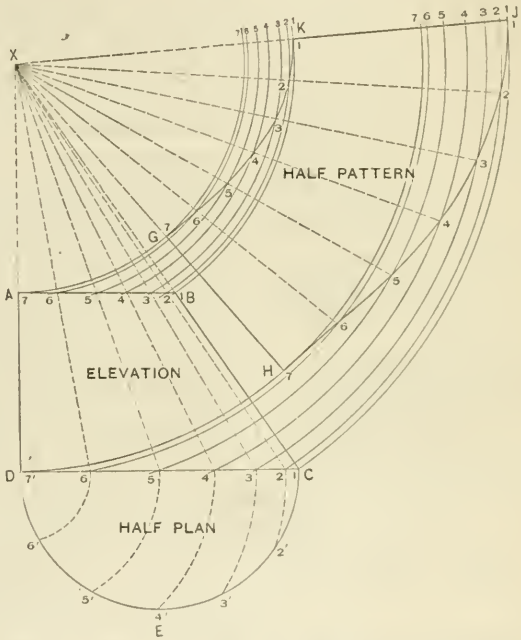
to be turned on the tank and also on the top, as indicated by E and F. Cleats can be fastened to the top as shown by C and D, which will hold the sides in position while the edges E F are being turned over. The soldering could then be done with little difficulty. By this method the edges, as E and F, would project beyond the body of tank, which might not be desired.

In Fig. 2 the method shown is such as is used in closing the ends of furnace square pipes. In this figure the bottom is supposed to be joined to the body by any convenient means. The top is formed as indicated by J G H K, and the edges, as represented by J and K, can be closed against the sides of tank so the soldering can be done conveniently.

In Fig. 3 is shown a method by which the top can be double seamed after the bottom is on. The usual edges are to be turned on the body, and the top formed as shown by L M N O. It is then to be placed in position on the tank and the edges similar to N O turned over as indicated by Q R S. After this operation has been performed the edges which are as shown by Q R S can be turned over against the body of tank, the result being similar to double seaming.

Pattern of Irregular Flaring Article.

From J. S., *St. Louis, Mo.*—Can some of the readers of *The Metal Worker* inform me, through its columns, regarding a short or easy way for obtaining the pattern of an irregular flaring article having one side vertical. The way I lay out the pattern takes too much time when one is in a hurry, hence a short or easy rule would be found very convenient at times. The method I use for obtaining the pattern is as follows: Let A B C D represent the elevation, and D E C the half plan of base. Produce A D and B C to X, which is the apex of cone of which A B C D is a frustum. Divide the half plan of base into any convenient number of equal parts with D as center. From the points in D E C describe arcs cutting D C, and from the points thus obtained in D C carry lines to the apex X. From the apex X draw the line X J. With X as center and from the points in D C strike arcs cutting X J. In a similar manner, with X as center and from the points in A B, strike arcs cutting X J. Set the compasses to the space D 6' of plan, and, starting from J, step from arc to arc, thus laying out the stretchout of D E C. From the points thus obtained draw lines to X cutting the arcs struck from A B. Draw lines free hand through the points in H J and G K, thus completing the half pattern.



Pattern of Irregular Flaring Article.

Note.—The pattern of article is usually obtained by the method shown by our correspondent, or by triangulation. If any of our readers have a short or easy way for securing the same result, will they comply with our correspondent's request and send the same for publication in *The Metal Worker?*

The construction of the first Hurst gun, with its "reinforced multicharge cartridge," was commenced in Washington last week, $50,000 having been appropriated by Congress for this purpose. The sum of $150,000 was paid for the right to manufacture.

Advices from Buenos Ayres show that, besides revolutionary disturbances within Argentina, relations between that country and Chili are strained to a dangerous point. Complications which arose during the struggle ending in Balmaceda's defeat are still a constant source of irritation.

WORLD'S FAIR NOTES.

Cold Weather Retards Progress.

The big Manufactures Building is a busy place these days. Between 200 and 300 carpenters are at work erecting the booths. It is somewhat odd that foreign exhibitors are about the first on the ground. Some 60 carpenters more are engaged in constructing the additions to the galleries across the pavilions. The floor space in the building is being increased in this way by nearly two acres.

The booths of the great European powers are really large buildings. In any other structure on the grounds they would look out of proportion, but under that great arch they are not over large. The great clock tower is up to the second story. The French Building is boarded up on the inside. The booth of Doulton & Co., the English potters, is going ahead rapidly. The skeleton frame was shipped from England, but the rest is being made by Chicago firms. Sage & Co., the London cabinet makers, have another booth near by nicely started. It was shipped ready to be put together. Forty carpenters are employed on the Tiffany Building, and five Japanese workmen have their structure so far along that it can be said to be a rival in tastiness to any other which may be erected hereafter. All these are under the main arch. New South Wales is building its booth in the west pavilion gallery. At times the sounds of the hammers become merged in one grand roar.

The guards say that during the cold spell it was colder in the building than out of doors. By March 1 the vast space will be well broken and a good idea of the way the Manufactures Building will look can be obtained.

Among the State buildings the cold weather was much more disastrous to construction than elsewhere on the grounds. In the great California Building the force was at one time reduced to three lathers. A solitary painter on Wednesday was trying to cover the wide expanse of the Michigan Building's exterior. He was the sole survivor of a large gang, which had dropped off one by one. Two carpenters were engaged on the Indiana Building. They were cold, extremely cold. Work was entirely suspended on the Washington State Building. A few men were engaged in finishing work at the other State buildings.

After a brave endeavor the contractors for the Illinois Building completed that structure and withdrew their last workmen Wednesday. The State Board examined the structure and probably will accept it. The cold added greatly to the cost of the interior decorations.

Work has not stopped for a day all winter on the Live Stock Pavilion. It was all outdoor work, and the frozen ears, noses, fingers and toes if collected would make a fine anatomical museum.

After a heroic struggle with the cold the construction gang on the electric elevated road surrendered a fortnight ago. It was hoped that the road could be placed in running order by April 1 in order to reap a good revenue from the large fair population of that month, but the delay will prevent the operation of the road until nearly the time for opening the fair. The contractors will put every man available on its construction at the earliest date.

The carpenters kept things moving at the railway station until a few days ago. Finally they called off from the uncqual contest until frozen fingers were not so common.

The greatest center of attraction at this time is undoubtedly Machinery Hall. There one hears the greatest amount of noise, finds the most activity, and sees by far the largest number of laborers at work. Every day there are 350 masons, shovelers, dirt wheelers, and all-around handy men employed on the construction of foundations for heavy machinery that is to be used in the power plant of the great exposition. The scene is both interesting and exciting. Inquiry among some of the foremen and superintendents elicited the information that while this particular department is well advanced there is yet sufficient work before them to keep large gangs going night and day in order to get out of the way of other forces coming on soon to place the machinery and put it together.

Taking into consideration the fact that nothing has ever been attempted in the way of a plan for furnishing steam and compressed air power that can be compared to this display, and only 80 days still remain in which to complete it, great activity is an absolute necessity. The plant covers a space 1100 feet in length by about 150 feet in width, exclusive of the space taken up by the boilers in an annex to the main building. The ground dimension of that entire area is being excavated to a depth of 10 feet below the floor surface and filled almost solidly with stone and brick masonry on which the engines will be placed and bolted down.

Topographical Map of Illinois.

An accurate topographical map of Illinois, made under the direction of the State World's Fair Board, is almost ready to be sent to the Illinois Building at Jackson Park. A prominent place in the building has been reserved for it, because it is believed to be the only map of the State in existence that is anywhere near correct. C. W. Rolfe, who collected the data used in making the map, says that on the best map of Illinois ever published 1382 important corrections have been made. These corrections refer chiefly to the location of railroad stations, the length and course of streams, the location of lakes and their number, the position of railroad lines and the boundaries of counties and the State line. Of course some of the corrections would not be considered important by many people, while the importance of other changes would be recognized at once. One town was found 18 miles from the place the maps located it and 12 streams were discovered to be running in directions exactly opposite the course indicated on standard maps; 193 towns were found to be from a quarter of a mile to a mile out of the way and 43 were from 3 to 7 miles from the places fixed on regular maps for them.

The map prepared by Mr. Rolfe is to be one of the big things of the Illinois show. It is 10 feet wide and 16 feet long, modeled in clay. A number of experts at the University of Illinois are just putting the finishing touches on it. The map will cost $15,000. Engineering corps were put in the field more than a year ago to collect data. Mr. Rolfe realized the need of taking advantage of all the data that had previously been gathered, and in doing this he saved great expense.

Some years ago a committee of the Western Society of Engineers reported that an appropriation of $20,000 a year for 56 years, or $1,120,000 in all, would be required to make an accurate topographical map of the State. Mr. Rolfe and his assistants used the data collected by the Mississippi River Commission, which included a line of levels from Cairo to Dunleith; a line of levels from Fulton to Chicago along the St. Paul Railroad, and a series of topographical charts of the Illinois share of the Mississippi and the low water slope of the Mississippi. From the lake survey he got a series of geodetic stations between Chicago and Olney. The Canal Commission furnished data of low water levels of the Illinois River. Topographic charts of the country between Chicago and Peoria were secured from the United States Geologic Survey and a line of levels from Olney to St. Louis and from Centralia to Cairo, with low water levels of the Ohio and Wabash rivers, were furnished by the Coast and Geodetic Survey.

These statistics were supplemented by data of the preliminary survey of the Hennepin Canal and profiles of every railway line in the State. The exact relations of the railroads at intersecting points were ascertained, and the profiles of the roads checked on each other, using those that had been corrected by United States data as master systems. To the outline so established, the details of the surface were added by traverses, with barometer and hand level, arranged to intersect railroads as often as possible, and practically to bring the observer within sight of every section of land in his district. Prominent points, either of elevation or depression, were visited and observations made upon them. Many cross checks and other means of correction were applied to overcome errors in atmospheric pressure, instrumental irregularities and errors of observation.

Finally, the results obtained were expressed in contour lines on the maps. Care was taken to make the maps more correct in their horizontal features than any heretofore published. The locations of towns and courses of streams were in most cases either verified or corrected.

This great map will show the precise location of every town and railway station in the State, the position of all the public buildings and State institutions and township and county boundaries.

Rules for Placing Exhibits.

Director-General Davis and Director of Works Burnham have agreed upon a set of rules for the government of exhibitors in the matter of installing exhibits. It is desired that the installation shall be artistic and harmonious throughout. Cheap arrangements will not be permitted, and designs must prove satisfactory to the Director of Works and the several chiefs of departments. The regulations, which are of interest to every intending exhibitor, are as follows:

Method of procedure when an exhibitor wishes approval of designs, location and style of foundations, sort and arrangement of lights, power, sewerage, water, gas, &c.:

1. Exhibitors shall submit full drawings, specifications and details to the chief of department in which the exhibit is to be installed, together with his address and office hours, and agree to hold himself ready during the following 48 hours to meet and further explain such drawings, specifications and details to those engineers whom it may be necessary to consult.

2. The chief of department shall thereupon be charged with obtaining approval from the Director of Works or his assistant of the drawings, specifications and details submitted so far as it shall be necessary to do so.

3. The chief of each department shall have a fixed hour before noon each day in which to see exhibitors, and the drawings and information necessary shall be sent to the Director of Works by or before 12 o'clock each day.

4. The Director of Works shall have a special secretary to attend solely to this work, who shall have special quarters at the Service Building in Room 18.

5. Such engineers and architects under the Director of Works as may be called on to pass upon matters for exhibitors pertaining to designs, construction, water, gas, mechanical and electrical engineering, &c., shall meet each week day at 1 o'clock p.m., in the office of said secretary, and shall pass upon all matters submitted in this behalf, and on the blanks provided for the purpose their findings in each case shall be recorded and at once signed by the Director of Works or his assistant and transmitted to the chief of the department whence it originated.

6. The chief of the department shall thereupon at once issue the permit to said exhibitor and he shall be allowed to proceed in accordance with its terms.

7. Exhibitors will furnish such duplicate plans, drawings or specifications as may be required by the Director of Works.

Stockholders are Paying Up Well.

Exposition stockholders have paid up well. In his report to the Board of Directors yesterday Auditor Ackerman showed that on 597,650 shares of stock of the value of $10 each $5,509,767 have been paid, leaving an unpaid residue of $466,733, or approximately 7.8 per cent. of the whole.

According to Treasurer Seeberger's monthly report, there is a balance in the treasury of $573,879. His report shows further that from the sale of souvenir coins $836,438 has been received, as well as premiums on the same amounting to $10,000. This applies to the coin secured by the Remington people. The total disbursements and receipts are set forth by Treasurer Seeberger as follows:

Balance received from temporary organization	$4,252.64
Received on current installments of stock subscriptions	5,423,496.20
Received from banks, interest on deposits to January 31	65,368.53
Received from City of Chicago account sale of bonds	5,003,726.06
Received for souvenir coins	836,438.00
Received for premium on souvenir coins	10,022.28
Amount of gate receipts at Jackson Park to February 8	193,093.26
Received account debenture bonds	3,617,500.00
Received account accrued interest on debenture bonds	16,866.61
Miscellaneous receipts from sundry sources	351,672.82
Received various stock subscriptions not yet classified	108.40
Received from various deposits on contracts, being amount on hand to credit of escrow account	79,000.00
Received from Dept. Public Comfort	1,875.00
Total	$15,603,419.80

DISBURSEMENTS.

Total disbursements on vouchers, as per daily report to auditor	$15,029,539.97
Total cash on hand	573,879.83
Total	$15,603,419.80

And Again the Boiler Suit.

The famous boiler contest has taken a new turn and now the advantage of the situation seems to rest with the Stirling Boiler Company. After the Master in Chancery, Winchester, filed a report in which he recommended an injunction restraining the fair management from allowing the Stirling Boiler Company to put its boilers in the space allotted to the Babcock & Wilcox Company, and also recommended that the court compel a specific performance of the contract between the Babcock Company and the World's Fair, the attorney for the latter asked on the 6th inst. to be allowed to remove the case from the local court to the United States Circuit Court. After a sharp contest between counsel the court granted the request. And now it is thought that a hearing can hardly be secured in time to do the Babcock & Wilcox Company any good, as the matter will have to take its turn and may not be called up until next year. In the meantime the Stirling boilers will be set in place and the exposition will have run its course.

Miscellaneous.

The Hon. E. H. Conger, United States Minister to the Republic of Brazil, writes Chief Walker Fearn of the Foreign Affairs Department, that the preparatory exhibition at Rio Janeiro of articles intended for the World's Fair was officially and successfully inaugurated in that city in January. The diplomatic corps were all present and were given posts of honor. The display was a marvelous one and surprised every one who witnessed it. The old National Museum was entirely cleared and the space was filled to overflowing. More than 500 packages were necessarily left unpacked at the docks, and many of the State exhibits will go direct to Chicago.

The Bethlehem Iron Company are erecting scaffolding preparatory to placing a duplicate in staff of the great hammer employed in the works of that company.

Weekly Prize Competitions.

$25.00.

FOR MORE than six months Weekly Prize Competitions ($10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of $12.50, a second prize of $7.50 and a third prize of $5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. These competitions are open to every one, and it is hoped that there will be a general response from business men. Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers to the different questions will be favorably regarded as meeting the purpose for which these competitions are announced. We shall have the privilege of publishing any or all of the contributions received.

Prize Competition No. 12.

SUBJECT:

Arrangement of Pocket Cutlery.

This competition is intended to call out practical suggestions in regard to the way in which pocket cutlery is displayed, and touches such points as the following:

Whether in show or wall cases and on flat or inclined surfaces;

The kind and style of boxes;

Whether samples and stock are kept together or separate;

Manner of marking prices;

How damaged or broken lots are disposed of;

Suggestions in regard to assortment of qualities and styles, and as to how the sale of the goods may be increased and made profitable.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

Replies are to be received not later than March 11, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Prize Competition No. 12.

Our weekly Prize Competitions Nos. 1 and 2 are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a good deal of practical information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 3. Closing February 18.
Waste in the Store and How to Avoid It.

No. 4. Closing February 25.
Suggestions as to Improvements in Putting up Goods.

No. 5. Closing March 4.
A Method of Securing a Reliable and Prompt Delivery of Goods.

No. 12. Closing March 11.
Arrangement of Pocket Cutlery.

Another subject will be announced in our next issue.

Our readers are also reminded of the following Prize Competitions, announced on another page, in each of which four prizes, of $50, $25, $15 and $10, are awarded:

No. 6. Closing February 18.
How Retailers Can Best Advertise and Extend Their Business.

No. 7. Closing February 18.
Travelers' Yarns.

No. 8. Closing February 18.
How to Treat Clerks.

No. 9. Closing February 18.
Shop System of Keeping Track of Jobs.

No. 10. Closing February 18.
Business Maxims—At Least 10.

No. 11. Closing February 18.
How Small Retailers May Keep a Record of Prices.

The *Railway Age* tells the following story: "When a locomotive freezes to the track while taking water so that its steam will not move it, and remains fast for four hours until another engine can be got to bump it loose, the weather may be said to be extraordinarily cold. Yet this is what happened to the engine of a fast Illinois Central train at a lonely water tank in Illinois one morning last week. Next time the boys will see that they do not let the tank overflow so as to form a pool around the tender trucks when the mercury is a rail length or so below zero. But it is strange that with railways running well up toward the arctic regions in this country it should be left to a road in central Illinois to be the scene of such an unusual occurrence."

The Board of Public Works of Austin, Texas, is in the market for about 9000 tons of cast-iron water pipe.

COPPERSMITHING.

ART OF COPPERSMITHING.

XL.*

DOME COPPERS.

Dome coppers, as will be seen, Fig. 456, are made similar to open ones, the dome being substituted for the light course. Let us suppose we have a copper ready for a dome, and it is required to make a dome seat 3½ inches wide, with a riveting edge turned up 2 inches deep, and the dome a half sphere, made in four pieces. To obtain the pattern for this we proceed as follows: The diameter inside the turned up dome seat or riveting edge, A B, Fig. 457 will be 104.63 inches. Then $\frac{104.63}{2}$ = 52.31, and $\sqrt[2]{52.31^2 \times 2} = 73.98$ or is to say, 52.31 − 36.99 = 15.32, and $\overline{F\,B}^2 + \overline{D\,F}^2 = \overline{D\,B}^2$, or $\overline{36.99}^2 + \overline{15.32}^2 = \overline{40.30}^2$; that is, it equals the chord D B of half the arc C D B; but D G equals D B, and $\overline{D\,B}^2$ minus one-half of $\overline{D\,F}^2$

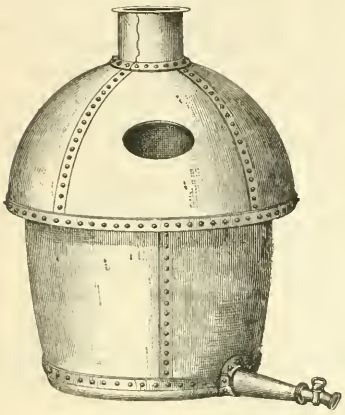


Fig. 456.—Dome Copper.

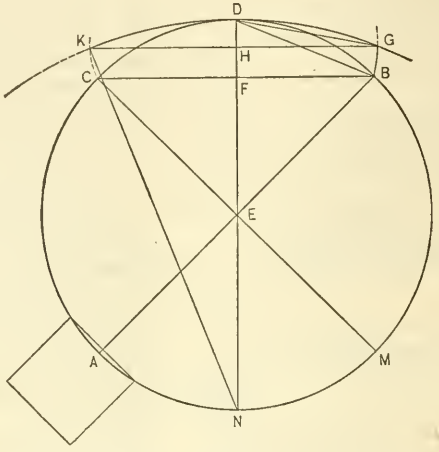


Fig. 457.—Method of Obtaining Pattern of Dome.

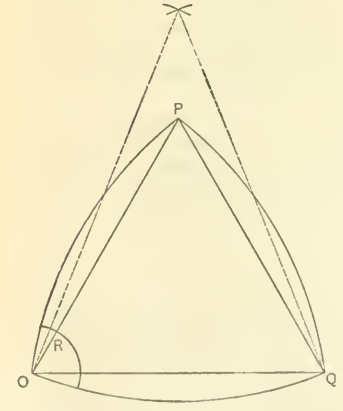


Fig. 458.—Pattern for Quarter of Dome.

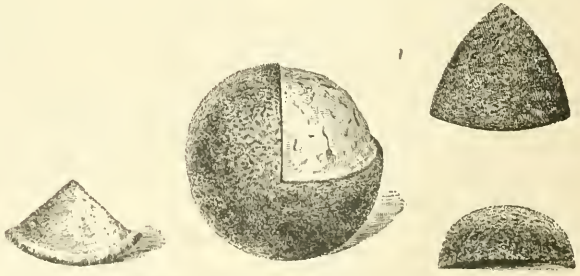


Fig. 459.—Illustration of an Orange.

dome and work it on to the copper. As I have said before, a dome may now be had in one piece, but were this not the case, then it must be made in pieces, and these must conform to the size of the sheets at hand. Now, let the size at the brim be as in the last example, namely: 97.63 inches in diameter, and the brim or C B; that is to say, it equals the side of the inscribed square of a circle, A B, whose diameter is 104.63 inches, or the diameter inside the riveting edge, represented by the circle D C A N B. Now, $\frac{73.98}{2}$ = 36.99, or one-half the chord C B of the arc C D B, or F B, and one-half the diameter D E − F E = D F; that (that is, $\overline{D\,H}^2$) equals $\overline{H\,G}^2$, or $\overline{D\,G}^2$ $\overline{D\,H}^2 = \overline{H\,G}^2$, which is $\overline{40.30}^2 - \overline{7.66}^2 = \overline{39.42}^2$. Then $\frac{\overline{H\,G}^2}{D\,H} + D\,H = D\,N \times 2$ or $\frac{\overline{39.42}^2}{7.66} + 7.66 = 209.25$, or the diam-

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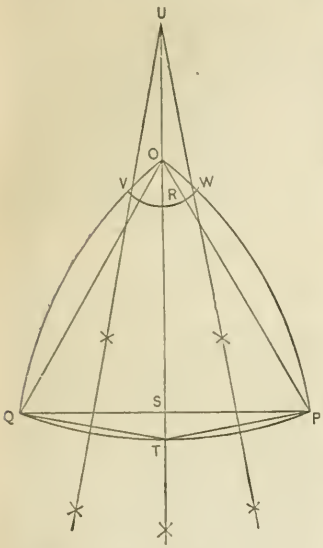
eter of a circle of which the curve of each side of the pattern is a part. Now construct a triangle on K G (that is, on O P, Fig. 458, which equals K G), and with D N or 104.62 or $\frac{209.25}{2}$ (that is, the diameter of the dome seat) as radius, describe the arcs about the triangle O P Q, as shown in Fig. 458. Then at one corner, O, of the pattern, with a radius, O R, equal to one-half the diameter of the crown pipe, mark out the hole for it, making the hole so that when complete it will be about 20 inches in diameter, which will then complete the pattern required of one of the four sections of the dome. Now, having the pattern and the four pieces cut out by it, bend an iron template to the curve of a radius of 48.81 inches, and take the sections to the hollowing tub and hollow them until they fit the template every way, after which planish them in a promiscuous way on a suitable head placed



Art of Coppersmithing.—Fig. 460.—Second Method of Obtaining Pattern.

in a solid block. Then punch them and place them in position in the seat, remembering to have the crown pipe also in position before the last quarter of the dome is put finally into its place. Next bolt them together in succession. The manhole may be prepared and fixed to the last quarter before placing, or it may be worked on after, at the discretion of the workman or employer. Put three or four temporary rivets in each seam of the dome and in the seat at each seam, and one or two between. We are now ready to work in the rivets, which may be done in a similar manner to that described and illustrated for an open copper with a light course.

I wish here to make a suggestion for the benefit of the boy who may have occasion to peruse these pages in the hope of finding the assistance he is in search of, because I think this is one of the most appropriate places which has suggested itself, where we can take a practical lesson from nature. Fig. 459 is the picture of an orange with the rind peeled off from three-fourths of the upper half of it, one-fourth being left on to illustrate a part of our lesson. Lying apart from the orange are the three-fourths of the rind which have been taken off. One piece is lying with the concave or flesh side of the skin upward and one with the concave side down and one lying perfectly flat. Now let us carefully consider these three pieces of rind in relation to the lesson under consideration. Let the upper half of the rind of this orange represent the dome of the copper in the next example, and let the dome be made in four pieces, as before. It will be readily seen that the four pieces of orange rind, after being removed from the orange, show in miniature: 1, the exact shape of the pattern; 2, the exact shape it should be when hollowed and planished, and 3, the position of the first piece when it is placed in the riveting edge on the copper brim. Now, if we conceive the edges for riveting to have been left on at two sides of the pattern, then the rivet holes of the seam would come down the line of division where the rind of the orange has been cut. With a little study this should be plainly understood. We will now proceed to find the shape and size of this pattern as suggested to us by the orange rind. Let the diameter C M of a spherical dome or an orange, Fig. 457, be 88 inches in the present example. Describe the circle A C B M to some easy scale that would represent a large-sized orange, say $\frac{1}{4}$ inch to a foot, and divide its circumference into four equal parts, A C, C B, B M and M A; then the diameter of the circle C M is $\frac{22}{16}$ inch, or $5\frac{1}{2}$ inches. Now draw the diameters A B and C M, and join C B; then the arc C D B represents the bend of either side of the section when hollowed to fit the surface of the orange. Draw D B, which represents the chord of half the arc C D B. Now divide D F in two equal parts at H, and through H draw K H G, parallel to C F B; then with D B as radius and D as center describe the arcs B G and C K, cutting K H G in K and G; then K G represents the true length of the side of a triangle O P, Fig. 460; that is, from point to point, when the section is lying flat the same as the orange rind in the picture, the line D B having remained the same as it was before the section was flattened and made a plane by being pressed down level. Here, then, we have the length K G of one side of a triangle lying within the pattern O P, Fig. 460, and we find by actual measurement that the line K G is full $4\frac{1}{2}$ inches, which, being multiplied by 16, is 66 inches (or more correctly, 66.1). Now bisect P Q in S, and through S draw O S and continue it to T, making S T equal to D H, Fig. 457, or one-half of D F; and draw the lines, or chords, T P and T Q; and bisect these chords perpendicularly, with lines meeting in U. Then from the point of intersection of these lines at U, with the distance U Q, U T, or U P (which is 5.5 inches, and this multiplied by 16 gives 88; the first, the diameter of the orange, and the second, that of the dome), describe the arcs O P, P Q, Q O. Now, with O R as radius, describe the arc W V for the crown pipe hole, and W P Q V is the pattern of one section of the dome as before, but without riveting edge, which must be left on the two sides W P and Q V.

There are very many useful lessons that may be learned in a similar way to that suggested here by the rind of an orange, if the student is apt and is of an inquiring turn of mind.

A member of the Dominion Parliament states that $20,000,000 have been expended on army rifles for that country, and that "gas pipe" would make more efficient weapons. A little while ago Germany, it will be remembered, was agitated by the announcement that a large percentage of the army rifles were defective, and Russia is now reported to have made a similar discovery. In regard to Germany and Russia the natural inference is that both governments welcome a pretext for preserving the peace.

Workmen to Study the Fair.

The Chicago *Herald* has undertaken a very enterprising scheme in connection with the World's Fair which is exciting much interest in labor circles in that city. The scheme as outlined in the *Herald* for the 5th inst. is as follows:

There are in Chicago many organized crafts. The fair will continue for 26 weeks. Each of the local labor unions will be invited by the *Herald* to choose from its membership a man deemed best qualified to act for it in studying processes, machinery, tools and materials peculiar to its interest, and the *Herald* will send him to the fair daily for one of these weeks, paying him $50 for his time and expenses, so that his family shall not lose by his personal and his representative distinction. It may be that more than 26 representative men will present themselves, in which case there will be weeks in which two or more experts will be given an opportunity to avail themselves of the proposition here made. It is the *Herald's* desire that at least one delegate for each week may be recommended by the unions, and if there are more than that number so much the better.

Each of the men thus selected will make as thorough an investigation as possible of the subject matter in his charge, and it will be expected of him that he will write for the *Sunday Herald* a report of his observations, to be published in its columns for the perusal not only of his own union and his fellow-craftsmen throughout the country and all over the world, but for the perusal also of the great general public, who will feel a keen interest in the observations of men thus chosen and thus equipped for so interesting and important a trust. Illustrations will be furnished for these reports to whatever degree may be found desirable.

The entire undertaking has been placed by the *Herald* in the hands of a committee composed of James J. Linehan, president of the Trade and Labor Assembly; John C. Harding, president of Typographical Union, No. 16, and J. B. Cogswell, president of the Carpenters' Union.

The project has been received with much enthusiasm, and we understand that some of the unions have already made their selection of the man whom they deem best qualified to represent their particular craft. It is one of the most practical methods yet devised for securing, not only a thorough and systematic study of everything in the wide domain of industrial and artistic progress which the fair shall present, but also the dissemination of the results of that study for the benefit of mankind generally. As a piece of journalistic enterprise it is most admirable and commendable. Although local in its character, being confined to representatives of Chicago trades, yet all classes of industry have reached such an advanced stage of development in that great manufacturing city that there need be no fear of any branch of industry being inadequately represented among the workmen chosen.

Here is Uncle Sam's account with the silver mines up to date:

	Ounces.	Cost.
Purchased under act of 1878	288,474,702	$308,195,497
Sherman act	129,926,795	127,257,410
Totals	418,401,497	$432,372,907
Present market value		351,457,257
Loss		$80,915,650

These figures are sufficiently eloquent.

The question of establishing a British labor bureau is under discussion. The Government desire to avoid both ministerial changes and the increase of legislative work. All that is actually known is that the general principle has been agreed to, and that, as soon as matters of detail have been arranged, the labor bureau will be established.

The Swedish inventor, Felix Starkenberg, whose wave motor and unique stern-wheel boat attracted attention, died in Brooklyn last week at the age of 47 years

THE LETTER BOX.

Pipes Freezing Below Frost.

From Z. S., *Haddonfield, N. J.*—Please inform me through the columns of *The Metal Worker* why it is that water pipes will freeze 2 feet below the frost. We are having quite a time in our town with pipes freezing and find that they are below the frost line 2 feet. These pipes are ¾-inch iron pipe leading from the main to the stop box at curbs. The main pipe in the middle of the street is 6 inches in diameter, made of kalameined sheet iron. One pipe I have in mind, leading from the main, was thawed out and froze up the following night, and I know it is below the frost line.

Note.—Not knowing why our correspondent should have had such a curious experience, we thought others in his part of the country might have had similar trouble, and wrote for information to another correspondent in the Southern part of New Jersey who we knew had investigated the frost matter to some considerable extent. In his answer he gives the depth of frost as found to exist beneath different sorts of streets and soils. His letter, which we print below, is of much interest, though it does not explain the trouble. We would request other correspondents to write us if they can solve the difficulty of frozen pipes as presented by "J. S."

"The following shows the kind of pavement, soil and depth of frost as determined by actual measurement from top of street to where the bar or pick would be dispensed with:

Kind of surface.	Kind of soil.	Depth of frost.
		Ft. In.
Unpaved street....	Gravel and sand....	3 4
Asphalt street.....	Gravel and sand.....	3 3
Stable yard.....	Ashes; made ground.	2 6
Cobblestone street.	Sand.....	4 0
Cobblestone street.	Gravel and sand.....	4 2
Asphalt street.....	Gravel and sand.....	4 2
Asphalt street.....	Gravel and sand.....	4 3

"The average depth on the lower part of the city of frost is 3 feet 10 inches. The great trouble that we have had with frozen supplies is that the city ferrules, which are drilled into the top of the mains, are some 6 inches nearer the surface than the main water pipe. If the ferrules were put on the side of the main there would be less frozen supplies in our city. I have never heard of water pipes freezing 2 feet below frost."

Painting Conductor Pipe.

From J. H. W., *Williamsport, Pa.*—In reply to the communication of "G. R. C.," Mansfield, Pa., in *The Metal Worker* of January 21, I wish to ask, why he wants to paint the conductors at all? It seems to me, the way tinners are going at it nowadays, that in the course of a few years they will have to be jacks of all trades in order to get a job. We shall be painters, stonecutters, carpenters, bricklayers, hodcarriers, and even dirt diggers. Now, fellow tradesmen, why not put a stop to all this kind of work? Surely, you only learn the trade of tinsmith; why, then, paint conductors inside? It is bad enough that we have to use paint at all. Hanging eaves, troughs and gutters ought to be painted, and that well, too, in order to preserve them. Why not let the painter do it, as it surely belongs to him and not to us tinners? Give the painter a chance to earn his wages. Why should we take his trade away from him? This can also be applied to the mechanics mentioned above. Let every mechanic have his own work to do and this will go far toward avoiding strikes, and will help wages. I wish I could see the tinner who first started to paint eave troughs and conductors. You ask what I would do with him? Now, if I was large enough, I would paint him up with red paint so that his mother-in-law would not know him from the ghost of Sitting Bull. I would like to hear from some of the tinners in regard to the above. Let them give their views on the subject.

Hot-Air Furnaces.

From S. S. T., *Chicago, Ill.*—In looking through the columns of your valuable paper of February 4 I noticed an article by "W. T." of Pennsylvania, of which kind I would be pleased to see more, for I candidly believe a freer interchange of opinions based upon actual experience both by practical furnace salesmen and practical mechanics would prove of infinite value to the trade at large in bringing furnace work to a much higher standard than it enjoys at present, especially in some localities. And what would help the dealer would reflect upon the furnace manufacturers as well, and would tend to aid the latter in their competition with the various other systems now being introduced. It is a well-established fact that a hot-air furnace of ample capacity, erected with the judgment and skill that a mechanic should incorporate in the work and a proper study of the laws of heating and ventilation, will give more complete satisfaction, viewing it from the standpoints of comfort and health, than any other system yet invented.

But these results cannot be obtained always unless all parties concerned will contribute a fair proportion of horse sense from the foundation up; yes, I might add from the time that the architect makes his first calculations, for it is to his judgment that the house owner must look and not to the suggestions that the furnace-heating engineer may make, not always with a view of cheapening or facilitating his share of the work, but with a view of aiding his apparatus to take advantage of every condition and substantiating the statements, which previous experiences have demonstrated he could honestly and conscientiously make. It has been the writer's experience to meet architects who were unalterably opposed to floor registers on the first floor, insisting on side walls only, and who were unwilling to listen to any reasonable argument in favor of floor registers, generally citing some building that had been warmed very satisfactorily by using side-wall registers, never stopping to consider the conditions existing whereby the former were preferable so far as results were concerned in the majority of cases, yet this same architect would make no provisions for using even the latter of suitable dimensions, but would confine the furnaceman to the limited space usually found in the ordinary partitions of a house, viz., 3½ x 14.

At the same time he would provide for the plumber, or in fact any other mechanic whose labor might enter into the construction of a modern house.

Again, it is of the utmost importance that the bricklayer in laying up the chimney exercise caution and judgment in his work. One frequently finds obstructions, caused by their carelessness, which require considerable time to locate, and proportionate expense to remove, while frequently the matter of suitable and proportionate area in square inches is a dead letter with them, they taking it for granted that a chimney supplying sufficient draft for an ordinary heating stove should prove ample for a large furnace. But aside from all this comes the difficulty of educating the house owner up to the importance of proper ventilation, especially when some unscrupulous dealer whose only qualifications are cheapness stands ready to do the work far below what an honest and conscientious dealer would do it for.

It was the writer's experience during the past year to be brought in contact with a party who was on most topics more than ordinarily intelligent, but whose ideas were somewhat limited regarding ventilation. It was indeed hard to convince him that a furnace would work better with the registers located on the inside of a room at a distance averaging 7 feet from furnace with suitable ventilation from the cold side than with the registers located on the outside of rooms at a distance of 20 feet from furnace and no ventilation. He, however, finally agreed to try the experiment, as he termed it, and during the recent cold spell a visit to his house showed that with an ordinary fire in the furnace and check drafts in operation, the temperature in all lower rooms averaged 74° F., while the upper rooms indicated an average of 72° F., while the quality of air seemed simply perfect. In this case the price received warranted the performing of a thoroughly first-class job.

In conclusion let me add that I hold that whatever is worth doing at all is worth doing well, and every man who has a certain piece of work to perform should take pride in doing it in a manner that will reflect credit upon himself as well as upon his employer. While it requires more skill to do a nice piece of furnace work than it does to put up a lot of conductor, yet the nature of the former fully warrants exercising the extra care. I sincerely hope to see a more thorough discussion of this really important topic on lines that will prove comprehensive and instructive from the apprentice to the experienced journeyman.

Trouble with a Gas Range.

From G. R., *Mansfield, Pa.*—For the information of readers of *The Metal Worker*, I would state that the gas stove, which I wrote you about in the letter published in *The Metal Worker* of January 28, has a flue connection of 4-inch pipe.

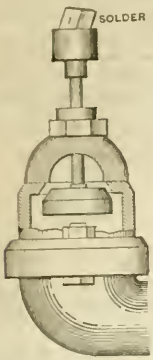
Note.—If the range is connected in this way with the chimney and all the products of combustion are carried off, we fail to see why there should be the condensation on the walls of the room complained of. If any reader can send an explanation of this trouble we shall be glad to hear from him.

Preserving Tin Roofs.

From C. L. F., *Clay City, Ill.*—I would like to ask "E. F. B.," Greenville, Pa., whose letter appears in *The Metal Worker* of January 28, to tell me what good the sand will do on the last coat of paint on a tin roof.

Trouble with a Hydraulic Ram.

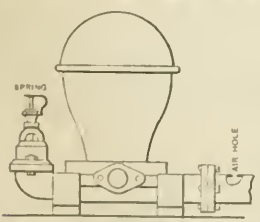
From A. J. L., *Glenville, Ohio.*—In *The Metal Worker* of January 21 I notice that "C. L.," New Haven, Conn., complains of trouble with a ram. Some years ago I had just such trouble with a ram that had been in use about 30 years. The brass outside, or pulsating valve, was very much worn and would keep stopping. I reasoned, that the valve being lighter than it



Trouble with a Hydraulic Ram.—Remedy Suggested by A. J. L.

originally was, was not heavy enough to fall when it was relieved by the air chamber valve. So with that idea I fastened a reducing coupling on the end of the brass stem and inside the coupling put a piece of solder, as shown in accompanying sketch. When I left it appeared to be working all right, and from inquiries I found that it continued to operate satisfactorily. One day I was near the ram and looked to see how it was, and found that the 1-inch piece cut off of the bar of solder was tossed into a piece of metal as round as a bullet from being continually thrown around within the coupling. This was some years ago, but the ram is still running with a piece of solder in the coupling and has given no trouble of late years.

From G. F. SCHAFFER, *Washington, D. C.*—In answer to the inquiry of "C. L.," New Haven, Conn., I would say (although his description is very meager) that he



Remedy Suggested by G. F. Schaffer.

had better put a spring on top of the valve so that when the valve is knocked up by the water in the drive pipe, as in diagram herewith, it just barely touches the spring, which always pushes the valve down. By placing the finger on the spring when the valve is in motion it should just be felt to touch. The air hole must be near the ram so it will supply the air chamber, otherwise the ram will work with a ruinous concussion. Perhaps the ram may be too large for the supply of water on hand.

From P. X., *Montpelier, Vt.*—Tell "C. L.," New Haven, Conn., whose letter appears in *The Metal Worker* of January 21, to reduce the fall of water to the ram or add weight to the impetus valve and he will overcome the trouble he complains of.

Leaking Cans.

From G. A. K., *Akron, Pa.*—I have a contract to put up a farmer's creamer, the tanks of which are lined with galvanized sheet iron and the cans made of XX bright tin, some being of copper. They are filled with fresh water morning and evening through pipes emptying in the bottom of the tank and discharging from the top. Some of those made of copper give me trouble, leaking in a short time, the water acting so hard on the solder that it actually eats it out of the joints. Inclosed find some of the solder, half-and-half, I scraped off one of the cans that had been in the water 13 weeks. Now, what is the cause and what is the remedy? The construction is such that it is impossible to solder them with hard solder. Do you think block tin would last?

Note.—It is difficult, if not impossible, to state to just what particular action the effect produced on the half-and-half solder is due. This is partly owing to a lack of more definite information as to how these copper cans are soldered and whether on the outside or on the inside. Basing our remarks on the data furnished, the primary agent inducing the action of disintegration of the half-and-half solder may possibly be something in the water itself. We are, however, rather inclined to attribute the effect to lactic acid from the milk, but in either case block tin would likely prove more durable.

Stamping Machine for Shop Use.

From J. M. D., *New York.*—Has there been published in *The Metal Worker* a description of stamping machine suitable for shop use, one that an ordinary mechanic could make himself? If so, please republish the article, giving description of machine.

Answer.—The following cuts and description of machine to be used for raising curved moldings appeared in *The Metal Worker*, and may fulfill our correspondent's requirements. In Fig. 1 is shown the side elevation of machine. A is a heavy block of wood that serves to hold the block of cast iron B, which is provided with set screws to hold in the block of wood C, to which the dies or forms are bolted. D is a similar block of iron, only it should not be as heavy as B. B and D are fastened to the wood work by bolts that go through the flanges. To have the machine work properly, the wooden block A should go into the ground or be made very solid, so there will be no rebound. When very large work is to be done, the iron D and the mold may not be heavy enough; then a lead cake or piece of iron can be fastened on to the beam above D, so as to get as heavy a blow as may be required. The beam E is secured to the holder K by means of two bolts. The plank sides F should be quite wide and made as firm as can be so the beam will

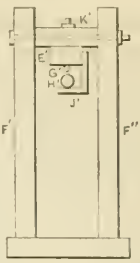
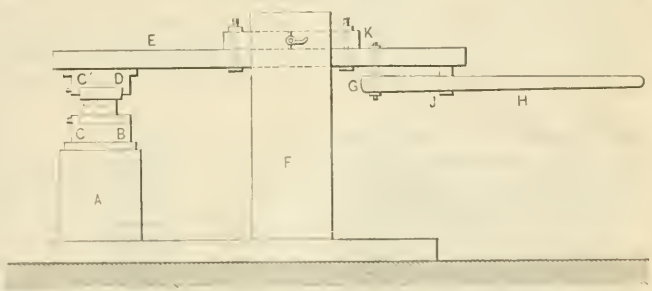


Fig. 2.—End Elevation, Showing Swivel.

not "wobble," or the dies will not come together true. The swivel joint G is to allow the handle H to be withdrawn from the holder J. When working the machine it would be inconvenient to let go of the handle H, so as to allow the beam to fall, but by having the handle swiveled to the beam, and on the rest or holder J, the beam can be raised up as far as required, and when the handle is moved from the rest the beam drops with a sharp blow. The higher the beam is raised the heavier the blow will be. To have the machine arranged properly, so the dies could be adjusted, it would be well to have slots in the beam E so it could be moved forward and back along K, being secured in the desired position by means of the two bolts. Slots should be cut in the two side planks so the beam could be be raised or lowered at will, being secured by the bolt passing through K. In Fig. 2 is shown the partial end elevation of machine. F F represent the side planks through which the bolt passes to secure the beam holder K. The handle H is fastened to the beam E by the swivel G. When the beam is raised by means of the handle the handle is thrown to the left, thus passing beyond the holder J. The beam is then at liberty to fall and strike the required blow.



Stamping Machine for Shop Use.—Fig. 1.—Side Elevation of Machine.

The street canals in Venice are frozen over, rendering gondoliers useless, the first time in a century.

PLUMBING AND GAS FITTING.

The Milwaukee Convention.

Under date of January 31 Peter J. Somers, mayor of Milwaukee, has sent the following cordial letter to President Jeremiah Sheehan of the National Association of Master Plumbers:

It has come to my knowledge that it is the intention of the National Association of Master Plumbers to hold their eleventh annual convention in Milwaukee next June. This is more than pleasing news to our people, because it will be a pleasure for them to contribute to the comfort of the members of the association upon that occasion, and we feel that this city is abundantly able to accommodate this gathering of representative business men of the country. Milwaukee is fast becoming a convention city. Its location upon Lake Michigan is indeed most charming; this is most apparent in your convention month. Our hotel facilities are of the very best. The population of our city is about 250,000, and we will all feel honored by your visit. I am sure that the news of your coming to Milwaukee will be hailed with delight by all the plumbers of the city, who, by the way, are among the most enterprising, genial and prosperous of our fellow citizens; they will look after the interests of the convention with solicitnous care and will leave no want unprovided for. We promise you a pleasant time and a hearty welcome.

Sewer Gas and Trap Water Seal.

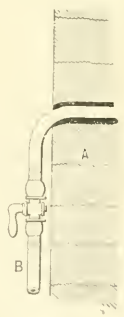
From F. P. G., *Cincinnati, O.*—In the answer to the communication in relation to the "Passage of Sewer Gas through Traps," which appeared in the issue of *The Metal Worker* of February 4, you admit that the water seal of a trap is no barrier to the entrance of sewer gas into a house unless the water is constantly renewed. What, then, is the advantage of a trap if, as a matter of fact, the gas can force its way through the seal, and why is it impressed so upon the plumber that all his work must be gas proof?

Answer—The protection which the water seal affords is from disease germs, which cannot pass through the water, but which would have free access if the seal is broken. A well known English authority, Dr. Fergus, stated some years ago the result of experiments made, demonstrating the ability of gas to so impregnate the water seal as to give off on the house side the gas entering from the sewer side. But the germs of disease are retained in the water and are not supposed to enter the building unless there is a free passage of the sewer air, which can only occur through the trap being unsealed. If, therefore, on the one hand the sewer air in its passage through the water in a vented trap is deprived of its more dangerous characteristics, and on the other hand the unvented or improperly set trap admits the sewer air as it comes from the sewer laden with disease germs, the importance of the good plumbing work, as represented by the former, needs not to be impressed upon the plumber. In one case we have the offensive odors alone, in the other we have both the offensive odors and the disease germs. In connection with this subject an experiment made some years ago by Professor Doremus may be interesting, and we give it for our correspondent's benefit. To each end of a block of brown sandstone 12 inches long by 4¾ inches thick the professor attached an iron plate and tube. The sides and other parts of the block except where these plates and tubes were inserted were covered by many layers of varnish to render the stone impervious to gases. A flexible tube was next fastened to a gas jet and connected with one end of the sandstone block and the gas was turned on. After waiting for a few minutes he applied a lighted match to the tube at the other end of the block and a small flame was kindled, showing that the gas had passed through the solid stone. There is no precise analogy between the sandstone block and the water in the trap, but it serves to illustrate the power of gas to permeate substances. It must not be inferred that the sewer air flows through the water seal as it would through an open pipe, but merely that the water seal is not always a perfect barrier to the gas, though it is to the germs.

Thawing Frozen Street Mains.

From J. R., *Portland, Maine.*—Can *The Metal Worker* give any points as to the practice adopted by New York plumbers in thawing out frozen street mains? We all have methods of our own, but it is well now and then to exchange views with others.

Answer.—The thawing out of street mains in New York City is effected in most part through the agency of live steam, while in many instances hot water



Thawing Frozen Street Mains.—Fig. 1.—*Water Main at Cellar Wall.*

is used—the preference, however, being given to the former. The method of operation is as follows: The main pipe is cut where it enters the front wall in a cellar and on the street or outer side of the stop cock. The end of the frozen section of the pipe is then attached to one of the openings in the cross branch of a galvanized-iron T, while the arm of the T is attached to the house section of the water pipe by means of soldering nipples. The plumber next gets up steam in a machine resembling a diminutive kitchen boiler, furnished with the necessary appliances to regulate the amount of pressure needed. This machine is set on a furnace and partly filled with water, sufficient room being left for the steam,

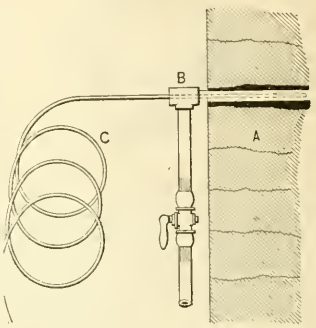


Fig. 2.—*Method of Thawing.*

which is injected through a coil of ¼-inch tubing inserted in the open end of the T into the frozen pipe. According as the ice is melted the tube is pushed in further, until the entire length of pipe is penetrated and cleared of the obstruction. The tube is then withdrawn and the opening in the T through which it was operated is plugged, the T being allowed to remain for future use if an emergency should arise. Some of the plumbers are content to work with hot water instead of steam and are satisfied with the results, although it must be apparent that live steam under adequate pressure must operate much more rapidly on the ice in the pipes than water. It should be borne in mind that in plumbing work the plumber must be able to meet special cases by modifications of well recognized plans to suit circumstances. It is not alone necessary to understand the plumbing business, but the successful plumber must be a man of resonrce when the emergency calls for it.

In the accompanying illustration Fig. 1 represents the water main where it enters the front wall of cellar. A represents the front wall and B the pipe. Fig. 2 represents the pipe cut with the galvanized T inserted, the cutting of the pipe and the attachment of the T thereto being effected at the point B. The coil of tubing is represented by C.

The Clow Patent Lead Pipe Connection.

James B. Clow & Son, Lake and Franklin streets, Chicago, are manufacturing this article, which has much to recommend it in its simplicity, effectiveness,

The Clow Patent Lead-Pipe Connection.—Fig. 1.—General View of Connection.

cheapness and saving of time. It is intended to be used in place of a solder joint in connecting lead and iron pipe.

Fig. 1 is an illustration of the connection, while Fig. 2 is a sectional view showing the form of its interior. In using this connection, it is first slipped over the end of the lead pipe. A steel expander, which

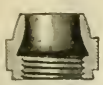


Fig. 2.—Sectional View of Connection.

is merely a tapered steel bar, is then inserted to spread the pipe and press it into the chamber in the connection. The iron pipe is then screwed in at the other end of the connection, is brought up tightly in place and helps to hold the lead pipe fast, as will be seen in Fig. 3, which shows a piece of lead pipe inserted between a corporation cock and a round way stop. A portion of one of the connections is cut away so as to show how the several parts come together.

The manufacturers guarantee this joint to be stronger and more durable than the regular solder joint and much cheaper. It is made in four sizes—½, ⅝, ¾ and 1 inch.

Electricity and Water Pipes.

Not long ago we referred to trouble that has been experienced abroad by the corrosion of lead pipe, due, it was assumed, to the nearness of electrical cables. The second instance of the kind we noted was in this country, but no systematic investigation had been made, and it was difficult to determine exactly in what way the corrosion was promoted by the electrical current in a neighboring wire. Quite recently a correspondent of *Fire and Water*, writing from Memphis, Tenn., calls attention to the same thing. We quote from his letter below:

"About 12 or 15 months ago our street railway system was changed from mule power to that of electricity, since which time we are having so many leaks in service pipes under the electric railway track that I am led to believe that the electricity has something to do with these numerous leaks, though the wires under the tracks do not come in contact with the pipes. We use iron and lead pipes for service, galvanized iron principally, and many of these give out inside of one year, and some have given out inside of three months, and in every instance under the railway track, which fact leads me to believe that the electricity is responsible for the trouble, though I am not able to explain why."

It would seem that with the greater application of electricity to motor and lighting purposes this trouble of corroded water pipes is likely to increase. It would be well, therefore, for the electrical companies or water companies to discover the exact cause of the trouble with a view to applying a remedy.

Testing Iron Pipe and Lead Work with Water.

From A. P. V., *Cincinnati, Ohio.*—I went security some time ago for a plumber to whom was awarded the contract for the plumbing of a private residence on that delusive system, the "lowest bid." The man had the reputation of being a good workman, and I provided all the material, which was of the best character. Before the job was completed he left for parts unknown, and I have to see to it that the work is done in accordance with contract. I find that one of the conditions is that the whole of the iron pipe and lead work is to be tested with water, and as most of the fixtures are in place, it appears to me difficult, if not impossible. How can it be done, and what benefit is to come from testing lead pipe? In the absence of proper plugs, what is the best way to sustain the pressure of the whole system filled with water?

Answer.—Presuming that the iron pipe is of the grade of "extra heavy" and the joints well made there should be no difficulty in applying the water test so far as the lines are concerned. When it comes to testing the lead work the only course open is to remove such of the fixtures as are in position, cap all the lead pipe openings and fill up. First of all, of course, the house drain must be securely plugged at the front wall trap—if there is one—and that can be easily done. A prominent New York plumber who tests the entire iron pipe in a building at once is in the habit of calking in a circular piece of 6-pound lead, when making the joint on the house drain nearest the running trap on the inlet side. He then fills up his pipes, the lead sheet answering all the purpose of a plug. When the test is satisfactory, putting his hand through the trap he cuts out the lead and leaves the pipe clear. There is both advantage in and frequently necessity for testing the lead work in buildings. It is but little use to make iron pipe joints secure if the ferrule joints on the application of a test are defective, and no piece of house plumbing can be guaranteed as safe if the joints connecting the lead and iron pipe are not subjected to either a water or air test. Any good plumber, knowing his business and having a level head, can easily get our correspondent out of his difficulty.

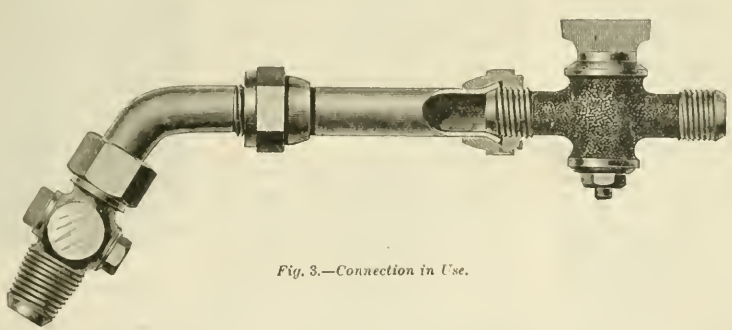


Fig. 3.—Connection in Use.

Ball of the St. Louis Master Plumbers.

The Liederkranz Hall, St. Louis, Mo., was crowded by a merry party Wednesday evening, February 8, on the occasion of the annual ball of the Mound City master plumbers.

Between the hours of eight and ten 100 carriages rolled up to the entrance of this popular south-side hall, with twice as many couples, intent on taking part in the festivities.

The hall was handsomely decorated, the music charming and the tables were lavishly spread with epicurean dishes that would satisfy the most critical. At the completion of the last course, the ladies were presented with handsome souvenir spoons with gold bowls, and the initials "M. P. A." engraved therein. All the arrangements were made and executed in such a manner as to reflect credit upon the committee in charge.

During the evening ex-Secretary Jno. P. Kelleher, who has so efficiently performed the duties of his office, was presented with a gold watch. The presentation was so complete a surprise to Mr. Kelleher that he found difficulty in finding words to express his appreciation of the beautiful remembrance.

It was in the small hours of the morning before the dancers departed for their homes, all voting it a grand success and one to be long remembered.

TRAPS AND VENTS.

The Toronto Steel Clad Bath & Metal Company, Limited, Toronto, Canada, wish to contradict the statement that they have purchased the United States and Canadian patents of the Peerless water heater. At present they are merely agents for them in Canada.

The Folding Bath Tub Company, Marshall, Mich., issue a very pretty catalogue illustrating and describing the combination folding bathtubs and sanitary bath chairs of their manufacture. The publication, of oblong shape, is printed on tinted paper and contains a full account of the goods mentioned. The catalogue is written very pleasantly and gives a

good deal more than the mere technical details of the construction of the various apparatus. The illustrations present the appearance of the tubs and chairs very faithfully.

JOHN H. MESSIER, Worcester, Mass., is the patentee of a water heater designed especially for use in barber shops. The heating apparatus consists of a horizontal boiler having a suitable burner underneath, provided with a special system of pipes connected with a cold-water supply, the heater being a small separate apparatus underneath the basin.

A SAFETY LOCK for gas cocks has been patented by Frank Lawrence, San Francisco, Cal. The invention relates to the class of safety devices for this purpose in which a spring-controlled lever is connected with the key and has the upper end adapted to engage the notches in the lower flange of the valve seat. The general result is effected of permitting the easy operation of the key, and its positive locking when the valve is shut off on either side.

CRANE COMPANY, 10 North Jefferson street, Chicago, have just issued a 26-page catalogue of water works supplies. Illustrations and descriptions are given of fire hydrants, check valves, solid wedge straightway valves, double disk straightway valves, valves for service pipes, bibb cocks, compression bibbs, rough stops, checks and wastes, corporation stop cocks, crows, water-pressure regulators, Mueller's tapping machine, valve boxes and flange fittings. An introductory note to this catalogue states that during the past season the company have furnished 100 cities and towns with hydrants and valves. They now claim to manufacture the greatest variety of water works supplies in America, always carrying a large line.

SEALED PROPOSALS will be received by W. W. Johnson, Custodian U. S. Post office, Baltimore, Md., until 2 o'clock p.m., February 23, for furnishing and putting in place complete water closets in the U. S. Post Office, Court House, &c., building at Baltimore, Md.

THE TRIMONT MFG. COMPANY, Roxbury, Mass., are much pleased with the success their Trimo A Plumbers' Wrench has met with in the past three or four years at the hands of dealers and users, among the latter being the New York Steam Heating Company, who, we are informed, find it especially adapted to their requirements. Some of the features of this tool are referred to by the makers as follows: That it is drop-forged from bar steel and all parts interchangeable. Grips the pipe firmly without lost motion, and will not lock upon the pipe, but in reversing releases its hold instantly. They allude to the demand as increasing both for domestic and foreign consumption. The Trimo Chain Pipe and Basin Wrenches are also manufactured by this company.

A RECENT ADVERTISEMENT in a local Ansonia paper contains some entertaining verses referring to the plumber, and below is a note in which the song is "disrespectfully dedicated to a friend who resides in Ansonia who unscrews his water pipes and takes them to bed at night to prevent them from freezing, and thereby beats the legitimate plumber out of a job." The signature of the advertisement is 278 Main street, Ansonia, Conn., where, we believe, a Mr. Reynolds lives.

VANDERMAN'S Plumber's Estimate and List Book, published by the Vanderman Plumbing & Heating Company, Willimantic, Conn., is a volume of blanks containing over 200 pages. The trade are more or less familiar with the style of these estimate blanks. The form for each job covers two pages, and includes a printed list of all the material likely to be used in plumbing work. These are arranged on separate lines, with columns opposite for dollars and cents in which is entered the total amount for the various articles. There are also a number of miscellaneous items of expense given at the bottom of the second page. A feature of the present edition of the work is a ledger index in the front page, by which the jobs can be quickly referred to and also a number of price-lists on standard goods such as lead pipe, iron fittings, brass fittings, compression brass work, soil pipe, boilers, traps, &c.

GEO. A. YUILLE, formerly president of the Chicago Economic Gas Company, will take charge of maintenance of the Clow Sanitary Company at the World's Fair. There will be 3000 closets, 2000 urinals and 1500 lavatories in the buildings and about the grounds. Of these one-third will be free, and for the other two-thirds an admission of 5 cents will be charged. The company will employ over 400 people in connection with the above.

J. J. WADE & SON, plumbers and sanitary engineers, 298 Dearborn street, Chicago, are doing the plumbing in a number of the largest and handsomest buildings in the city, among which are the following: Old Colony building, 17 stories, Dearborn and Van Buren streets; Boyce building, 15 stories, Dearborn street; Kedzie building, 10 stories, Randolph street; Watson building, 10 stories, Franklin street; also the famous Newberry Library and other buildings of less note. These buildings are being fitted with Wade's patent sewerage system, and, in fact, Wade & Son are constantly introducing this advanced system in buildings in Chicago and surrounding country.

Maddock & Sons' New Pottery, Trenton, N. J.

Work has been resumed at the renovated pottery establishment of Thomas Maddock & Sons, at Trenton, N. J., which, it is said, can now produce 60 per cent. of all the sanitary ware manufactured in the United States. This pottery was the scene of two disastrous fires during last year which demolished the entire plant. It has now been rebuilt on an enlarged and improved scale and is said to be one of the finest examples of its class in existence.

The building is in the shape of a hollow rectangle, inclosing the kilns. It is of brick faced with white trimmings and stands five stories high. Some idea of the massive character of the work can be secured from the following figures: Structural iron work, 1,000,000 pounds; bricks used, 2,400,000; entire frontage of the three main sides, 548 lineal feet; floor space, 115,422 square feet; galvanized iron used in roofing, 35,000 square feet; galvanized iron used in ceilings, 85,000 square feet. Nearly 700 barrels of cement were used in the cellar floor.

The five kilns are of Lawson's patent, large down-draft pattern. Special attention is stated to have been given to securing immunity from fire. To this end the roof, ceilings and doors have all been made of corrugated iron, a portion of the flooring and shelves being the only wood in the buildings. In the portion used for storage of the valuable models and molds the floors are cemented.

The fittings and equipments of the building, in machinery and otherwise, are of the best and most approved nature. A complete electric plant has been installed, operating 300 lights.

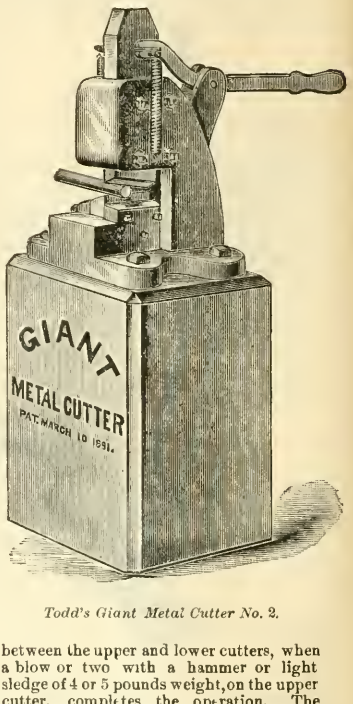
The whole plant will be devoted exclusively to the manufacture of sanitary ware, 350 hands being in employment. Messrs. Maddock will continue the production of general ware at the old Trenton China Works in that city.

The formal act of raising the American flag on the Inman steamers "Paris" and "New York" will take place on Washington's Birthday, and it is said that President Harrison and his cabinet will participate in the ceremony. James A. Wright, Jr., vice president of the International Steamship Company, is quoted as saying that the company propose to have built at least six steamships in the United States equal to those just named.

Todd's Giant Metal Cutter No. 2.

Henry B. Todd, Meriden, Conn., is manufacturing the Giant Metal Cutter No. 2, as herewith illustrated. This machine is an improvement on Giant Metal Cutter No. 1, previously illustrated in *The Metal Worker*, being designed to cut bar iron and all softer metals, from the thickness of sheet tin to rods 1 inch in diameter. The machine consists of a casting of best steel, having a bottom cutter held rigidly in place by set crews, as shown in the engraving, with a top cutter working up and down through the casting.

The top cutter is raised by the hand lever and the piece to be cut is inserted



Todd's Giant Metal Cutter No. 2.

between the upper and lower cutters, when a blow or two with a hammer or light sledge of 4 or 5 pounds weight, on the upper cutter, completes the operation. The spiral springs are intended to hold in place the piece of metal to be cut when it is so large that repeated blows are necessary. Giant Metal Cutter No. 2 cuts shear fashion. The parts are made in duplicate, so that extra parts can be furnished at any time to replace those worn or broken. The size of the cutter is $3\frac{1}{2}$ x $\frac{3}{8}$ in., and shipping weight of machine about 135 pounds.

W. K. Vanderbilt's steam yacht "Valiant," building in England, will have two sets of triple-expansion engines to drive her twin screws of bronze. Her indicated horse-power will be 5000, this great power being necessary to drive her 18 knots when loaded, 17 being her guaranteed speed at sea with moderate forced draft. Her length between perpendiculars is 310 feet.

The forthcoming sugar crop of Brazil is estimated by United State Consul Stevens at near 225,000 tons. The planting for the crop of 1893-4 is the largest on record.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, February 18, 1893.

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Liquid Air.

Professor Dewar, a distinguished English scientist, in a recent lecture delivered before the Royal Institution of London, gave some interesting results of investigations made by him into the properties of liquid oxygen. This liquid was until quite recently a curiosity produced only in minute quantities, too small and too evanescent to admit of any exact and systematic examination of its properties. As liquid oxygen boils at 182° below zero, it is, in an ordinary temperature, always in a violent state of ebullition, which means rapid dissipation, and which presents, from its agitated condition, a fatal bar to any extended experiments as to its qualities. This difficulty has been overcome by Professor Dewar in the discovery that by surrounding a vessel containing the liquid with a very high vacuum the influx of heat from the outside would be reduced to one-seventh. The result is liquid oxygen at a temperature below its boiling point, tranquilly and slowly evaporating as water evaporates at moderate temperature. Mr. Dewar is able to produce the liquid by the pint, and demonstrated his discovery practically by exhibiting a bulb containing a quantity of liquid oxygen, protected by the means above mentioned, the contents of which only evaporated one-fifth during the progress of the lecture, notwithstanding the heat of the room. The phenomena shown point to the conclusion that there is practically no radiation across an absolute vacuum. It was also demonstrated that atmospheric air can be condensed into a liquid at ordinary pressure by the cold of liquid oxygen boiling under the air pump. Liquid air thus obtained was shown in quantity. Many other interesting experiments were carried out, suggesting new fields of scientific research in this line, and even pointing to a near solution of the problem of liquefying hydrogen.

Authority and Trust.

A great deal has been said about the risk in practical mechanical work of a blind trust in authority, and about the true mechanic who accepts no statement of fact that he cannot himself verify; but, as a matter of fact, in mechanical operations, whether in the humble shop in a country town, or in the magnificently equipped establishment such as may be found in favorable localities, where capital can and does command the highest engineering skill, wherein accomplished draftsman are constantly employed, and every facility for accurate work is supplied, a very small proportion of the fundamental facts that in daily practice are made the basis of this or that mode of procedure have been verified by any engineer, draftsman or workman who ever set foot on the premises. These facts are taken on trust as established; that is to say, the statements of fact as made by accepted authorities are accepted with confidence as contained in books of reference; and this being the only practicable course that can be pursued is the wise course. Consider how much work of a paying kind could be done, if all the tabulated statements of tensile strength of materials, of the transverse strength of beams under variously distributed loads, of weight of materials, of elasticity, of coefficients of friction, of the properties of steam, of specific heats and specific gravities, of the heat units generated by combustion of equal weights of different fuels, &c., in a list that would require a large volume even to name them, had each, before they could be accepted, to be personally verified by experiment or by a mathematical demonstration. Evidently the longest life would be far too short to perform the labor that these tabulated statements represent—a labor that has absorbed the energies of thousands of lives, and has exhausted the powers of thousands of the brightest intellects the world ever produced.

Established Authority.

Since, then, we must live by faith, no less in practical life than in religious belief, we must seek to place our faith where it will not bring us to grief and disappointment. In cases where we doubt a statement made by an authority we must verify, or take the risk of failure, with the equally possible chance of success. Most people are obliged to take the chances in such exigencies, because, if they have the educational qualifications for the needed research, they have not the time, or if they have the time they have not the qualifications. Perhaps it would more nearly hit the exact truth to say that most men in the mechanical trades have neither the time nor the qualifications, to say nothing of the apparatus needed for accurate experimental work. They must, whether they like it or not, sink or swim by the aid of such records of results as are obtainable from books and journals printed for the benefit of their respective trades. The authors of these publications may be called established authorities. Many of them speak wisely and accurately, and their teaching will be of inestimable value to future generations, as it has been to our fathers before us. These benefactors of the human race have erected permanent guide boards that stand as monuments to perpetuate their memory long after they have passed from the stage of life.

The Selection of Authorities.

As there are many books published so full of inaccuracies that they are like dangerous tools, treacherous things to have around the shop, it is very desirable to avoid them. Books of this kind do not long go unchallenged, and the best men in any trade are always competent to name books that are free from important errors and well fitted for the uses of their calling. It is safe to say that no misstatement of important facts long remains undetected in this age of sharp scrutiny, active inquiry and rapid spread of information. Nearly every trade now has publications more or less exclusively devoted to its interests. These papers make it a point to scrutinize and carefully review books purporting to be written expressly for their respective trades. Such books, new or old, are compelled to run the gauntlet of criticism, both as to matter and method, and are thus soon exposed in their weakness or confirmed in their value, according as they are unreliable or of authoritative character. It is not the least service rendered to industry by valuable trade newspapers that their correspondence and editorial columns afford an open arena for the challenge and discussion of all doubtful or disputed questions of fact of interest to their readers; and for this reason, if for no other, no progressive mechanic can afford to dispense with a good trade publication pertaining to his special calling.

Drainage and Ventilation of Stables.

The sanitary condition of stables is a matter which has not received anything approaching the attention which it deserves. The effects of an intelligent consideration of this question, followed by the necessary action for bringing about improvement, have been strikingly instanced by Edward Tidman of London in a paper on "Sanitary Ventilation" recently read by him before the Surveyors' Institution of that city. The case quoted is one of a cavalry barracks, where the death rate of the horses was 180 to 197 per 1000 per annum. The stables were rebuilt on designs in which provision was made for efficient drainage and ventilation, and during the following ten years the death rate fell to 28.50 per 1000. Mr. Tidman says that 75 per cent. of town stables in England are in such an unsanitary state as to be dangerous to man and animals, and to this cause is attributed the prevalence of glanders and farcy and other diseases among the horses.

Hastening Slow Collections.

That a successful plan bearing on this important matter would be of great interest to many old and new business men is beyond a doubt. In consequence we give below a letter from an old reader, asking for some suggestions that would help him. The remarks on it were furnished by another reader who has had an opportunity to confer freely with a great number of men in need of similar information and who has employed various methods with varying success over a wide section of country. The inquiry is as follows:

"The past year has been a prosperous one to me, with plenty of work at paying prices. The only complaint is slow collections. Will you kindly solve for me this difficult problem: What is the best possible way to approach the customer who is slow in his payments, to receive our pay, retain him as a customer and not be guilty of giving him offense? That an effective method would be hailed with delight by many of your subscribers as well as myself is assured."

Commenting on this another subscriber writes: "No idea is entertained that your correspondent will find in the following observations and suggestions an infallible solution to his problem, but trust is felt that he and others may find them of some use. It is assumed that he not only runs his buying and selling himself, but keeps his books and works at his trade inside and outside as well. In learning the trade it was learned that ten hours was a day's work, but on going into business it was found that 16 hours was nearer the mark. These 16 hours should be divided into halves—eight hours for hand work and eight hours for head work, and of the two the last half should always have the preference and should never be subservient to the other half. First-rate hand work can always be bought at from $2 to $3 per day. Head work, which is to be up in the morning clear headed to see that everything that is needed for the day's work is ready for the men to start off with, cannot be hired, especially when this same head must plan for them the next day and waste neither time nor material, receive their report at night and give them their orders, besides buying and selling. Now this part of the head work should be done quickly, for it must not be allowed to take more than one third the head work half.

"The next thing, then, is charging up and keeping the books so that the chore boy can tell a customer how much he owes. This should be correctly and carefully done, for it is preliminary to the most important work of all. The all essential and most important work is making out the bills, delivering them and making collections. Consequently half of the time of the head work half of your day should be devoted to it, letting the labor half suffer if your mathematics cannot be made to correspond with the limit. I would impress you with the importance of the trade of bill making and collecting, which is a trade in itself, and one which it will pay you to learn. Bill collecting is generally considered a disagreeable job by those who do not recognize it as a trade, and work at it as a trained workman would and must to be successful.

"The first point is in charging up, for most people enter a protest against a large bill, the items of which they cannot remember, so if your charge is full and has a memorandum explaining some incident that the customer can connect with the items it will be found an advantage when read on the bill. Now, when you buy often you receive a bill before the goods, and on it a notice that no claims are admitted after five days, also —— per cent. off for cash in a few days, and in some cases, where goods have a long distance to travel, a further notice states, 'All goods shipped at owner's risk,' and immediately on getting the shipping receipt the goods are yours, and the bill is immediately due and collectable. That is business! You are in business! Why not do business in a businesslike way?

"Send a bill as soon as the work is done. Many people are prepared with the money to pay a bill for work they order done, but if you wait a long time before sending a bill they spend the money and your bill reminds them that if you had sent it when you ought it would not annoy them now, and as you have made them wait for the bill you can wait for the money, which is working the rule both ways.

"Send the bill at once, because some people want to save up from their income enough to pay it, and they don't start to save till they know how much it is, and the longer you wait the longer you'll have to.

"Send the bill at once, so a chronic slow payer can be begun on sooner.

"Send the bill at once to a business man or corporation, as they may have special pay days, and if you miss one you will have to wait till the next; so make a note of their pay day on your charge books, ledger and bills.

"Send the bill at once, while the work done is fresh in the mind of your customer, so he can see if all the items are fair and that you have not waited till he forgot, and put in some.

"Send your bill at once, so that if it is lost it can be replaced by another as soon as you find it out.

"Enter your customers' names and the amounts they owe in a pocket ledger and carry it with you, for you can often collect a bill in this way from a man you seldom see, and can give him a receipt and mark it paid on your book while he sees you do it. Some bills have proven easier to collect with the following printed in neat small type in the lower left-hand corner when it is truly carried out:

GOOD WORKMANSHIP, MATERIALS AND TREATMENT MAKE COLLECTIONS.

Please examine the items and report any errors, so they may be corrected at once. Collections made 1st of every month.

"All this preliminary work helps to approach the customer who is slow in his pay. He has had his bill and knows that you want your money on the 1st of the month, that you are willing to correct any errors and that he has received your best work with good materials and has had good treatment. Now, don't fail to see him on the 1st of the month; if you do not it is your fault and gives him a chance to say he supposed you intended to let it go over another month as the work was only just done. Never lose sight of the fact that he did you the favor when he gave you the order, but the favor was transposed and he received the favor the minute that your time, labor, skill and material completed his work and you have as good as loaned him money to the extent of your bill. Thoroughly understand this fact and truth and it will give you confidence to maintain it in a quiet, dignified way, which will impress him. You may tell him that while you always like to collect your bills at the date set, to save further time and trouble for both, you are willing to grant him the favor of another month if he needs it, and that if he prefers he can make a payment on account at any time it is convenient for him, but to come and see you if the promise he is then making becomes impossible to keep, and to let you know what further proposition he has to make. He will see from this that you intend to have the money, that you are disposed to be fair in your treatment, and that you are willing to be generous in the future. Tell him if he has any other work to send in the order, also if he knows anybody that wants anything in your line you would be glad to be recommended if he feels that he can, for your friends are your best-paying advertisements. This will gain his confidence and that is what you want, for if you once get that he cannot withhold the cash or make no provision to pay you.

"If after such a manly, quiet and honorable usage you lose his trade and he feels offended, you made a mistake in trusting him at all. Before you put it down to profit and loss, however, go and tell him that you have done all that you think is required of you, but before you entered suit you came to hear what he had to say, for you know you can get a judgment which will increase the bill to him and is a useless expense, and that you will give him a week to come and pay up, after that time you will sue."

The Watkin Tower.

Ever since the Eiffel tower in Paris was found to have turned out a success there has been a lurking feeling in England that she ought "to go one better." In 1890 the project of building a tower which should overtop the great Parisian structure took practical shape, and a company was formed, the principal promoter of which was Sir Edward Watkin, the well-known originator of the channel tunnel scheme for connecting England and France. The chief engineers of the world were invited to offer designs, and some sixty or seventy competitors from every part of Europe and America sent in competitions for the prizes of £500 and £250, to be awarded to the two most meritorious plans. The design selected as the best has, with some modifications, been adopted.

In regard to the project, *Iron* says: "As the contract for the metal has now been placed, it may be expected that work on the great tower at Wembley Park, London, will shortly be proceeded with. The erection, which is to eclipse anything of the kind that has ever been attempted, is to be entirely constructed of steel, which is to be furnished by the Stockton Malleable Iron Company. It will be 1,150 feet high above the base, which will rise 162 feet above the level of the grounnd, and it will, therefore, exceed by some 150 feet the hight of M. Eiffel's celebrated Parisian structure. Messrs. Heenan and Froude of Manchester are building the tower."

The tower is stated to be of very graceful proportions. It will contain a central hall for dancing, of 20,000 feet area and 60 feet high, and will also possess a hotel with 90 bedrooms. Work has been already begun on the foundations. Wembley Park, in which it will stand, is an inclosure of 280 acres, situated between Willesden and Harrow. It can be reached by rail in 10 or 15 minutes from the center of London. Sir Edward Watkin, the projector of the undertaking, who is one of the most enterprising and progressive of Englishmen, notwithstanding his advanced age, promises that the structure shall be completed before the end of next year.

The plans for the new Third Avenue bridge across the Harlem River have been approved by the Board of Estimate and Apportionment and will doubtless be acceptable to the War Department. Including the approaches, this bridge will cost about $2,000,000. The total length of the bridge and approaches will be 2324 feet. The bridge will be built of iron and steel, and the approaches will be built of iron and masonry. The central swing span, which will be of steel, will be 300 feet long, and each side of the draw will be 104 feet in the clear. The bridge will have a width of 86 feet. The channel spans will be 26 feet above high-tide mark.

It is noticed as a curious fact that while paper is displacing wood in the manufacture of many articles, wood is displacing the materials formerly used in the manufacture of paper.

Crane's Compression Fire Hydrants.

Illustrations are herewith given of improved forms of fire hydrants manufactured by Crane Company, 10 North Jefferson street, Chicago. The standard compression hydrant, shown in Figs. 1 and 2, has leather-faced main valves, closing with the pressure. This form of valve is used with great satisfaction in nearly all the large cities and towns. The construction of the valve and seat is such that it is not necessary to shut off the water to renew a broken stand pipe, as the valve seat is set in the The brass plungers close the discharge ports as the main valve is opened. The arrangement is such that no frozen waste water can stop the use of the hydrant. The important feature of making repairs very easy has been carefully studied The illustrations enable the interior construction of this hydrant, as well as its exterior, to be thoroughly grasped by the reader.

The Crane Company state that they were the first to engage in the manufacture of hydrants for auxiliary pipe lines to be used in connection with fire boats in extinguishing fires located some distance from the docks. By the means of these when not in use, as there is no circulation to prevent the water freezing; consequently no main valve is required.

Fire hydrants with more than one nozzle are now made by this company with independent gates at each nozzle, operated by a simple device of their own invention. As illustrated in the sectional view, Fig. 4, this device consists of a small gate sliding in guides back of the nozzle. A jointed arm connects the gate with a crank which is turned by a wrench applied to an operating nut on the outside. It cannot be turned the wrong way, nor can the valve be forced beyond its proper position and damaged. The operating nut is similar to the nut that operates the valve stem, and does not detract, but rather adds to the general appearance of the hydrants. The valve is simple, and will adjust itself to any small irregularities of the guides, which forces it to its seat at the proper time. When the valve is opened the water way is clear and unobstructed in any way. Every valve is in-

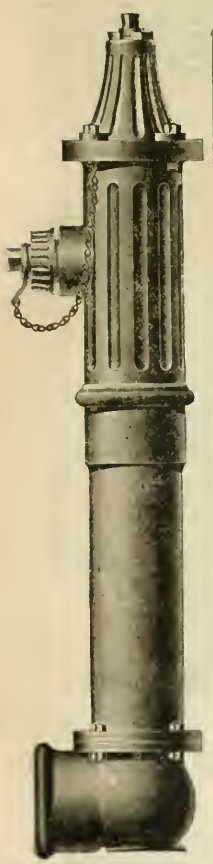


Fig. 1.—General View of Standard Compression Hydrant.

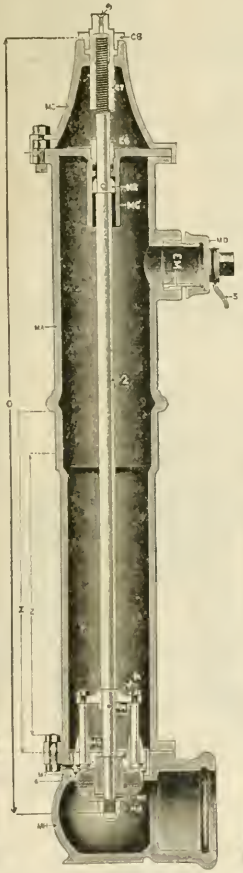


Fig. 2.—Sectional View of Standard Compression Hydrant.

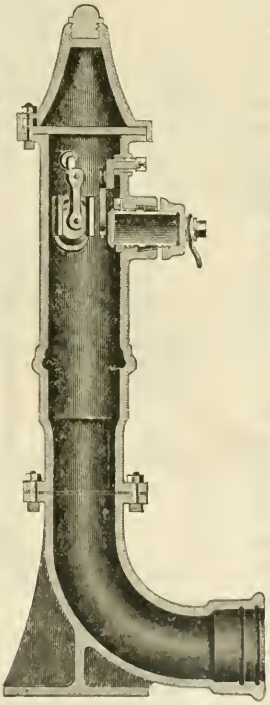


Fig. 3.—Sectional View of Auxiliary Pipe-Line Hydrant.

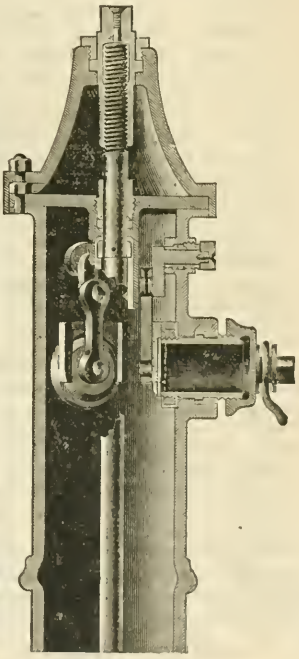


Fig. 4.—Sectional View of Multiple Nozzle Hydrant.

CRANE'S COMPRESSION FIRE HYDRANTS.

base, independent of the stand pipe, the water pressure holding it to its seat. It is therefore claimed to be perfectly safe from danger from discharging water on account of a displaced or damaged valve. To prevent damage from the exertion of an unnecessary amount of strength in closing the valve, which is usual, a hexagon nut fastened to the rod immediately under the stuffing box may be torn loose without injury to the hydrant, as the drip yoke is loosely collared on and allows the stem to turn. The waste valve is of solid brass, positive in action, with no leather facings to wear and no intermediate mechanism to get out of order. It is double, so that the barrel drains in one-half the usual time. pipe lines and hydrants the powerful engines of the fire boats can be made available to aid the ordinary department. These hydrants, a sectional view of one being shown in Fig. 3, are chiefly made for hose of 3½ inches internal diameter, a single line of hose often doing as much as four to five lines from the ordinary steamers. The hydrants are also provided with independent gates at each nozzle, but have no main valve. The connections between the mains and the hydrants are made with elbows of long radius, reducing the frictional loss to a minimum. The fact that these lines are liable to remain unused for long periods of time renders it necessary to drain them during the winter months terchangeable and does not depend on the water pressure to hold it tight.

Canadians who have been shipping cattle in bond from Boston to Liverpool have been notified that they can do so no more. Until the opening of navigation by the St. Lawrence River Canadian cattle are shut out of the British markets by the scheduling order of last fall and are shut out of the United States markets by the American quarantine order.

The cities of St. Paul and Minneapolis have a combined population exceeding 350,000.

STEAM AND HOT-WATER.

One Large or Two Small Boilers.

From S. S., *Marcellus, N. Y.*—I wish to ask a question through your columns on steam heating. Suppose I have a large building to heat, say 48 x 80 x 12, two stories high; which would be regarded as the more economical, all points considered, to heat the entire space with two heaters, one for the upper floor and one for the lower floor, or one large heater capable of heating the entire building, the price of heaters not to be considered? The point to be covered is this: Is one large fire more economical than two small ones for steam heating; if so, why? The heaters to be placed in the cellar in both instances.

Answer.—Our correspondent describes the situation of the building, &c., but in conclusion he asks whether one large fire is more economical than two small ones, and the answer to this question is, Yes. Other things being equal, it is better policy, so far as the fuel consumption is concerned, to use one large heater. The combustion is always better in a large grate than in a small one, as it has proportionally less cooling surface in direct contact with the fire. The coal immediately against the brick or iron, as the case may be, does not burn as thoroughly or efficiently as the coal in the middle of the grate. It must be borne in mind, however, that there are several other reasons why it may often be desirable to use two fires instead of one. There is a better regulation of the temperature in mild weather when a large fire will give too much heat and there is the extra boiler to be used in case one is disabled. In speaking of the relative economies of large and small fires, it is to be assumed that both fires are kept burning briskly. In a dull fire where there is a great deal of waste due to the escape of unconsumed gases, there is less to choose between a large and small grate.

Care of Steam Heater in Summer.

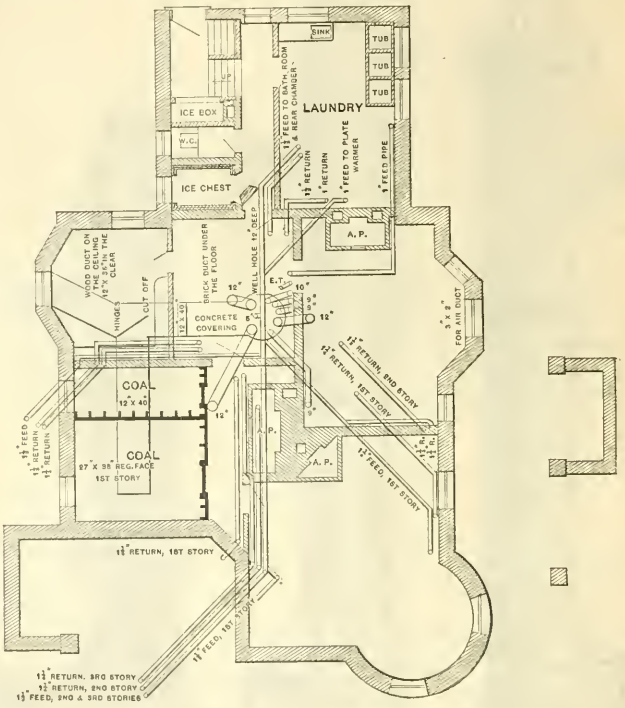
From "B. C.," *Shamokin, Pa.*—In one of our school buildings we have a steam heater. One of the directors is in favor of emptying the boiler when it is not in use during the summer, leaving all the valves open, so that the air can circulate through all the valves and pipes and keep them dry and preserve them. The other directors claim that the system should be kept full of water. Which is the better way?

Answer.—The second suggestion is to be preferred—namely, that the boiler and system of piping should be left full of water in the summer time. While one would suppose that drawing off the water and leaving the system dry would be likely to preserve the iron better, yet the fact is that dampness accumulates within the pipes and the simple act of drying has a very corroding effect. When iron is kept completely submerged in water the corrosion is comparatively small. Our correspondent can test this from his own observation, where an iron rod or plate has been partially submerged in water for a long while. The portion that is completely covered will be found less corroded than that part between the air and the water where it is alternately wet and dry and subjected to both the action of the water and the air.

Combination Hot-Water and Warm-Air Heating.

The combination hot-water and warm-air method of heating is very popular with some people, and, in addition to the pleasant heat furnished, is said to be economical in coal consumption. The direct hot-water heat being used in rooms remote and the warm-air (or indirect) being connected to the halls and rooms immediately over the heater, secures the degrees of heat required in any condition of the weather.

We illustrate herewith the heating arrangements of a residence, situated at Glencoe, Ill., on the lake shore, 90 feet above the level of the lake. In Fig. 1 is shown the basement plan, in Fig. 2 the first-floor plan, in Fig. 3 the second-floor plan and in Fig. 4 the plan of attic. The working plans for the heating were made by the Chicago branch of the Magee Furnace Company, the heater being a No. 51-2 Magee Boston heater with six hot-water sections.



Combination Hot-Water and Warm-Air Heating.—Fig. 1.—Basement Plan.

The water in this heater, it is pointed out, has a vertical circulation, and the fire pot is constructed with water sections and fire brick alternating.

As shown in basement plan, Fig. 1, the heater is located in as central a position as possible, set on a foundation of brick and cement, 12 inches deep, with a brick arm extending underneath the cement floor to partition, to receive the cold-air duct, which is made of wood on the ceiling running to an opening in the west wall.

The cold air duct is also connected with the cold-air register in main hall. Both ducts are operated by one cut-off, so arranged that air cannot possibly be closed off from the heater. The cut-off is operated in boiler room, by a lever at the side

of heater. This method of constructing the cold-air duct is desirable because fuel is saved by closing the duct at night.

The size of the hot-air pipes are all shown in the engravings.

In the first-floor plan, Fig. 2, the dining room, music room and hall are heated by indirect, or warm air, and the sitting room and butler's pantry by direct hot-water radiation. The size of warm air stacks and hot-water risers to third floor are marked on the plan. On this floor two chambers over the dining room are heated with warm air, and the sitting-room chamber, music room chamber, rear chamber and bathroom by hot water. The size of registers and number of square feet of radiating surface in each radiator is marked on the plan.

In Fig. 4 is shown the location of registers and radiators on third or attic floor. The size of registers and pipes, and the number of feet of radiating surface in each radiator, are shown in the plan. On this floor warm air is used in the dining-room chamber and hall, and hot water in the sitting-room and music room chambers.

The expansion tank is located near the ceiling, at point marked on plan, and connected to waste by a 1-inch overflow pipe, so that in case the water becomes overheated it will escape. There is a vent at the highest point of the overflow pipe to prevent syphoning. The tank is connectcd to heater by a separate pipe running to basement, which connects near the heater with a return from one of the radiators. To fill the system, a force pump is provided in basement from whence the water is pumped through the tank to attic. There is an altitude gauge in basement near force pump, to show the hight of water in the system.

In setting a combination heating plant

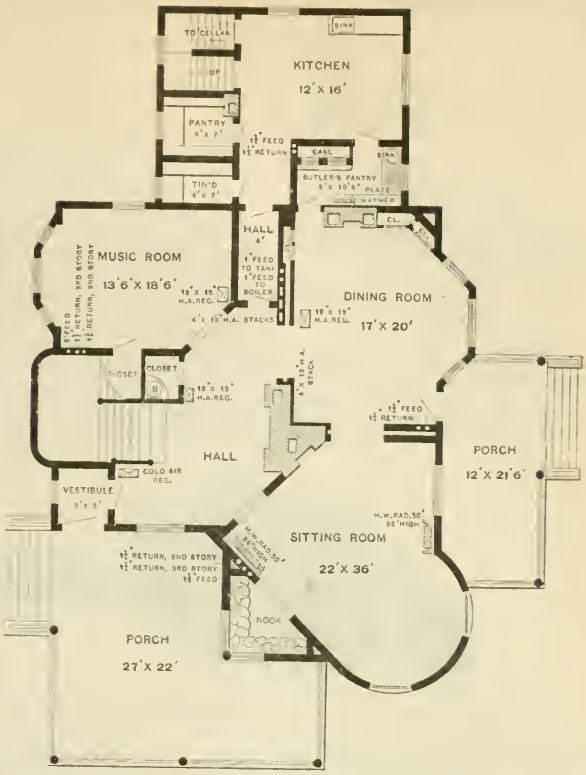


Fig. 2.—First-Floor Plan.

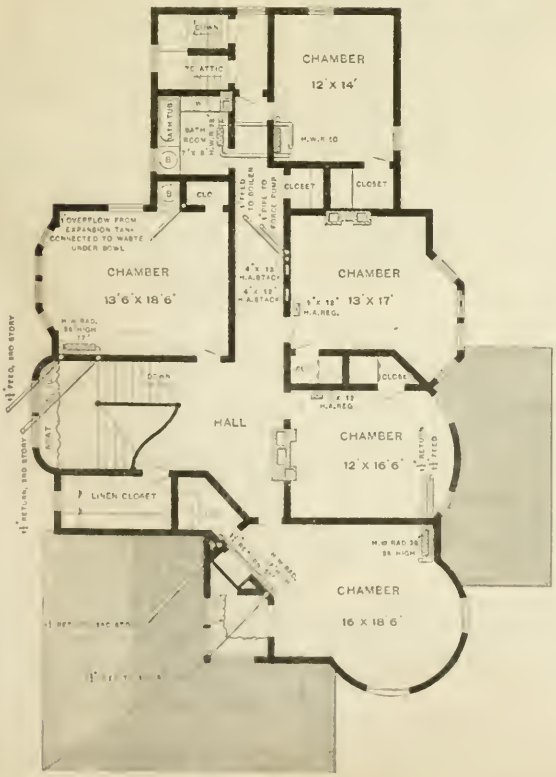


Fig. 3.—Second-Floor Plan.

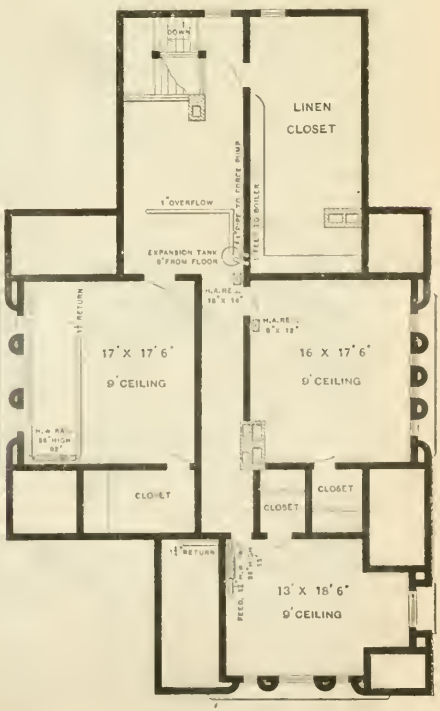


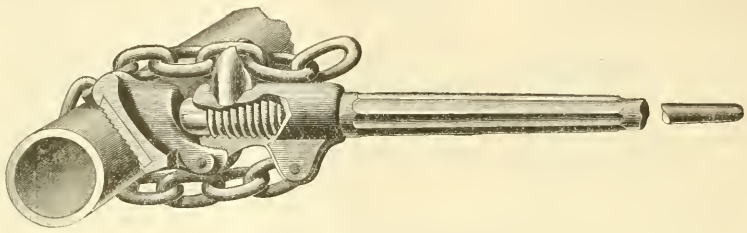
Fig. 4.—Attic Plan.

the principal difficulty to be overcome is adjusting the hot water and warm air so they will heat evenly. In the Magee heater, sectional hot-water heaters are used, which are made to heat from 85 to 167 feet of radiating surface, exclusive of mains. One of these sections, of any size, can be added to or taken from the boiler at pleasure.

In piping for a combination system, we find it necessary, in a great many instances, to use larger mains than is commonly used with a hot-water heater. This is done to get the quickest possible circulation and to avoid overheating the hot air in mild weather.

Hilts' Adjustable Chain-Pipe Wrench.

E. F. Keating, 75 John street, New York, is introducing the above wrench for the Roll Paper Cutter Company, Richford, N. Y., as shown herewith. The wrench has a traveling handle, so that after the chain has been passed around the pipe and fastened, one turn of the handle will take up the slack in the chain. The grip on the pipe is immediate, thus giving maximum results in minimum space and time. The wrench has a ratchet motion, and can be removed from the pipe without having to raise or lower the handle. It is well adapted for working in contracted places. The point is made the ordinary chain wrench has been considered powerful and practical, the difficulty with it being the lost motion required to grip the pipe. This difficulty, it is claimed, is entirely overcome in this wrench. The wrench is made in six sizes, for pipe from 1 inch to 16 inches, with lever from 26 inches to 80 inches in length.



Hilts' Adjustable Chain-Pipe Wrench.

HEATING NOTES.

Thomas C. Andrews, New York City, is the patentee of a steam or water heater. The boiler, as claimed in the patent, comprises a plurality of superimposed sections with a central heating compartment in the sections; a hot-water chamber around the heating compartment in each section, and all made to communicate.

We have been favored with a very pretty glass paper weight, advertising the products of the American Radiator Company, 111 and 113 Lake street, Chicago. The trade mark of the company and sundry allusions to the character of their radiators are permanently attached to the under side of the article, so as to be constantly in sight.

Frank W. Somers, 88 Lake street, Chicago, Western manager of the A. A. Griffing Iron Company, manufacturers of the Bundy radiators for steam and hot water, reports business unusually good for this time of the year. The Bundy radiators are to be used in the World's Fair Hotel, Raymond flats, new depot of the Illinois Central Railroad at Twelfth street, and many other flat buildings, churches and residences in Chicago.

The Japanese Building at the World's Fair is to be heated by means of an Economy hot-water heater, manufactured by the J. F. Pease Furnace Company, Syracuse, N. Y., and supplied by Geo. D. Hoffman, 82 Lake street, Chicago.

Geo. D. Hoffman, 82 Lake street, Chicago, is to supply the steam-heating plant for the large eight-story apartment building owned by Judge Grosscup, at Forty-third street and Grand Boulevard.

The Excelsior Steel Furnace Company, 110 to 114 South Jefferson street, Chicago, have issued a very neat 16-page catalogue of radiators, which they are putting on the market. They control for Illinois and other Western States the Brown Patent Improved Flue Radiator with all cored surfaces, manufactured by the Corry Radiator Company of Corry, Pa., under the patents of R. F. Brown. The system of radiation employed is the result of long and costly experiments and the manufacturers claim very great advantages from the use of radiators of this description. One important claim made is that these radiators secure great economy of floor space, which will be appreciated by architects and house owners in cases in which the saving of room is important. Illustrations are given in this catalogue of a variety of styles, shapes and sizes of radiators adapted to different locations, as, for instance, for ordinary situations, for windows, for circular windows, &c. They manufacture an attractive line of patterns in artistic decorations, as well as in plain styles. Announcement is made that during the year 1893 a line of indirect radiation will be placed on the market, which, it is claimed, will possess many advantages. Tables are published giving the heating surfaces of each section of the different sizes of radiators manufactured, together with full price-lists.

We have a pleasant letter from E. N. Squires, secretary of the New York Central Iron Works Company, Geneva, N. Y., inclosed in which is a very novel novelty in the advertising line. It is a toothpick built out of celluloid and bearing a very close resemblance to the natural quill. The versification talent that this firm have often displayed is exemplified in the present instance with the couplet :

"Take your pick and get the best.
Choose the Dunning and leave the rest."

This simple little poem, together with the address and name of the company is printed on the quill.

A number of leading machine makers have just established a limited liability company, "Technical Office of German Machine Makers," in Hamburg, with the object of pushing the exports of machines.

The *Inter-State Grocer* says that in 1892 the wholesale grocery trade of St. Louis showed an increase of 12½ per cent. over 1891 in the value of goods sold. The greatest increase was in coffee.

The American Lamp & Brass Company.

An event of great interest to the lamp trade was consummated last week at Trenton, N. J. It was made public that three of the largest concerns in the United States had consolidated into an organization devoted exclusively to the manufacture of lamps. The establishments alluded to, which have been amalgamated under the title of the American Lamp & Brass Company, are the Great Pioneer factory of Swann & Whitehead, the Great Empire factory of Swann, Whitehead & Clark; and the Clark Bros. Lamp, Brass & Copper Company; all of which are located at Trenton. The capital stock of the new company is given as $1,000,000. It is stated that the main object in effecting the consolidation has been to make the practically unlimited capacity of the three large establishments available for a still larger output of lamps, by making the three great factories distinctly individual departments of one great factory, and thereby creating a better and more economical system of operating them. The new arrangement is said to be in no sense a trust or stock jobbing scheme, as none of the company's stock will be put on the market. The union of these companies will give them greatly increased advantages in the manufacture and marketing of their products, which are already well known the world over.

The officers of the American Lamp & Brass Company are: W. R. Whitehead, president; P. K. Clark, first vice-president; J. Y. Clark, second vice-president; F. B. Clark, secretary, and Charles Clark, treasurer. The decorating department of the concern will be in charge of Frederick Swann, and W. S. MacLewee will superintend the metal department. The above named, with the addition of J. S. Clark and W. S. Clark, are the incorporators of the new company.

A bill modifying foreign bills of lading, with the design of protecting American shippers, is likely soon to become a law. The present bills of lading are full of exemptions in favor of the carrier which crept in in times long past, when the risks of ocean carriage were much greater than now and when the carriers were in a position to dictate their own terms to shippers.

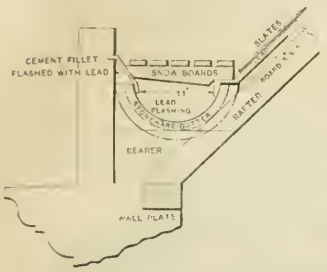
Grand Master Sargent of the Brotherhood of Locomotive Firemen contradicts the reports circulated from Chicago that a general strike is contemplated. He says: "There could not be a strike without disrupting the Brotherhood of Firemen and the Brotherhood of Engineers. The constitutions of these orders absolutely prohibit anything of the kind, and I know it to be a fact that were a general strike permissible the men would not be in favor of it."

Halifax papers chronicle another deal in Nova Scotia coal mines by American capitalists.

ROOFING AND CORNICE.

Durable Gutter Construction.

A rather novel form of gutter construction is that recently brought out by an English manufacturer, and which is shown in cross section in the accompanying illustration. The gutter is made of stone ware with lead flashings, and is covered in such a way as to keep the trough from clogging. The gutters are manufactured in a variety of decorative designs, and are supported on molded Ruabon bricks, which are said to be both ornamental and inexpensive. They require no painting, and both the cornice and roof gutters are unaffected by extreme changes of tempera-



Cross Section of Durable Gutter Construction.

ture. The form of gutter construction here illustrated is being placed upon a number of buildings in Atherton, England, and, we understand, with pleasing results. Although the arrangement of parts here shown represent a form of English practice, it may prove interesting, if not suggestive, to many of our readers.

Roofing Contracts.

From J. J. B., *Philadelphia.*—Will not some of your correspondents in the roofing and cornice trade tell us of some of the contracts they enter into; how much they made (on paper) before they started and how much they lost when they were through with it, and what was the cause of it, so that others can avoid just such contracts?

Trouble with a Roof.

From TIN CHIPS.—A new store had been built in town, and there was considerable rivalry between the two tin-shop proprietors regarding who should secure the contract for putting on the tin roof. At last it was decided that Jim's boss should have the job, and great was the rejoicing in the shop over the decision. Jim had never worked on a tin roof, and at last the opportunity was to be presented to show people what he could do in the roofing line. The tin was laid, and the seams pounded down with the greatest care, and when it came to the soldering, then the science came in. Jim resolved that if there ever was a tight roof, it would be the one he was to solder. After the roof was soldered it was swept off clean and each and every seam examined to see that there were no leaks, for, if the roof was to leak, Jim would lose his reputation as a soldierist. After the building had been finished there was a light fall of snow, and almost every one knows there is nothing that will demonstrate a roof's tightness like snow. On this account Jim welcomed the fall of snow, as it would be the means of showing that the roof was perfectly tight. An examination of the plastering under the roof revealed a number of dark spots, and as these spots were produced by water, it did look as if the roof leaked, otherwise what caused the water? Jim cleaned off the snow, and gave the entire roof a very careful examination, but not a leak could be found. The rival tinner—the one who did not get the job—was of the opinion that the work had been improperly done and that the roof would leak as long as rain or snow fell. Jim was sorely perplexed regarding the strange manner in which the roof behaved, as he was certain the roof did not leak, yet there were the wet spots on the plastering. It came about one day that the school teacher came in the shop, and as the subject of the leaky roof was mentioned, the teacher informed Jim that probably the roof was really tight, and that the spots on the plastering were caused by the moisture from below coming in contact with the cold tin. This would cause the moisture to condense and drip through the roof boards on to the plastering. This theory was adopted as correct, and a dark cloud was removed from Jim's horizon.

Slate Deposits.

In a recent issue of the *American Slate Trade Journal* George H. Harris presents some remarks on the subject of slate deposits which may not be without interest to many of our readers. Among other things he says: The analysis of slate shows that its principal ingredients are silica and alumina. Slate is pronounced by many people to be aluminous clay. It contains a small percentage of carbonate and sulphate of lime. Peroxide of iron is also found in slate. Green slate contains but little, if any, iron. The purple and red take their color from the iron they contain. The presence of slate is determined by the outcrop upon the surface. The average citizen with a limited amount of intelligence, possessing the necessary qualifications for success—pluck, perseverance and muscle—is better equipped to solve the problem in regard to the exact location of a slate deposit than is the most scientific mineralogist.

But very few quarrymen, if any, are thoroughly confident of meeting with success in developing the slate quarry. It frequently occurs that the most experienced quarrymen lose their all in some unfortunate venture of this kind, while some inexperienced workman may find the larger bed and larger compensation with little effort. If success in quarrying slate were an absolute fact, and if there was no question regarding the location of the deposit, then a condition of things would exist directly contrary to the present. The laborer would then be the capitalist. The risk which surrounds the average quarrymen makes capital imperative. Time, money, patience and all the modern appliances are necessary and indispensable requisites in slate quarrying.

In order to connect the past with the present, so far as it relates to the original deposits of slate, it might be stated that geologists have been unable to form a continuous history of rocks from the remains of plants and animals found in them. Hence it appears that there is a diversity of opinion among these men regarding the early formation of slate deposits.

One of these gentlemen thus states his opinion regarding slate in its earliest stages, which conforms to natural laws and is as authentic as anything written upon this subject. It is as follows:

"It is said that the slate beds have been formed ages back, at the bottom of the seas, where mud had been washed by rains from the old lands and carried by rivers into the seas. Most of the mud was made up of feldspar, with smaller amounts of lime, magnesia, iron, potash and carbon. The mud deposited in layers or beds in the bottom of the seas, in course of time got covered with other materials. The whole mass, slowly hardened and consolidated by pressure and heat, lifted out of water. It cracked and split in various directions while in process of drying. Influenced by that law of crystallization by which all minerals assume certain shapes, the mass split up into rhomboidal masses. After this came the great disturbing forces by which the beds were bended and twisted in all directions. The great pressure on these lay between the N. N. W. and E. S. E. Between these two points the particles of the mass became flattened and compressed into about half its original bulk, and thus was imparted to an unbroken mass of rock that lay between these cracks and divisional planes that had a tendency to peel off from each other, and is now called slaty cleavage."

There is a great similarity in the location of slate deposits, whether in Pennsylvania, Maine or Vermont. We generally observe the outcroppings of slate on high lands or mountains with a depression at the base, which extends to another range of elevated land. Take, for instance, the slate beds of Vermont and New York, we find that they are located in and about an extensive range of hills, the valley which properly extends from Castleton, Vt., to Salem, N. Y.

The slate section of Vermont and New York is located at the southern trend of the Adirondack Mountains and in close proximity to the Champlain Valley. The valley in which are located the slate deposits varies in width from 1 mile to 5 miles and narrows down at the northern extremity, leaving but a limited space for travel between two mountains previous to entering the Otter Creek and Champlain valleys, lying at the base of the Green Mountains. From their sides are taken marble, granite and other minerals. This range forms the eastern bulwark of this great valley, while the Adirondacks perform a similar duty on the west side of the Champlain Valley.

The Adirondacks commenced their duties at a very early period in the geological history of the earth. They belong to the Archæan age—sometimes called the iron age on account of the presence of iron. Graphite, granite, mica, schist, hornblendic rocks and crystalline limestone are the principal mineral deposits of this range of mountains.

Designs in Slate Roofing.

In our issue for February 4 we presented illustrations of a number of designs in slate roofing taken from an English architectural journal. We give below additional designs from the same source, remarking in this connection that the combinations of slate may be varied al-

just what has been previously mentioned and described, but the ordinary courses fill in between the diagonal lines in a different way. A little care in starting each of the varieties is all that is required to enable any intelligent workman to manage each of these patterns.

A little center pattern is given in Fig. 34. A dark slate, cut as in Fig. 37, is in the regular roofing slates are reached. To work out this design the only shapes necessary are those shown in Figs. 40, 41 and 42, and their arrangement is distinctly shown in Fig. 39. In the next two diagrams, Figs. 43 and 44, other designs are shown, worked out with the same detail as in these previous examples. A pattern of the same style, but much larger, is

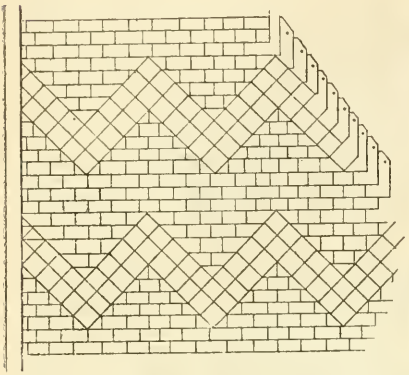


Fig. 31.—A Unique Combination of Cut and Uncut Slate.

Fig. 34.—A Neat Pattern.

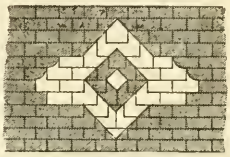
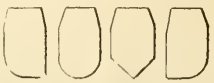


Fig. 43.—Design varied from Previous Examples.



Figs. 35 to 38.—Slate Used in Producing Pattern Shown in Fig. 34.

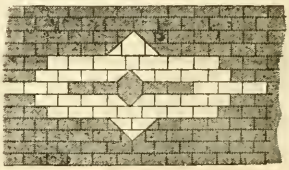


Fig 44.—A Pleasing Design of Light and Dark Slate.

Figs. 40, 41 and 42.—Shapes Required to Produce Pattern Illustrated in Fig. 39.

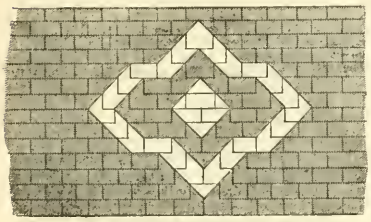


Fig. 39.—A More Elaborate Design.

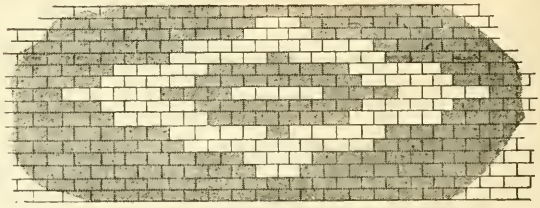


Fig. 45.—Design Made Without Cut or Shaped Slate.

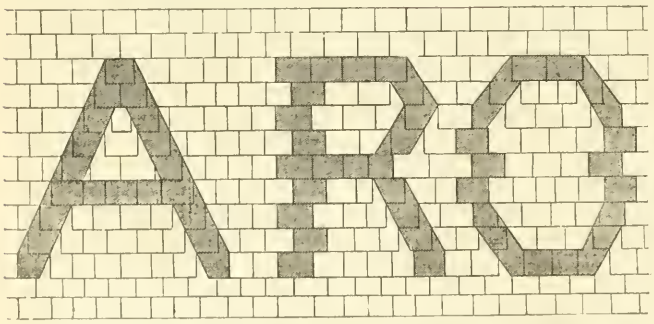


Fig. 46.—Showing how Letters of the Alphabet may be Formed with Slate Specially Cut for the Purpose.

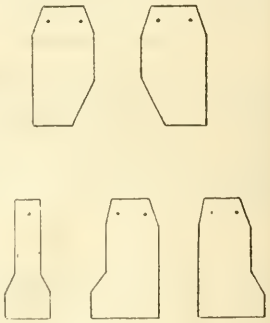


Fig. 47 to 51.—Forms of Cut Slate Used in Making Letters shown in Fig 46.

DESIGNS IN SLATE ROOFING.

most without limit, according to taste and requirements:

Before considering a totally different style of ornament, an example recently seen by the writer may be noticed. It consists of diagonal bands of shaped slates, with a few ordinary courses between each diagonal band. In Fig. 33 will be seen exactly what is meant. The shaping is

center. The light slates surrounding it are variously cut, both to the round-cornered shapes, Figs. 35 to 38, and to the beveled-cornered shape.

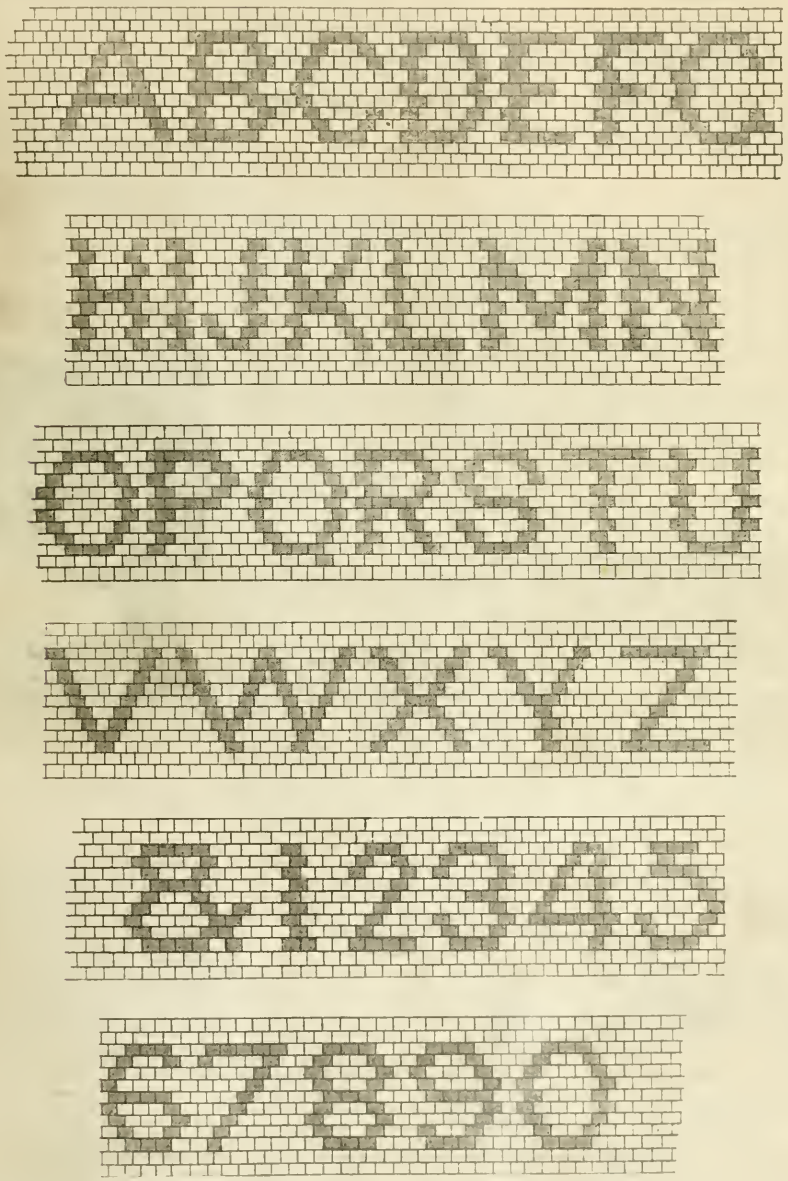
Some of the common slates outside are also cut as shown in these figures. A more elaborate example is given in Fig. 39, where the center is light; next is a series of dark slates, and light again before the

given in Fig. 45, and in this it will be noticed that there are no cut or shaped slates at all—all are of the usual square form.

It is sometimes desired to have a firm's name shown in the roof of a warehouse or workshop, and this, though usually managed by means of the paint pot, can yet be arranged in the slating.

It is, perhaps, a little troublesome to manage, especially if the name be such as Macfarlane, Fotheringham, Sons & Co. This would require an immense length of roof to accommodate it. But it is just as well all firm names are not so bulky. The letters require about seven courses of slates further up in the same letter. These, it will be noticed, are for nine courses of slates.

All the letters of the alphabet may be easily formed from A R O, and worked out in seven courses. For instance, B may be almost wholly found in R, C in O and D in R, &c., while the diagonal of A will be required in such letters as M, N, V, W and Z. These are all arranged with square-cornered slates of a darker or lighter color than those of the rest of the roof. A complete alphabet and set of numerals, shown in Figs. 52 to 57, inclusive, are given for the use of any one who may want to work a name in a roof. There will then be no difficulty whatever in arranging any name required. Then, though this alphabet is for nine courses, the seven course one is arranged in the same way as this. With these remarks and accompanying sketches we hope it has been made quite clear that ornament in slating work may be much more frequently introduced than it is, to the great benefit of the public at large.



Figs. 52 to 57.—Alphabet and Numerals Made by Using Slate of Ordinary Shape.

DESIGNS IN SLATE ROOFING.

to form them respectably. In Fig. 46 is given a sketch of three letters, A R O, worked out in slate cut as shown in Figs. 47 to 51. It may be wondered where Figs. 50 and 51 go. An examination of Fig. 46 will show, however, that they are required immediately above the cross of the A. Fig. 49 is required just a little

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The Cortright Metal Roofing Company of Philadelphia have changed the address of their Western office from 134

Van Buren street to 84 Adams street. The company state that their Western trade has largely increased during the past year, necessitating better facilities for conducting the business, which is the reason for the change in their location.

FLASHINGS.

SEALED PROPOSALS will be received at the office of W. J. Edbrooke, Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock p.m., February 28, for the labor and materials required for the cut stone and brick work, iron and wood floor, slating and roof construction and roof covering for the superstructure of the United States Post Office building, Burlington, Iowa.

A POSSIBLE NEW MARKET in the sheet-iron trade may open up in the far East. We learn from an English exchange that galvanized sheet iron appears to be coming into favor as a roofing material in China. The use of this metal has hitherto been confined to some of the provinces, but it now being adopted in Peking itself. Galvanized sheets will, we are told, be used for covering the large iron railway station which is to be built during the coming summer in Tientsin, the port of the Peiho River open to foreign trade, and the Chinese Government have called for tenders for this work from any quarter. Intending competitors can obtain all particulars of the contract from R. M. Brown & Co. of Tientsin.

GEO. C. KEENE & CO., 148 to 150 East Front street, Cincinnati, Ohio, report the demand for their productions as being excellent and are running their plant full. Among recent goods shipped are carloads of roofing machinery to the Berger Mfg. Company, Canton, Ohio; a 10 foot cornice brake to the Sims Mfg. Company, Newark, Ohio, and a 10-foot corrugating machine to Cambridge Roofing Company, Cambridge, Ohio.

THE INDUSTRIAL EDITION of the *Easton Express*, Easton, Pa., contains some interesting details respecting the slate quarries, at Bangor, Pa., which are being operated by the Bangor Excelsior Slate Company of Easton. The company are working two extensive slate mines, the Bangor Excelsior and the Bangor Royal, the property of R. S. Brown, of which the yield during the past year was 24,000 squares. Considerable additional facilities have, however, been recently introduced for the more rapid mining and handling of the material, and the output is consequently expected to be largely augmented during the present year. The quarries are stated to be thoroughly equipped with all the latest mining devices in the way of steam drills, derricks, conveyors, &c., operated by steam or electric power; and the roofing slate is all made on the spot, complete and ready for direct shipment.

E. E. SOUTHER & BROTHER of Nos. 932-936 North Second street, St. Louis, Mo., favor us with a copy of a neat catalogue of 32 pages, illustrating and describing their roofing specialties. The firm give attention to corrugated iron and steel sheets for roofing, siding and ceiling, pressed standing seam, V-crimped and roll cap roofing, gutters, corrugated down spouts and pressed steel brick. With reference to their corrugated iron the firm state that all their sheets with the standard 2½ inch corrugation are 26½ inches wide when finished, and lay exactly 2 feet wide after lapping one corrugation. They make sheets from 4 to 12 feet in length, of the best box annealed iron or steel, especially adapted for corrugating. The catalogue is profusely illustrated, the engravings being clear and distinct, while the descriptive letter press includes directions for laying the Climax roof, as well as giving other particulars of interest to those engaged in the roofing trade.

THE AMERICAN ROOFING COMPANY, with office at 1505 South Second street, St. Louis, Mo., are distributing a hanger bound with metal strips and arranged with an eye for suspending it upon the wall. Printed upon a floral design is a panel carrying a number of illustrations of corrugated iron, roll and cap roofing, steel-pressed brick, shutters and doors, and curved corrugated iron or steel. The poster is lithographed in colors and likely to attract attention wherever it may be exposed to view.

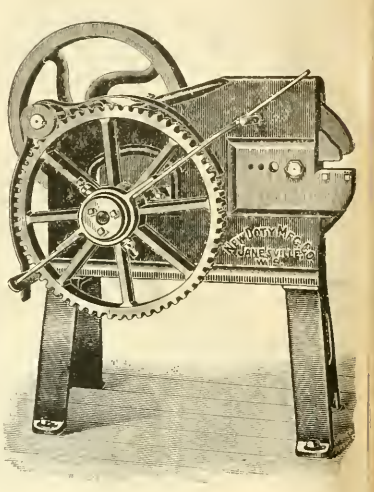
The Small Arms of the Great Powers.

The newest small arms of the Great Powers are of the following calibers: Austrian Mannlicher, 0 315 inch; French Lebel, 0.315 inch; German Mannlicher, 0.311 inch; British Lee-Metford, 0.303 inch; Russian Mouzin, 0.300 inch, and Italian Carcano, 0 256 inch. The weights of the rifles, without bayonets, are: Austrian, 9.6 pounds; French, 9.2 pounds; German, 8.3 pounds; British, 9.2 pounds; Russian, 9.5 pounds, and Italian, 8.2 pounds. Several of the powers now supply to each man 150 cartridges. Assuming this to be the number all round, the weight is: Austrian, 9.8 pounds; French, 8.1 pounds; German, 8.9 pounds; British (black powder), 9.2 pounds; Russian, 7.7 pounds, and Italian, 7.1 pounds. Thus the caliber of the rifle, as a rule, regulates to an important extent the total weights to be carried by the men in action. Putting aside bayonets, cartridge boxes, magazines and other equipment, the Austrian soldier, whose rifle is of the largest caliber, carries in rifle and 150 cartridges a weight of 19.4 pounds, while the Italian soldier, whose rifle is of the smallest caliber, carries in rifle and 150 cartridges a weight of only 15.3 pounds. The British rifle and ammunition are, however, too heavy in proportion to the caliber, and the result is that, although the British soldier uses a bullet of less caliber than the Austrian, the French or the German soldier, he carries a greater proportionate weight in rifle and ammunition than any soldier except the Austrian. It may be added that Belgium has adopted a caliber of 0.301 inch, Roumania, one of 0 258 inch; Spain, one of 0.295 inch; Turkey, one of 0.301 inch, and Switzerland, one of 0.295 inch. Belgium, Spain and Turkey use the Mauser principle; Roumania uses the Mannlicher and Switzerland uses the Schmidt.

According to the *Engineering News*, the use of meters at Detroit, Mich., has shown some remarkable results. It has effected a reduction of the daily *per capita* consumption of water from 204 gallons in 1888 to 140 gallons in 1892, about 31 per cent., and has so reduced the pumping expenses as to make the operating expenses for 1892 actually $2251 less than for 1888, notwithstanding an increase in population estimated at 46,000 and an increase in families supplied from 36,863 in 1888 to 46,400. While the population increased over 40 per cent. from 1888 to 1892, the total yearly consumption decreased nearly 15 per cent. L. N. Case, secretary of the Detroit Water Board, estimates that in the past four years the meters introduced have saved, in pumping expenses and interest on enlargements of the works, otherwise necessary, about $235,000. In addition an ever increasing extravagant waste, restrained only by lack of capacity of the works, has been stopped and the *per capita* consumption has for four years been going steadily downward, instead of upward. Until the consumption is reduced to at least 100 gallons *per capita* the water commissioners of Detroit, it would seem, cannot begin to rest contented with the results of their efforts to save water, for of 39 of the 50 largest cities of the United States, excluding Detroit, the daily water consumption of 31 was below 140, and of 21 below 100 gallons *per capita*, while 14 of these cities had a consumption of only 75 gallons or less, and 5 were below 50 gallons.

The New Doty Shear.

The accompanying engraving represents a new shear brought out by the New Doty Mfg. Company of Janesville, Wis. It is especially adapted for cutting bar iron, either flat or round, the machine shown—the smallest size built—cutting 3 x ½ inch flat bar, or 1-inch round. The knives for flat and round iron are independent of



The New Doty Shear.

each other, and both sets of knives are at all times ready for use without any change. The round iron knives are made the reverse of the iron, and do not flatten it in cutting. The machines are made very strong and powerful, and do their work easily. All boxes are cast solidly on to the body of the machine, and there are as few separate parts as possible. The eccentric, eccentric shaft and clutch are all cast in one piece. The balance wheel, shaft and all bolts are of steel. The motion of the knives is controlled by a clutch, which can be operated by hand or foot power.

THE STAFF OF TRAVELERS who will represent the Michigan Stove Company on the road during 1893 embrace the following, who will cover the territory named: Chas. Breasted will travel in the State of Illinois; Henry A. Pope in Southern Illinois; M. E. Mills in Wisconsin; A. S. Dean in Minnesota and Dakota; J. C. Bosworth in Iowa; J. W. Cassell in Missouri and South Iowa; J. F. Farrell in Kansas, Colorado and Texas; Matt. R. Bingham in Nebraska; Fred. H. Warren, Chicago; T. H. Harlow on the Pacific Coast; W. E. Anthony in Northern Michigan; C. H. Millen in Southern Michigan; A. H. Dane in Indiana; A. Saybolt, Jr., in Ohio; F. P. McCanna in New York and Pennsylvania, and G. Holloway in Southern States.

"The Metal Worker" Competition in Skylight Pattern Cutting.

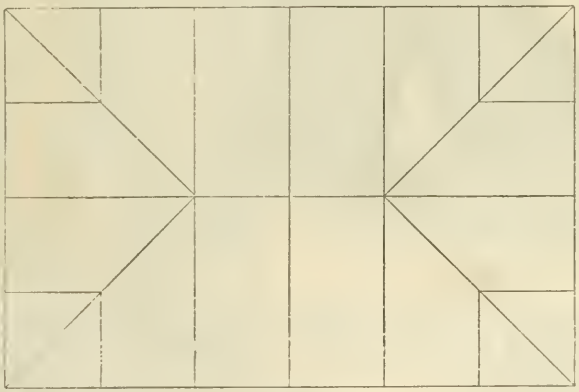
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

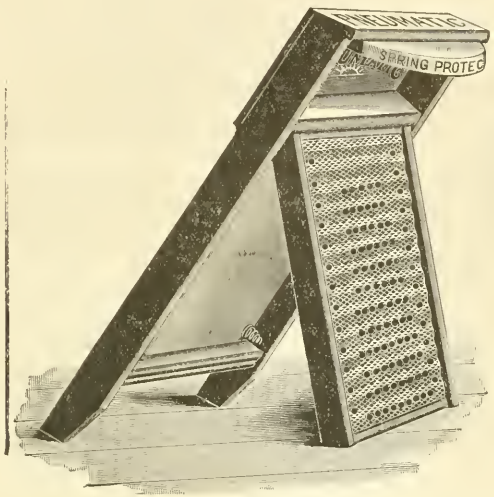
1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

THE RETAIL STORE.

The Pneumatic Washboard.

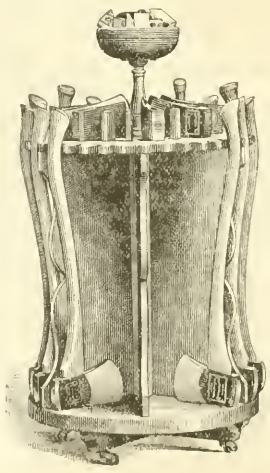
The pneumatic washboard, as herewith illustrated, is being offered by Gorham & Sargent, Cleveland, Ohio. By the construction of the washboard, it is explained, an air chamber is formed under the rubbing surface. When in use the perforated rubbing plate is described as being pressed downward into the air chamber at each stroke of the operator, forcing air, suds and water upward through the fabric that is being washed, thereby thoroughly cleansing the clothes in a short time, and with great ease. The point is made that the yielding to pressure of the rubbing plate, in connection with the air chamber, affords relief to the arms and shoulders of the operator. The board is represented in the cut as after having been used, opened out to dry and shows the air chamber under the rubbing surface, springs, &c. The board is provided with the Peerless embossed rubbing surface, with large and strong pivoted frame, heavy zinc, and the manufacturers claim, combines in one article all valuable features of the best washboards and washing machines.



The Pneumatic Washboard.

A Convenient Axe Stand.

The accompanying illustration shows a convenient form of Axe Stand designed by Samuel H. Blackwell, Fairfield, Maine. It will accommodate six dozen Axes, three dozen with handles and three dozen without. The hight from the floor to top of the upper shelf is 33 inches; from floor to top of lower shelf is 6 inches, and from top of lower to top of upper, 27 inches. The shelves are 24 inches in diameter. Around the edge of the upper shelf are 36 notches in which the handles of the Axes fit, the Axes resting on the lower shelf, the weight of the bit of the Axe being sufficient to keep the handles in place. Around the upper shelf, 6 inches from the edge, there are 18 pins shaped like the eye of the Axe, on which the unhandled Axes are placed, they being sufficiently far apart to admit an Axe between them, thus making room for 18 more Axes, and making three dozen in all. The small urn or bowl is for Axe Stones and Wedges. It stands 11 inches from the top and is 9 inches across the top. The top shelf is supported by six boards arranged at equal distance around the circle. The whole is upon casters, which allows the stand to be moved around the store at the pleasure of the dealer.



A Convenient Axe Stand.

The trade will recognize the convenience of this Axe Stand, in view of its simplicity and the comparatively small space occupied in displaying an extensive line of goods, with the further advantage that it allows every Axe to be examined without disturbing any of the others.

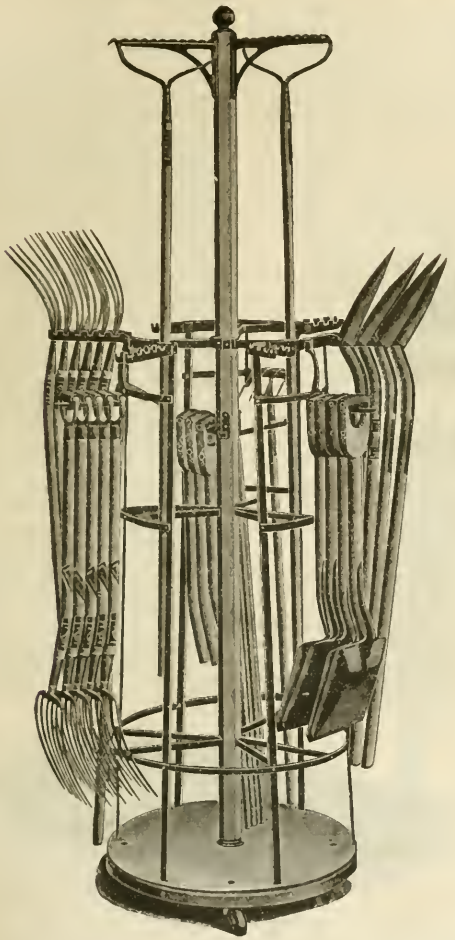
Revolving Show Stand.

The accompanying illustration of a revolving Show Stand is reproduced from the London *Ironmongry*, and consists of a block of wood about 18 inches long and 4 inches square, covered with a piece of virgin cork. A piece of cork that will just fit around the block in its natural curl without cutting is the best, and is secured by fixing a 6-inch circular block at each end. The articles to be displayed are attached in picturesque disorder, not being crowded lest they become confusing to the eye. Knives, Forks, Scissors, Corkscrews, Ice Picks and other articles can be securely attached by the points, so as to stand out prominently from the cork, forming an attractive display. This is made to revolve by a roasting jack concealed in the cork above the stand, the constant movement and the glitter from the polished surface of the goods in the sun or gaslight arresting the attention of passers-by, proving, it is said, a wonderful and constant source of interest. We suggest that an electric motor or other power could readily be substituted for the roasting jack by those desiring to utilize this idea for displaying this class of goods.

Revolving Show Stand.

Herrick's Agricultural Tool Rack No. 2.

F. A. Herrick & Co., 228 Second street, Jackson, Mich., have put on the market a



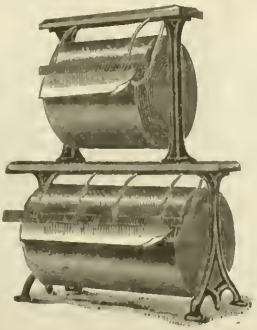
Herrick's Agricultural Tool Rack No. 2.

tool rack, as illustrated herewith, reduced in size but constructed upon the same principle as their No. 1 rack. The No. 2 is designed especially for use where floor space is limited, the platform being but 30 inches in diameter, whereas the platform of the large rack is 4 feet across. The No. 2 rack holds 120 tools and handles, and when desired will be furnished to revolve so that in a crowded store it may be rolled in some corner out of the way and revolved to get at the tools needed, thus economizing considerable room. Testimonials from merchants having used the large rack indicate that but about one quarter the space is required for the accommodation of the same number of tools as with other racks and that sales on such goods are largely increased.

It is reported that as a result of the Old Colony deal the consolidated road has placed an order for thirty-five new locomotives with the Rhode Island Locomotive Works of Providence.

Economic Hopking Roll Paper Cutter.

The roll paper cutter herewith illustrated, put upon the market by the American Roll Paper Company, St. Louis, Mo. has the original Hopking knife and an improved automatic finger for raising the sheet of paper. Thus the paper is always in a position to be readily grasped for tearing it off. The cutters are well finished in japan and hardwood, and are made in all sizes from 6 to 36 inches. They are made in pyramids of every kind or in single rolls.



Roll Paper Cutter.

Decorated Imperial Ironware.

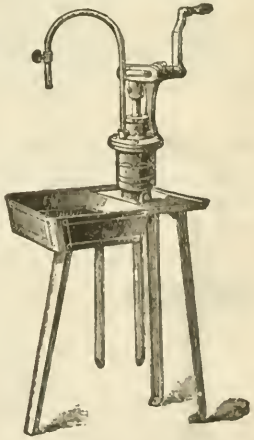
St. Louis Stamping Company, St. Louis, Mo., are putting a line of these goods on the market, an illustration of which is herewith given. The tea pot shown is of decoration K; coffee pots are also made in the same style, the line being known as

Decorated Imperial Ironware.

the Acme. The goods have bright tin lids, wooden handles, and are finished both inside and outside in ironware. The goods are designed to supply the demand for a cheaper and more popular grade of goods than those finished in nickel plate.

Self-Measuring Pump.

The Bevan Mfg. Company, through Morgan & Cornell, 42 Hudson street, New York, are introducing an improved pump, as here illustrated. This is designated



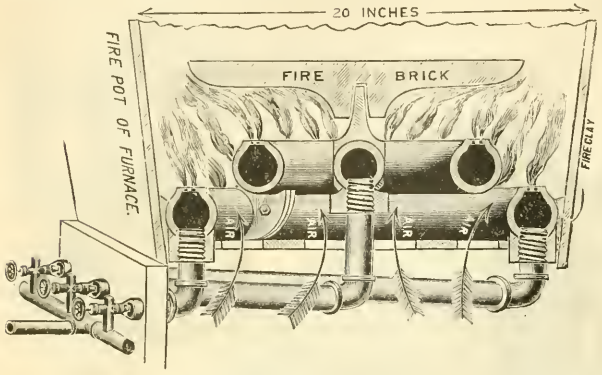
Bevan Self-Measuring Pump.

as a self-measuring liquid conveyor, intended largely for handling kerosene, benzine, turpentine, &c., dispensing with the use of tanks, funnels and measures. The advantages claimed by the makers for this over the old method are as follows: Barrels or cans of oil can be stored in the cellar or outbuilding and connected with the pump by means of two pipes, one of which conveys the oil to the pump and the other

returns the drip. One full turn of the crank measures exactly one-half pint, thus allowing the material to pass directly into the purchaser's can. The pump is hermetically sealed, avoiding disagreeable odors, occupies but 1 square foot of floor space and can be placed where most convenient. Emphasis is laid on the reduction of fire risks to a minimum by its use.

The Duplex Ring Burner.

E. C. Merrill, 168 Second avenue, Pittsburgh, Pa., has brought out an improved form of his Duplex Ring burner, designed

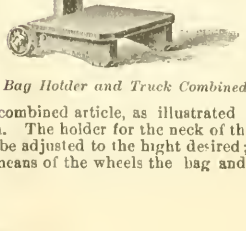


The Duplex Ring Burner.

especially for cast-iron fire pots from 16 to 20 inches in diameter. We understand that the burner has given excellent results in operation, and the manufacturer is well pleased with its record as a gas saver, making reference to one case where it was used with 50 feet of gas in a five room dwelling. The principle embodied in the Duplex is to exclude the draft on the side of the fire pot and take the necessary supply above the gas flame. This, the manufacturer says, gives a mixture by gravity, and causes the flame to travel close to the side of the fire pot. This burner has been adopted successfully in hot air furnaces, power boilers, and steam and hot-water heating boilers. In the latter case, it has been used with the hot-air thermostat furnished by the Merrill Thermo Valve Company.

Bag Holder and Truck Combined.

Ames Plow Company, Boston, and 53 Beekman street, New York, are offering

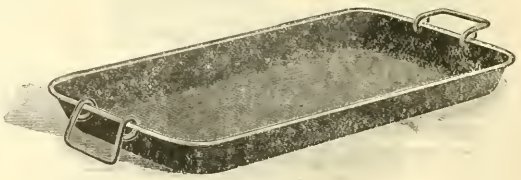


Bag Holder and Truck Combined.

the combined article, as illustrated herewith. The holder for the neck of the bag can be adjusted to the hight desired; and by means of the wheels the bag and contents can be trucked onto the scales and off again, or to any portion of the building, without handling it. The device is especially designed for warehouses where grain or other matter is handled in bags.

Pressed-Steel Pans.

The Kilbourne & Jacobs Mfg. Company, Columbus, Ohio, are manufacturing these pans, as shown herewith. The pan is stamped from one sheet of steel, and the flange or top edge of the pan is turned over a $\frac{5}{16}$-inch steel rod, stiffening and strengthening it and giving a smooth finish. The handles are of $\frac{5}{16}$ inch round iron, and drop down against the sides of the pan when not in use. The pans are designed for use in bolt, rivet and screw factories, machine shops, &c., under lathes and kindred machinery, to catch the turnings, trimmings and borings from the tools. The smaller sizes are adapted to handling



Pressed-Steel Pan.

small castings, bolts, rivets, &c., in process of manufacture, from one machine to another. The point is made that these pans are much more desirable and convenient than wooden boxes, or sheet iron trays bent up and riveted, for such purposes.

MEMORANDA.

The recently organized firm of Cavanagh & Thompson, dealers in Cordage, Brushes, Brooms, Earthenware, Glassware, Woodenware and other lines of house-furnishing goods are now fairly established in their quarters at the intersection of Reade and Hudson streets, New York, where they are always pleased to welcome their friends. They refer to business as satisfactory and promising well.

John M. Waddel, Greenfield, Ohio, issues a circular in which he announces his withdrawal from the John M. Waddel Mfg. Company as secretary and manager, and states that he is now equipping a new manufactory with the latest improved machinery, to be known as the Waddel Wooden Ware Works. It is expected that the new firm will be ready to market its goods not later than April 1. A full and complete line of Cash Registers, Money Drawers, Coffee and Spice Mills, Animal Traps, Toys and novelties will be manufactured. It is stated that new ideas and artistic designs will be introduced in Coffee Mills, and that all goods, in fact, will be made from patterns but recently designed.

United States Gutta Percha Paint Company, Providence, R. I., are putting on the market a paint designated by the letters A. B. C., which represent the full title, which is, Architects', Builders' and Consumers' Prepared Paint. This paint is put up in gallon, half gallon, quart, pint and half pint packages, which are labeled handsomely. This line is specially designed for the Hardware trade, and makes very attractive shelf stock. The manufacturers are sending out sample cards to the trade, which may be had on application.

An entertainment, hop and reunion will be given by the Philadelphia Hardware Association on Thursday evening, February 23, at 8 o'clock, at Young Maennerchor Hall, corner Sixth and Vine streets, Philadelphia. A very entertaining programme, including accomplished talent, has been prepared, and several well-known speakers will make addresses. In addition an excellent orchestra has been engaged to discourse music. The association are hoping for a large and representative attendance of the Hardware interests of the city. The entertainment is in charge of the following committee: H. L. Stortz, E. H. Shannon, L. C. Glading and S. S. Raser.

S. O. Cummins of Bellaire, Ohio, advises us that he is putting in the show window of his Hardware store a plate-glass front, 10 x 15 feet in dimensions, with mirrors at sides. Mr. Cummins refers to this as the largest plate-glass front in the city.

Arrangements for the hardware dinner next Tuesday evening are about completed. We are advised by the committee that the demand for tickets has exceeded the supply, and a good many persons, many of them connected with leading houses, have been unable to obtain tickets. The success of the dinner in point of numbers is thus assured, and everything would seem to indicate that it will be a thoroughly enjoyable and representativegathering.

The whale fisheries last year as a whole were successful. The catch of whales by the combined fleet in the Arctic Sea and South Atlantic was 214, against 212 in 1891. The number of vessels engaged in the business January 1, 1893, was 95, with a tonnage of 21,165, against 92, with a tonnage of 20 845, January 1, 1892, while in 1860 the fleet consisted of 569 vessels, with a tonnage of 176,848.

A bill to prevent tramp steamers transporting merchandise from one American port to another, by making a triangular voyage to a foreign port, has passed the United States Senate.

A firm of butchers in New York, with $5,000,000 capital, are establishing large slaughter houses in Kansas City, in competition with firms in Chicago.

The Tin Petition.

In view of the fact that a duty of 4 cents per pound is to be imposed on pig tin after July 1 of this year, a petition is being circulated by T. J. Pope's Sons & Co. of 292 Pearl street, New York, which is to be presented to Congress, asking that that section of the McKinley bill be repealed. It is claimed that it is now evident that tin mining in this country has not been a success and that the production of pig tin could not reach 5,000 tons per annum during the next two years, as would be necessary under the McKinley bill; fear also being entertained that the existiog state of affairs will lead to disastrous speculative operations, consumers of tin in all forms are being asked to sign the following petition:

Whereas, By the law passed in October, 1890, and known as the McKinley bill, pig tin is subject to a duty of 4 cents per pound, to take effect on and after July 1, 1893, with a proviso that unless the production of pig tin in the United States is shown to be 5000 tons per annum, during the ensuing two years, the duty should thereafter be abrogated, and, whereas, from competent and expert testimony it is already known that the home production of the article cannot, in all human probability, amount to anything approaching the quantity named of 5000 tons per annum, the undersigned, your humble petitioners, respectfully represent that it is extremely unjust to the people of the United States, and more particularly to those directly interested, as consumers of an article of prime necessity to the industries and arts, that the said tax should now be imposed. Pig tin is a raw material, practically unproduced in the United States, and has been for many years on the free list.

The importations now reach an aggregate of about 21,000 tons per annum, the duty on which at 4 cents per pound will amount to nearly $2,000,000.

We further respectfully represent that the imposition of a tariff upon pig tin is directly opposed to the tin-plate industry, which it is so desirable to introduce and foster in this country, and toward which commendable progress has already been made.

In view therefore of the facts above stated, we humbly petition that the law, so far as it relates to the imposition of a duty on pig tin, may be promptly repealed or its operation suspended.

The petition has not yet been issued to the New York trade, but in the quarters where it has been circulated it has met with a considerable response. The signers to date are as follows:

Michigan Brass & Iron Company, iron and brass founders, Detroit, Mich.
Western Electric Company, electrical goods, Chicago, Ill.
John T. Noyes Mfg. Company, mill machinery, Buffalo, N. Y.
J. M. Batchelor, financial editorial writer, Brooklyn, N. Y.
Hook & Hastings, church organ builders, Boston, Mass.
Meneely & Co., bell founders, West Troy, N. Y.
J. Regester & Sons, bells and brass work, Baltimore, Md.
Meriden Britannia Company, silver-plated ware, Meriden, Conn.
Granular Metal Company, Boston, Mass.
Elbel & Co., saddlery hardware, Canton, Ohio.
Westinghouse Machine Company, steam engines, Pittsburgh, Pa.
C. Van Norden & Co., solder makers, Boston, Mass.
Standard Stamping Company, tin ware, St. Louis, Mo.
Cincinnati Lead Pipe & Sheet Lead Works, Cincinnati, Ohio.
East Hampton, Bell Company, bells, East Hampton, Conn.
Starr Bros. Bell Company, bells, East Hampton, Conn.
Gong Bell Mfg. Company, bells, East Hampton, Conn.
L. M. Rumsey Mfg. Company, manufacturers and metal dealers, St. Louis, Mo.
Covert Mfg. Company, hardware specialties, saddlery, West Troy, N. Y.
E. F. Kirwan Mfg. Company, tinware, Baltimore, Md.
Geo. R. Meneely & Son, brass founders, West Troy, N. Y.
R. Tynes Smith Can Company, tin goods, Baltimore, Md.
Boyden Brake Company, car brakes, Baltimore, Md.
Troy Nickel Works, stove trimmings, Troy, N. Y.
Samuel Pierce, metal organ pipe manufacturer, Reading, Mass.
Chas. G. Summers & Co., can makers and packers, Baltimore, Md.
Wm. Litchfield, copper and brass founder, Charlestown, Mass.
John L. Finney & Bros., vegetable and fruit packers, Aberdeen, Md.
R. Emery, can packer, Taylor P. O., Md.
Harry Lambert, packer of canned goods, Salem, N. J.
Great Western Smelting & Refining Company, Chicago, Ill.
Wm. Powell Company, brass founders, Cincinnati, Ohio.
F. H. Lawson & Co., dealers in tin plate and metals, Cincinnati, Ohio.
Fait & Slagle Company, oyster and fruit packers and manufacturers of tinware, Baltimore, Md.
J. F. Brady & Co., packers of canned goods, Bridgeton, N. J.
Wm. King & Son, church-organ builders, Elmira, N. Y.
H. W. Colter Canning Company, fruit canners and can makers, Mount Washington, Ohio.
H. F. Stern, canner of fruits and vegetables, Zanesville, Ohio.
Excelsior Brass Works, brass goods, Duquesne, Iowa.
A. F. Brown, packer, Havre de Grace, Md.
F. M. Anderson, canner, Keokuk, Iowa.
Baltimore Chemical Company, manufacturers of chemicals, Baltimore, Md.
P. O. Klinefelter, tinware, roofing, &c., New Freedom, Pa.
Sidney Shepard & Co., itware manufacturers, Buffalo, N. Y.
Enterprise Mfg. Company, hrdware, Philadelphia, Pa.
Automatic Switch Company, Baltimore, Md.

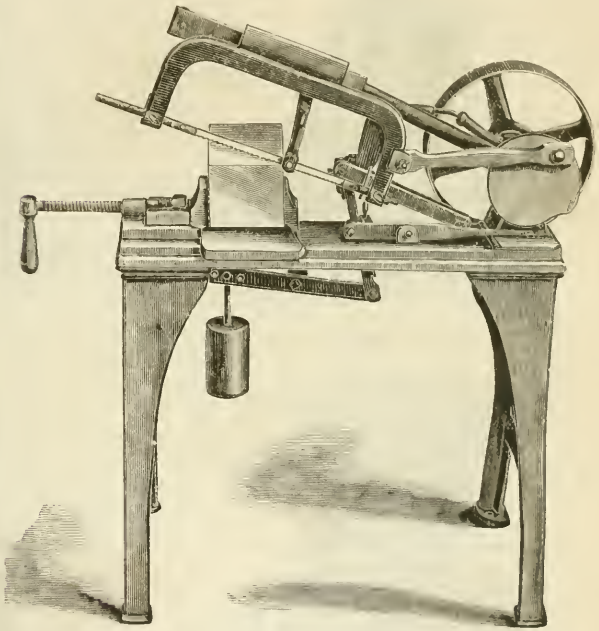
It will probably be two or three weeks more before the canvass will be completed and the petition in proper shape for presentation to Coogress.

The new Waldorf Hotel on Fifth avenue and Thirty-third street cost over $5,000,000, and the building is as completely fire-proof as it can be made. At each end of the deep building a fire-proof well, lined with fire brick, runs from roof to foundation, inclosing a steel stairway. The greater part of the ironwork was furnished by the Cornells.

The Leader Sawing Machine.

The Leader sawing machine, recently put on the market by the Frasse Company of 90 Park Row, New York, is intended for cutting iron or brass bar or tubing of any shape or size up to 5 inches in diameter. The machine is provided with an automatic tension which permits of adjustment for metals of various densities, this being accomplished by setting the weight forward or backward on the lever to suit the class of work operated upon.

The adjustment of the weight also controls the blade for rapidity of cut, as when the frame has advanced and made a cut it is lifted slightly, freeing the blade during the return stroke, thus preventing the teeth from dragging; upon completion of the back stroke the frame descends and is ready to make a new cut. It will be readily seen that the life of the blade is lengthened by this construction. A pivoted vise similar in design to a planer chuck is employed to hold the work, thus enabling the user to cut off pieces at any angle. A table-like projection is added to the bed below the vise to prevent a partly detached piece from dropping to the floor. The saw clamps, adjustable for a blade up to 14 inches in length, are so arranged that the straight running of the blade is insured. The machine is provided with a gauge for regulating the length of the pieces to be cut and also with an extra saw guide, which may be attached to the frame guide by a thumb screw. This is of benefit when very thin sections are to be cut off, but is not necessary for ordinary work, as the blade runs well enough without it. The shaft bearing is bushed; consequently the resultant wear comes on the bushing and not on the bearing, and as it is bored and turned to a standard size, in case of wear it may be replaced easily.



THE LEADER SAWING MACHINE.

The naval docks at Brooklyn and Puget Sound are to be lengthened to 650 feet.

Some New Gem Furnaces.

The Burgess Soldering Furnace Company, Columbus, Ohio, will place upon the market about March 1 a new combination furnace, which they call the Gem No. 6. General views of the furnace are shown in the accompanying illustrations. Fig. 1 is a furnace for tinners' use, and it will be seen that the opening in the hood of the furnace will accommodate large coppers. The plate on which the coppers rest is of cast iron, deflected with projections forming flues for conducting the heat underneath it. The sides are also provided with flue plates to protect the bolts and also to take the heat from rear to front of hood, and to prevent it from burning the handles of the coppers. It is furthermore provided with a removable cast-iron top or lid which will not fall off, but which may be removed to accommodate the ordinary size melting pot. The tinners' furnace is said to work out of doors in all kinds of weather. Fig. 2 shows a furnace for plumbers' use, which, it is said, will heat coppers and melt metal at the same time. The slot burner is cylindrical and furnishes a flame 4 inches long on each side. The burner is of cast iron, and there is no gauze or perforated tin used in its construction. It is recessed at front and back for the purpose, it is pointed out, of preventing damage if roughly used. It is further mentioned that the construction and shape are such that solder from the coppers cannot fall into the perforations, and at the same time that heat is distributed the full length of the coppers. This furnace, it is claimed, will heat 4-pound coppers in two minutes, to the forging heat in five minutes and heavier coppers in slightly longer time. The reservoir is described as pneumatic and fire proof, and cannot be filled while the burner is lighted. It is made of IXXXX tinned steel or copper, and suspended under a heavy steel base to protect it from injury. An electrical furnace for lineman's use is illustrated in Fig. 3. These furnaces, it will be noticed, flare at the base sufficiently to protect the air and oil faucets. They are provided with sliding cut-offs and drip cups, and are furnished with a bail, making them portable. The superior quality of the patent bulb, which is made of black rubber, is alluded to. It is also mentioned that the air, oil and regulating faucets are all provided with stuffing nuts to prevent leakage. Alaska handles on the regulating faucets insure their being always cool. Fig. 4 shows a furnace intended for printers' use. It is also referred to as adapted to the wants of electricians, tinners, plumbers, dentists and pattern makers.

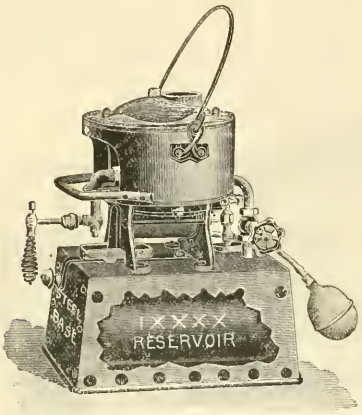


Fig. 1.—Tinner's Furnace.

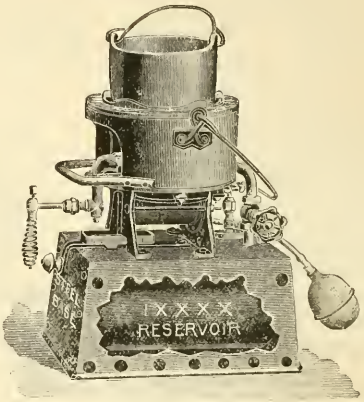


Fig. 2.—Plumber's Furnace.

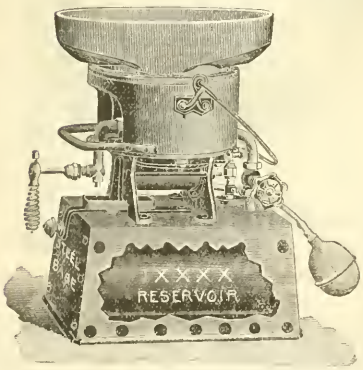


Fig. 3.—Lineman's Furnace.

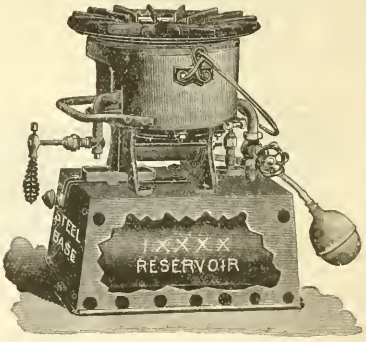


Fig. 4.—Printer's Furnace.

SOME NEW GEM FURNACES.

Australian public finances make a poor showing when analyzed by intelligent observers in Melbourne. Within a few years half a dozen banks have gone down, entailing losses exceeding £5,000,000 sterling, and although enormous sums have been borrowed by the several governments only a small proportion has gone into works of general utility, so that now the principal difficulty is in obtaining money to settle the interest account. It is stated that altogether the colonies have borrowed in the last four years $185,000,000. A correspondent of the London *Economist* writes: "Several of the governments have large deficits yet to meet. The New South Wales Government had used up all available resources, trust funds, savings bank funds, &c., at the time it resolved to try a local loan, and had close upon £3,000,000 to find. The Victorian Government, while showing by bookkeeping entries that it still has a balance available for fresh public works, is steadily exhausting its cash resources, and must by June next be at the point of begging the banks for temporary assistance unless it can float new loans. The outlook is a serious revenue deficit." In Melbourne the depression is without relief.

An enormous freight house for the Pennsylvania Railroad Company will be added to the plant already owned by that corporation on the Hudson River front above Thirty-seventh street. The land just bought cost $250,000.

STOVE TRADE NOTES.

A Phase of the Stove Trade.

A stove manufacturer, whose works are located in one of the largest iron-producing States of the country, relates an interesting experience, which has probably been duplicated, in some particular at least, by stove makers all over the country. The circumstance is described and presented to our readers in order that others engaged in the business may express their views concerning it, especially with regard to the best methods of treating cases of this kind. The manufacturer writes as follows: "A dealer in a distant State orders through our salesmen, with other goods, a large heater of our manufacture, and which is well known for excellent working qualities. He settles for all the goods except the heater, and writes us to the effect that it has been sold and that its working does not give satisfaction. We must either give him instruction which will make it work or he will return the stove. Now, we know the stove in question so well that we understand in a moment that it is in the hands of one of those woefully ignorant persons who would not know how to operate a Dutch bake oven, and who would make us pay for his ignorance if we would allow him to do so. We accordingly write to the dealer, giving him full directions as to the use of dampers, &c., at the same time hinting that he is expected to know all this. We told him that if these directions are observed and the stove still refuses to work we will have to take it back. Upon its return, however, we shall put it up just as received and test it ourselves. If we find it to be all right we will expect him to stand freight charges and the difference between a new and a second-hand stove. The dealer is evidently sure that the stove is a failure, for it comes back to us without any comment from him. We carry out our plan of testing the thing and find that it works perfectly. Accordingly, we write our friend a letter advising him as to what we have done and giving him the information that the loss shall certainly be made up from his pocket if we are at all able to bring this about. We may never again sell this man, but our brother in the business will probably escape having perfect goods returned through a whim of the dealer or ignorance of his customer."

London Fogs and American Stoves.

We have recently referred in these columns to the effort being made by the Reading Coal & Iron Company to introduce anthracite coal into the European markets, and the opportunity which seemed open for creating simultaneously a demand for American stoves in which to burn the fuel. In connection with this subject, it appears, from an account published in *Coal and Iron* of London, that, driven to desperation by the ravages of the fog fiend, a strong association has just been formed, in that city, under the title of the "Anthracite Association for the Promotion of the Use of Anthracite Smokeless Coal." The patrons and committee of the association include a number of influential and well known names in the commercial, industrial, political and scientific worlds.

The increasing prevalence of fogs in London is so unquestionably due to the immense volume of smoke thrown into the atmosphere by the almost universal use of bituminous coal in that city that the association, being impressed with this fact, are determined to use every effort to introduce the adoption of smokeless coal as the only means for abating the nuisance. And we learn that their efforts are likely to meet with great success. Already in many public institutions, hotels, clubs, railway stations and private residences the use of anthracite in place of bituminous coal has been adopted with good result. Scientists recommend this change as the only solution to the London fog problem, and it is believed that the more intelligent of London householders will be induced to give the association practical support by acting on their recommendations. The article from which we gain our information in regard to the Anthracite Association strongly recommends the use of anthracite for its freedom from smoke, cleanliness, absence of waste and dust, as well as for its economy, and states that "when treated intelligently—*that is to say, burnt in a grate or stove properly adapted for its consumption*—it has much to recommend it, especially in a hygienic sense," and further, in conclusion, it observes as follows: "Enough has been said to show that, *with the use of proper appliances, there is a great future in store for anthracite coal;* but much will, of course, depend upon the vigor and energy with which its claims are pushed forward by those who are interested in its adoption as a specific against the evils with which the London fog fiend can now, with apparent impunity, afflict us." The italics are ours.

Chimneys and Drafts in Operating Stoves.

At the last convention of the National Association of Stove Manufacturers, provision was made for the preparation of two circulars, one containing directions for setting up and operating stoves, and the other describing the possible and probable difficulties connected with chimneys and their flues, to be furnished any manufacturer who might choose to order them. It was stated in the convention that these sheets would give a variety of suggestions and ideas which stove manufacturers could probably use to advantage, for they could be sent with orders from dealers and thus offer instructions regarding the setting and operation of stoves in a way which would not prove other than satisfactory. Secretary Thomas has just issued copies of circulars of the character named and we have pleasure in presenting them herewith. The first is entitled "Directions for Operating Stoves," and presents a number of suggestions which the trade cannot fail to appreciate. It reads as follows:

To secure good operation in cook stoves and ranges, see:

1. That the flue stopper is in its place.

2. That the chimney is clear and has a good draft at pipe hole. Many chimneys are made too low and draw better when a smoke stack is put on them.

3. That the pipe fits closely on the stove and in the chimney. No air should go outside of the pipe.

4. That the pipe does not go too far in the chimney.

5. That no ashes from chimney get into the end of the pipe.

6. Avoid having the pipe telescope at the elbow. If you have all these parts properly adjusted and well arranged, open the direct-draft damper and see if you can get a good fire in the stove, together with a strong draft. If the stove will not burn well then, the trouble is not in the stove, but above it.

If the fire burns well on the above direct draft close the oven damper, then if it will not heat the oven and bake well please examine the flues and damper, and see:

1. That all the flues are open and clear so that smoke can freely pass through them. In cleaning flues many do not clean all the flues, and frequently push soot and ashes into back corners, and in that way stop them up.

2. Examine all the dampers in the flues and see that they open and close tightly and do not get out of place.

3. Be sure that you know how they operate, so they may not be open when you think they are closed.

If you are trying a stove without a hot-water reservoir and have everything in good order, as heretofore described, it cannot possibly fail in operation if you close the direct-draft damper and throw all the heat around the oven. Time should be given to get the oven hot before trying to bake.

If you have a stove with a reservoir be sure that the damper (if one is in the stove) to force the heat under the reservoir is closed, so that all the heat must go around the oven. Many reservoir stoves have two dampers, and in that case both should be closed.

We have known many persons who have tried to use such stoves with that damper under the reservoir open when they thought it was closed. On that account the oven heated too slow, but worked fast enough when they closed the damper.

It is possible that the draft of the chimney is so strong as to carry the heat so rapidly round the oven as not to be absorbed by the plates, and the oven fails to heat sufficiently from that cause. A damper in the pipe will relieve this.

The second circular is made up of extracts from various publications respecting chimney, drafts, &c., and reads as follows:

No stove has what is called a draft; it is the chimney (or its equivalent) that produces the draft. The taller the chimney the stronger the draft.

A stove can no more operate without a chimney than a steam engine can operate without a boiler.

If a stove fail to give satisfaction it is because of having a bad chimney or being improperly set up.

If a stove fail to operate, the chimney must be looked to for a remedy.

There are more bad chimneys than good ones.

Dealers should always know the character and condition of the chimney before they put up a stove, and they ought to know that a stove cannot operate without a good chimney, reasonable fuel and being properly set up.

As the maker of stoves builds neither the house nor the chimney, he cannot be held responsible for the operation of the stove, as a stove cannot operate of itself; it must have a chimney, it must have good fuel and it must be properly set up to do good work, otherwise it will fail, and the responsibity must be with the chimney or with its being improperly set up, and not with the stove.

The dealer often forgets that the things that prevent the stove from working are located between the pipe collar of the stove and top of the chimney, if the stove has met with no accident in the transit. It does not seem to occur to him that the pipe and chimney are to do the drawing. As well say the buggy balks when the horse refuses to go as that a stove can't draw.

Even in this day of almost perfection in cooking and heating stoves there is probably not one stove in the market but what here and there is said "not to work," and the twin expression is, "What shall we do with it?"

It is absurd for a man who can see the chimney and the stove set up to write to a manufacturer who cannot see either and ask why

the pipe and chimney will not draw or "work."

There is no manufacturer now making stoves who turns out goods that will not work.

Retail dealers in stoves and ranges, and those compelled to use poorly constructed or decayed chimneys will do well to read sufficiently to enable them to ascertain what the matter is when a well-constructed range or stove fails to operate as it should.

We illustrate a few of the causes why the stove is condemned when the fault is solely in the chimney.

A. Constructing a chimney by extending the flue downward to the floor, and in many cases into the cellar, creates a place for the accumulation of soot, ashes, &c., so as to save the expense of cleaning the flue, then the cold air below the pipe-hole chills the entire column of air in the chimney; it is therefore heavy and impedes the ascent of the smoke. The remedy is to either fill the flue with cement to within 6 inches below the pipe hole, or cut off the flue with a sheet-iron plate, the plate to be covered with several inches of cement, so as to make it air-tight. The result will be to apply the heat at the base of the flue, and a good draft obtained.

B. Often, complaints are made that the cook stove will not operate, although the pipe was carefully fitted into a chimney that has a good draft, and which has been in use for many years. Investigation proves that the stove is attached to a chimney whose base contains a very large old-fashioned open fire place. The remedy for this is the same as the preceding.

C. The chimney of the kitchen may be much lower than the main part of the house. The wind blowing over the house falls like water over a dam, sometimes almost perpendicularly on the top of the chimney, thus it beats down the smoke contained therein. The remedy is to build up the chimney, or add a smoke stack to equal the hight of the main building.

D. A building or a large tree may be near to and higher than the top of the chimney, so that the wind passing over them would blow down on the chimney.

E. When there is more than one opening in a chimney, a great variety of complications may affect the draft, so see that all the openings into the flue, no matter of what kind, except-ing the one you are going to use, are securely closed.

F. When two or more stoves are connected with one single chimney the combination is so variable that it is difficult to cover all such cases by specific directions. Common sense, directed by observation, must be used.

G. A new or green chimney will never have a perfect draft. It will not draw perfectly until it is thoroughly dried, which sometimes requires two to four weeks' time.

H. In building a chimney, a little mortar may be dropped from time to time and lodge out of sight, so as to partially close the chimney. A heavy weight may be let down by a rope and worked against the inside of the flue to force an operation.

I. In an old chimney the mortar may have crumbled from between the bricks so that it leaks air and spoils the draft.

All the air that passes through the chimney should first pass through the fire, unless used to check the draft.

At the close of the circular are four diagrams showing the manner in which chimneys should be extended above the roof of a building in order to secure a good draft, and also showing the construction which furnishes a very poor draft for a stove.

The Central Oilgas Stove Company

send us a copy of a new catalogue which they have just issued to the trade. It consists of 96 pages of letterpress, profusely illustrated and bound in heavy paper covers, carrying a side title which embraces the name and address of the company and an indication of the line of goods manufactured. The opening pages give the addresses of the various offices and salesrooms of the company, the terms and discounts, a comprehensive index, a bird's-eye view of the works at Florence, Gardner and Jackson, the division of territory showing the section covered by each office, and a statement to the trade relative to the goods produced. Attention is first invited to lamp stoves, of which a varied assortment is presented, including the American, Champion, Tom Thumb, Fairy Queen, Florence, Columbia, Monarch, Volunteer, Globe, Gypsy and the Sun. In this connection the makers state that they guarantee all their lamp stoves not to leak. Following these is a description of the oil-gas cook stove which was first introduced to the trade late in the season of 1892. The merits of this stove are set forth by means of ample descriptive letterpress, in which it is stated that the stove vaporizes and burns common kerosene or any of the refined products of petroleum, that the burner, which has no wick, has been enlarged, and the heating capacity increased fully 50 per cent. The Oilgas cook stoves for 1893 are made in four distinct combinations, known as the Florence, American, Crown and Champion. Numerous testimonials are also presented from those who have used these goods. Next in order the Oilgas vaporizing cook stoves are illustrated in numerous styles and sizes. The various features are carefully pointed out and much interesting information to the dealer is presented. A long line of gas cook stoves is shown, these having been improved for this season, especially the cabinet ranges. A new stove is the Cone. There are also many styles of sheet metal and glass reservoir oil cooks. The latter portion of the catalogue is devoted to cast iron oil cooks, ovens for lamp stoves, extension tops, sad-iron heaters, furnishings for oil-gas and vaporizing stoves, circular burner oil heaters; an illustrated description of the American oil heater, the Chicago and Florence heaters, the Globe circular burner floor lamp heater, the Grand and the Oilgas fireplace heaters. There is also shown a number of flat wick oil stoves with radiators as well as gas-heating stoves. The catalogue is of a character likely to prove interesting and valuable to stove dealers, especially to those handling goods of the description named.

Bower-Barffing Stove Castings.

A correspondent, writing from one of the Western States, raises the question, why some enterprising stove manufacturer does not initiate the use of iron castings which have been through the Bower-Barffing process on all the iron work that is now nickel plated for stove trimmings. The idea, he says, was suggested by the receipt of a sample cook stove, having the nickel work seriously rusted, probably by the action of frost, and the patterns of which had been in use but two or three months.

"As I understand it," he writes, "this process is cheap enough, so that a large share of the hollow ware in France is made by it, and if the French can afford to use it for stove hollow ware, it certainly ought not to be too high for Americans to use on the iron that they nickel plate. It is possible there may be some mechanical reason why this cannot be used. It might not hold nickel, but if there is no such reason, any house that could send its men out in the fall, assuring their customers that nothing could rust their nickel plating, would have more business than they would know how to handle."

We referred the matter mentioned by our correspondent to Secretary D. M. Thomas, of the National Association of Stove Manufacturers, and who is also president of the Bower Barff Rustless Iron Company of this city. In discussing the matter he states that the Bower-Barffing of stove ornaments previous to nickeling is not feasible. The plating would not always be perfectly adherent and the polished surface would be measurably injured by the treatment, while the appearance would not be altogether satisfactory. It is possible to Bower-Barff stoves and so prevent them from rusting, but as the process requires the iron to be made red hot, the plates would be liable to warp and twist to such an extent that difficulty in mounting would be experienced, while the cost would be largely increased. Sample stoves might be treated with advantage, but, in the opinion of Mr. Thomas, the process is not commercially applicable to stoves. He states, in this connection, that he has under consideration a new method of depositing metals and that he may shortly offer stove manufacturers a new and superior style of ornamentation.

The Enterprise Stove Company

of Vincennes, Ind., send us a copy of their catalogue for 1893. Its 78 pages are replete with matter of interest to the wide-awake stove dealer and the goods are illustrated in a manner to show them to the best advantage. The covers of the book are of colored paper, the front carrying a side title that is typographical in character. One of the first things to catch the eye of the reader is the injunction of the company with regard to ordering castings. It is to always give the name, number and date of the stove. The goods shown includes the Home Star for burning coal or wood and embodying the latest improvements, also the Home Star wood range, having large fire box, double fire bottom and fire box draft plate to force the draft under and through the fire instead of over it, as is often the case. These goods are shown in a variety of styles and are made in a number of sizes. The North Star is a cheap first-class wood range, having four boiler holes, and is made in three sizes.

The Home Star is a coal and wood cook, having draw hearth, patent long cut center, sectional fire back and dumping and shaking grate. It is made in four sizes and the usual modifications. The Guiding Star is another attractive member of this general class, as are also the Rising Star, the Home Star, the North Star and the Princess. Among the heating stoves which occupy the latter portion of the catalogue we notice the Silver Star, a very attractive base heater for burning wood. It has shaking and draw-center grate and the end feed door is attached to the damper in such a way that the stove operates with direct draft as long as the feed door remains open. The Bright Star Todd is a handsome construction, having extra heavy fire linings, which can be taken out and replaced without dismounting the stove. There are also shown several round-base burners, oak, Franklin, cottage parlor, laundry, box and cannon stoves, together with a list of stove hollow ware.

ODD PLATES.

The Peninsular Stove Company of Detroit send us a serviceable calendar for the new year consisting of a substantial leather-covered frame, having a solid back and measuring 5¼ x 4 inches. It is so made that six cards, each of which carries a calendar for two months, one being upon either side, can be slipped into the frame from the top, and as the month passes the second card can be drawn out and placed in front of the one previously exposed to view. Across the top of the frame is the name of the company, at the bottom are the names of the cities in which their works and offices are located, while at the sides is an indication of the line of goods manufactured. The back of the card frame is arranged as an easel, and when the flap serving as a support is raised there are exposed to view calendars for 1893 and 1894. There is also a loop for hanging the device upon the wall if preferred.

The Raymond & Campbell Mfg. Company of Middletown, Pa., have issued a notice under date of February 10, to the effect that their branch store at 45 North Second street, Philadelphia, has been discontinued. They notify their customers to send all orders and correspondence to Middletown, Pa.

We have received a copy of a very neat catalogue of something over 60 pages, issued by the Schneider & Trenkamp Company of Cleveland, Ohio, bearing the im-

print of William J. H. Gluck, who is agent for the company's goods in Baltimore, Md. The volume is carefully arranged, neatly printed and covers a great variety of gasoline goods made under the name "Reliable." Ample descriptive letter-press is presented, together with dimensions, prices, weights and other information of value in this connection.

Among the recent incorporations at Albany, N. Y., may be mentioned the McDonald Stove Company of Watervliet, N. Y., with a capital stock of $125,000.

William M. Gobeille, Main and Center streets, Cleveland, Ohio, issues a postal-card notice to the trade relative to the line of work he is prepared to execute. The matter is presented in verse and is entitled, "The Last Words of a Grate Pattern Man." The heading is a *fac-simile* of a portion of what we assume to be the letter head employed by Mr. Gobeille in his correspondence.

The plants of the Somersworth Machine Company at Dover and Salmon Falls, N. H., are the subject of a long article which appears in the New Hampshire *Republican* of February 10. It states that the corporation was started in 1848 by a board of directors consisting of M. C. Burleigh, John H. Burleigh and Oliver H. Lord, who laid the foundation for a business which is to-day large and prosperous. The present officers of the company are: President, O. S. Brown of Salmon Falls; treasurer and manager, Edward H. Gilman of Exeter. The directors include ex Congressman Joshua G. Hall of Dover, ex-Governor Charles H. Sawyer of Dover, John A. White of Concord, Edmund S. Boyer of Great Falls and William D. Sawyer of Dover. The stove works are at Salmon Falls, where there are 19 buildings, all conveniently arranged and equipped for the production, among other things, of more than 50 styles and sizes of stoves. These are turned out under the supervision of Superintendent E. A. Stevens, who, we understand, is an expert in this special line. It is stated that in connection with stoves the company make at these shops furnishings of every description constructed of copper or tin that are used in the manufacture of stoves and ranges.

Sam S. Utter, of 113 Beekman street, New York, returned to the metropolis the past week, after an absence of ten days. During that time he visited the trade in the State of Pennsylvania and spent two days in Pittsburgh, where he was the guest of the president of the First National Bank.

Henry A. Kelley, well known to the trade in New England, has connected himself with Richardson & Boynton Company, and will represent them in the Eastern States. A showroom has been opened at 94 Union street, Boston, where a full line will be carried, and dealers made welcome.

The Art Stove Company of Detroit, Mich., held their annual meeting on Monday, February 6, at which the following directors were elected: Theodore Miller, Neil McMillan, H Leonard Wilton, William H. Fernwood and R. Krakow. The directors then elected Theodore Miller, president; Neil McMillan, vice-president; H. Leonard Wilton, secretary, and William H. Fernwood, treasurer. The secretary reported 1892 as a prosperous year, and that the sale of Laurel stoves and ranges far exceeded those of any other year since the company were organized. They had increased their plant during the past twelve months by the addition of a new warehouse and of ice building and had enlarged their assortment of specialties by a new six hole range and three oil heaters.

A report was recently submitted by the Gas Committee of Manchester, England, to the City Council, with regard to the hire and sale of gas cook stoves. It stated that in November last the chairman and deputy chairman were authorized to secure a plot of ground for the purpose of opening a showroom and workshop. The committee made a careful inquiry as to the stove business, and state that at the end of 1892 there were 2568 gas cookers and fires rented, while 2274 were owned by private persons. The number of stoves sold from 1885 to 1892, inclusive, was 2528, valued at about $15,000. The number rented was 2,568, valued at something over $36,000. On this showing the committee strongly urged the securing of a site for the purpose named. It is not the intention to enter upon any new business in the premises, but to conduct more conveniently and economically that already in existence.

The Ransom Combination Duplex Grate is the subject of a four-page circular which reaches us from the Ransom Grate Company of Albany, N. Y. The device is illustrated, and is claimed to have been adopted by most of the leading stove manufacturers in this country. The list of licensees is said to be rapidly increasing, and in the circular is given a list of stove makers who are now using the grate in connection with their leading goods. They are also presenting a number of testimonials from some of those who have used the Ransom grate.

R. Robinson & Sons, Chicago, have issued an illustrated circular of their superior line of vapor stoves for the season of 1893. This line comprises the Superior process stove, which is made with double tubes, auxiliary generator, glass drip tubes showing the flow of gasoline, plated needle points, nickeled tank rests, burner drums with cast-iron tops and nickel and tile decorations; the Superior single generator, with two top burners and double burner on shelf; the Superior single generator, with three top burners and double burner on shelf; the Superior high junior in two sizes; the Superior low juniors in three sizes. A complete price-list is given as one of the features of the circular.

We have received, with the compliments of Frederick S. Bolte & Co. of St. Louis, Mo, a very pretty folder, the front page of which is embellished with landscape in colors. The folder calls attention to the fact that the firm have opened a new store at 915–917 North Broadway, four doors north of Franklin avenue, where they carry a full line of gas stoves, steel ranges, heaters, gas and gasoline stoves, refrigerators, together with a complete assortment of kitchen utensils.

Fletcher, Russell & Co., Limited, of Warrington, England, have brought out a new gas stove known as the Bengal. It is made in two sizes, the smaller being 24 inches high and 18 inches wide, with the front opening measuring 9½ inches in width. The larger size is 28 inches high and 21 inches wide and is adapted for use in rooms up to 16 feet square.

The Bussey & McLeod Stove Company of Troy, N. Y., will erect a three-story brick building, 40 x 75 feet, on Oakwood avenue, which, when completed, will be leased to the Troy Valve Company. Architect H. P. Fielding prepared the plans and specifications, and awarded the contract for the mason work to John Magill. The building is to cost $15,000, and is to be completed and ready for occupancy by May 1. The first floor will be used as a brass foundry. Work will be begun as soon as possible. The new building is for the purpose of manufacturing the Ross patent mobile wedge valve and hydrants, and it is expected a large number of men will be given employment. The directors of the Troy Valve Company, who were recently incorporated, have elected these officers: President, Enck Bussey; vice-president, William Ross; secretary, Robert Ross; treasurer, Charles A. McLeod.

James Boyle & Co of Salem, Ohio, have gotten out a calendar for the month of February, at the bottom of which is the statement that they "will call again next month." The card measures 6 x 9 inches and is embellished with a picture of the Prize Keystone four-hole cook stove. Above this is the name and address of the company, while below it is the calendar for the present month.

At the annual meeting of the stockholders of the Detroit Stove Works, held at their office, 1320–1360 Jefferson avenue, Detroit, Mich., on Wednesday, February 8, E. S. Barbour was elected president; F. H. Barbour, first vice-president; B. W. Dodson, second vice-president; W. M. Shaddinger, secretary and treasurer; G. W. Gunderson and L. W. Crowley, superintendents.

The Glazier Stove Company of Chelsea, Mich., send us a neat little catalogue printed in tinted ink on good paper, and relating to the leading specialties which they manufacture. The goods shown include oil heaters of attractive design, lamp stoves, cook stoves, gas heaters, ovens, &c. An index and telegraphic code are features of the pamphlet.

The Aurora Vapor Stove Company, of Cleveland, Ohio, announce the Aurora Evaporating Range No. 60 as possessing all the latest improvements. It has two burners in the top plate, a powerful burner in the step, at the side, and one in the oven. The stove is referred to as being finely finished in every particular and of attractive design.

The Art Stove Company, Detroit, Mich., are distributing a very attractive 4-page circular relating to the Crown Laurel Oil heater which they manufacture. The seven points of superiority claimed for this stove are set forth, together with a comprehensive description of its leading features.

J. B. Jones, secretary of the Carton Furnace Company, Utica, N. Y., while on a trip West stopped at Rochester, Buffalo, Cleveland, Dayton, Cincinnati, Columbus and Detroit. A call was also made at the Chicago branch of the company, 83-85 Wabash avenue. The amount of business done by the company in Carton heaters the past season is stated to be very satisfactory.

The Chicago branch of Orr, Painter & Co., Reading Stove Works, has been removed from Kinzie street to 15, 17 and 19 West Lake street. This branch will hereafter be conducted on an independent footing and not in connection with agencies of other stove firms. Two floors of the building have been secured, one of which is used as a sample room and for offices, while the other is intended for storage purposes. A full line of Sunshine stoves and Torrid furnaces is carried by this branch, which is under the management of Chas. A. Rusco, formerly city salesman for Chicago.

The Abram Cox Stove Company have placed on the floor of the sample room of their Chicago branch, 41 State street, one of their new Novelty hot air furnaces, which has a number of interesting points. The ash-pit door is unusually large, extending the full width of the grate section and above the grate. As the grate rests on slides, it can be pulled out with ease to make repairs, which will be appreciated by furnacemen. The cast front of this furnace extends almost its full hight, which enables the galvanized iron for casing to be cut in uniform lengths for every ring. The design of the front is highly ornamental, being elaborated to a much greater extent than is usual in furnace castings, resembling high class stove work in this respect.

PRIZE COMPETITIONS.

WE HEREBY ANNOUNCE a series of six prize competitions relating to trade matters in which our readers are interested. Four prizes of $50, $25, $15 and $10 will be awarded in each competition.

The competitions are open to all and a general participation on the part of the trade is invited.

We shall have the privilege of publishing any or all of the contributions received.

The committee of award in assigning prizes will take into account the merit of the different contributions and their suitability for publication.

PRIZE COMPETITION No. 6.

How Retailers Can Best Advertise and Extend Their Business.

The object of this competition is to obtain practical suggestions as to the methods which the retail dealer in Hardware, Stoves, Tinware, &c., can advantageously adopt in building up his business, and is intended to cover such points as the following:

Advertising in the local papers, with suggestions as to how such advertising should be done and to what extent;
The manner in which circulars and other printed matter may be used;
A description of any special or unusual methods of attracting and holding trade; and
General suggestions in regard to ways in which the business can be extended.

An account of any methods which have been found useful in building up trade will be suitable under this competition.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 6.

PRIZE COMPETITION No. 7.

Travelers' Yarns.

The traveling salesman is proverbially happy in the stories which he narrates, and this competition is for the purpose of calling out a collection of good yarns for publication. While the attention of travelers is specially invited to this competition, it is open to all. Stories relating more or less closely to trade or business matters will be preferred.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams 96–102 Reade street, New York, and marked Prize Competition No. 7.

PRIZE COMPETITION No. 8.

How to Treat Clerks.

Under this competition, beside a general discussion of the subject, such questions as the following may be considered:

The extent to which clerks should be given an opportunity of obtaining a knowledge of the business, and of price-lists, prices, &c.;
Whether it is desirable to have formal rules for the regulation of employees and for the management of the store. If so, a set of rules should be submitted;
To what extent clerks should be held responsible for their mistakes;
Suggestions as to how clerks should be treated in order to secure their most intelligent and efficient work;
Mistakes made in the treatment of clerks.

This competition opens an important subject and it is hoped that it will be discussed fully by merchants and by their clerks from their different points of view.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 8.

PRIZE COMPETITION No. 9.

Shop System of Keeping Track of Jobs.

This competition is intended to call out information in regard to methods of keeping account of the cost of labor and material on tin-shop work, repairing and new work, inside and outside. In connection with the general subject such points as the following may be touched upon:

Whether blanks or forms are used in connection with such work. (If so, samples should be submitted);
What record is kept of orders, costs of jobs, charges, &c.;
How time occupied in going to and from the job is covered;
Suggestions in regard to the profitable conduct of the shop.

To illustrate the system it is desirable that a specific job (as for example, repairing down spouting and eave trough, or other job of repairing in which new material is used) be referred to and the method of keeping track of the costs in such job fully explained.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 9.

PRIZE COMPETITION No. 10.

Business Maxims—At Least 10.

Those entering this competition will send at least ten maxims relating to the conduct of business, presenting in a brief and pithy manner practical suggestions which may advantageously be followed.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams 96–102 Reade street, New York, and marked Prize Competition No. 10.

PRIZE COMPETITION No. 11.

How Small Retailers May Keep a Record of Prices.

The object of this competition is to call out information or suggestions in regard to the best methods to be adopted in keeping a record of prices, showing cost or selling prices, or both cost and selling prices, of Hardware, Stoves, Tinware, &c., in a small retail store employing not more than four persons in the selling and bookkeeping departments, including the proprietors. Those entering the competition are expected to give a concise and clear explanation of their system, and if a price book is used, to submit as illustrating the system at least three specimen pages. If a price book is referred to it may be of any design or arrangement best adapted to the purpose, and may be original with the contributor or may be one of the different price books on the market. Fictitious names should be used instead of the real names of jobbers and manufacturers.

The committee in awarding prizes will take into account the merit of the different systems described, the character of the descriptions given, and the general utility and interest of the contribution.

First Prize	$50.00
Second Prize	25.00
Third Prize	15.00
Fourth Prize	10.00

This competition will be open until the close of business, February 18, 1893.

Contributions should be addressed to David Williams, 96–102 Reade street, New York, and marked Prize Competition No. 11.

TRADE REPORT.

The Iron Market.

Although there has been little change in the Iron market during the past week, the situation shows some evidence of improvement. The encouraging feature is an increased demand for some lines rather than stiffening in prices. The demand is doubtless large, but apparently not large enough to advance prices to any extent. Any improvement which may have taken place has not extended to this market, and no increase in sales is noticed. In certain sections where the market is active and no complaint of the amount of business offered, prices are not satisfactory, and other than regular brands of Pig Iron are irregular in price. The cause of the advance in Bessemer Pig Iron over prices which had been ruling is found in the fact that the output of the largest producers in the region of Pittsburgh was considerably curtailed by the idleness of some of their stacks. Two other large Steel making concerns were using more metal than they were producing, which made it necessary for them to go in and buy, and the same is true of one or two of the Wheeling concerns. The withdrawal of these three or four concerns from the market as sellers and their appearance as buyers naturally caused a drain on the supply, and for a time Bessemer Pig for early shipment was hard to obtain and commanded good prices. It is probable, however, that the supply will be considerably increased very soon, as two idle stacks in the Pittsburgh district and several in the Wheeling district will be making Iron before this month is out. A good many contracts have recently been placed for Wire Nails and the indications are that there will be a very heavy demand for Wire this year. On account of the low prices ruling for Structural Material, it is expected that the consumption will very materially increase and be much heavier this year than in any previous year. All in all, the outlook for a satisfactory volume of business in the principal articles of Iron and Steel manufacture is very encouraging. It is the general impression, however, that prices will continue to rule largely in buyers' favor, although on some lines, on which prices are very close to cost of production, it is not improbable that an improvement will take place.

In the West the improved condition of the weather is now a little more favorable to business. The railroads are moving freight more promptly, owing to the gradual disappearance of snow and ice. It will take two or three weeks, however, to enable them to catch up with accumulated traffic and to keep matters in the usual satisfactory shape. Everything is looking better in both raw material and finished products, with the single exception of Plates. The volume of trade, taking the whole line of Iron and Steel products, was larger last week than any other week thus far this year, with a distinct tendency to firmness in prices. For the two weeks past business in Pig Iron has been satisfactory. More orders are in sight, however, some of which will undoubtedly be closed soon. The activity is ascribed to the increased belief among consumers that prices are as low now as they are likely to be during, at least, the first half of the year. Quite a number of the largest buyers had been figuring on their contracts since about the first of the year and endeavored to push prices down lower, but find that bottom has evidently been reached. An encouraging feature of the situation is that considerable tonnage was entered at prices above the minimum recently current. Plenty of inquiries are reported for Southern Coke, but prices are too high as yet for much business in that line. The disparity between the selling price of Northern and Southern Iron is too great to enable much of the latter to be sold. The leading companies are still holding prices firmly, but smaller concerns are taking about all the business now doing in Southern Coke. Lake Superior Charcoal has not been in much demand, but one transaction is noted of a round lot at a good price. While new orders are not numerous, yet consumers are taking more Charcoal Iron than they had anticipated, and many of them are increasing their old contracts from 25 to 30 per cent.

In Southern markets there continues to be an easy feeling in the market for Pig Iron, and while there is a fair demand for current or short forward consumption, there is no disposition shown to buy large blocks of Iron for long time delivery, nor would the furnaces entertain them at present prices. The purchases have been mainly 500 to 1000 tons, and for this month's and March and April delivery, with smaller lots running down to one carload, but in the aggregate they make a fair volume of business. There is some inquiry for Lake Superior Charcoal Iron, but Southern Charcoal Irons are quiet.

There is no improvement reported in the demand for Pig Iron in the New York market, and quotations remain unchanged as follows: Northern brands at $14.75 @ $15.25 for No. 1; $14 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 75 @ $15 for No. 1; $13 75 @ $14 for No. 2 and No. 1 Soft; $13.25 @ $13.50 for No. 2 Soft.

In Philadelphia there has been a good deal of business done in Pig Iron, but without improvement in prices. Indeed, the trade have settled down to the conviction that there is not likely to be any improvement until some decided increase in demand is met with, and as most people are already working on a larger scale than usual it is hard to see at which point to look for improvement. Sales have been at all sorts of prices within the limits of quoted prices, varying according to quantity, brand, delivery, &c. The prices for Philadelphia (or equivalent) are as follows:

American Scotch, No. 1X	$17.00	@	$17 25
American Scotch, No. 2X	16.00	@	16 25

A remarkable feature of the Pittsburgh market during the past week was that there were more buyers of Pig Iron than sellers. This is a remarkable statement to make, but it is true. Bessemer Iron for prompt shipment was urgently sought for by buyers, and in some cases without success, even when offers of $13.50, Pittsburgh, were made to secure the Iron. Prices for Foundry Irons are quoted as follows:

No. 1 Foundry	$13.75	@	$14.00, cash
No. 2 Foundry	12.75	@	13.00, "
Charcoal Foundry No. 1	17.00	@	18.00, "
Charcoal Foundry No. 2	16.50	@	17.00, "

In Chicago Local Coke continues very active, and numerous sales are reported of good-sized lots ranging from 500 to 1500 tons for scattered deliveries. Improved conditions in the movement of freight are having their effect in stimulating business, and inquiries are more numerous. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	$16.50	@	$17.00
Local Coke Foundry, No. 1	13.25	@	13.75
Local Coke Foundry, No. 2	12.75	@	13.25
Local Coke Foundry, No. 3	12.50	@	12.75

Southern markets have been little effected by the advance of Bessemer Iron in Pittsburgh, Preliminary reports of stocks in the South indicate a small reduction, but there are well authenticated reports that some furnaces have quite an accumulation of Iron which they are anxious to sell. There are applications to have deliveries hastened on existing contracts and other indications that consumption is active and of large volume. Cincinnati quotations are as follows:

Foundry.

Southern Coke, No. 1	$13.25	@	$13.50
Southern Coke, No. 2	12.00	@	12.25
Southern Coke, No. 3	11.50	@	11.75
Ohio Soft Stone Coal, No. 1	16.00	@	16 25
Ohio Soft Stone Coal, No. 2	15.00	@	15.25
Mahoning and Shenango Valley	15.25	@	16.25
Hanging Rock Charcoal, No. 1	19.00	@	19.25
Hanging Rock Charcoal, No. 2	18.00	@	18.50
Tennessee and Alabama Charcoal, No. 1	15.50	@	15.75
Tennessee and Alabama Charcoal, No. 2	14.50	@	4.75

Billets and Rods.—There has been no business of consequence in this market in foreign or domestic material.

Steel Rails.—Some large contracts have been closed by Eastern mills, the week's aggregate of sales, in which all the works participated to a greater or lesser degree, figuring up to the best record thus far made this year in a similar space of time. The aggregate is 75,000 tons.

Metal Market.

Copper.—The situation remains practically the same as outlined last week. Although business in some lines of Copper and Brass goods has been checked to a certain degree of late by unfavorable weather, work in the various branches has continued active. The prospects for the manufacturing industries are referred to as being very encouraging, with particularly bright indications for an unprecedented consumption of Wire for electrical purposes. Despite these conditions and the fact that production of the metal is restricted to fairly well determined wants, the buying of Ingot continues slow in this market, and nothing in the nature of active speculative interest develops.

Pig Tin.—Speculative dealings have been on a more restricted scale, and in other directions the business, to all accounts, loses somewhat by comparison with that of the preceding week. The falling off in jobbing and consumptive trade buying is attributed in a good measure to liberal deliveries latterly on old purchases of "futures" and considerable quantics of Tin afloat available for delivery on contracts still outstanding. The speculative branch of the trade is indirectly affected, but surface indications are that excess of "long" over "short" interest in nearby futures cuts a more conspicuous figure there, leaving it uphill work for the "bulls" to make headway.

Pig Lead.—The sales reported for the past week involve about 500 tons, the greater portion of which were for near future delivery. Consumers have manifested no particularly lively interest and speculative spirit continues exceedingly tame. The alleged curtailment of production during the past six weeks has, in fact, been the chief, if not the only, support to values.

Spelter.—Offerings by some Western smelters have been a little urgent and of a nature reflecting pressure to sell for shipment during the three months ending with June. Along with data of output here and advices of poor chances for selling in Europe at any profit, this offering is suggestive, indicating that heavy stocks in smelters' hands are becoming tiresome, and that the home market is preferred to the European outlet at present.

Antimony.—The demand has been moderate and chiefly of a jobbing nature. Prices rather easy, but showing no radical change.

Tin Plate.—Orders for Cokes for spring delivery have fallen off, and outside of what may have been done direct in Oil and other special sizes, the business of the week makes an indifferent showing. Spot sales have been of strictly routine character, and rather small in the aggregate amount. Assortments here are somewhat broken, but the general supply appears adequate for present needs, and purchases are made without a great deal of difficulty at prices that ruled last week. Cable report notes that the stock at Swansea is now about 214,000 boxes, against 170,000 boxes a year ago. Uncertainty in future legislation deters buyers from purchasing in quantities larger than for immediate requirements. With this exception the trade throughout the country is in a healthy condition, and a good year's business is anticipated.

Coal Market.

With milder weather and plenty of Coal, the Anthracite market is "sloppy." That is to say, while the combine hold to the regular schedule, there is a plenty of Coal around at lower prices. Shippers speak of considerable shading, Stove Coal having been sold in New York as low as $4.50, f.o.b., per ton, which is 25¢ under the gross circular. All domestic sizes are in excess of the demand. Steam sizes are easier and better in supply, but Pea Coal is slow in delivery, so that new purchasers take their turn. Pea is $2.25, alongside. Buckwheat $2 @ $2.10, alongside, and not as easy as Pea. Collieries in Schuylkill County are starting up again, now that cars can be had to carry off the product.

Bituminous Coal is $3.50, alongside, and in some cases $3.75 is paid, but the market is the same as a week ago. Shippers are behind on contract orders, and on others there is some delay, chiefly by reason of lack of cars. In this respect the situation is improving. Tidewater shipments have been resumed from New York harbor, but the greater part of the Coal going eastward is being shipped via all rail routes.

Week's production, 829,831 tons; for the year, 3,581,604 tons; Reading tonnage, 450,000 tons. The Pennsylvania Railroad tonnage for the week was 311,648 tons Coal and 112,253 tons Coke.

A Columbus, Ohio, special says that operators representing 95 per cent. of the soft Coal output of Hocking Valley have agreed to form a selling corporation, and are taking steps to carry out the idea, but have abandoned the plan for a trust.

The Glendon Colliery at Mahanoy City, Penn., formerly owned and operated by J. C. Hayden & Co., has been leased by the Lehigh division of the Reading Coal & Iron Company. This colliery has an annual production of 100,000 tons. To increase the output great improvements are in contemplation.

A new use has been found for Culm. The Lehigh & Wilkesbarre Coal Company have just contracted for having an 8-inch bore hole sunk over the abandoned workings of their great colliery—the Nottingham—at Plymouth. It will penetrate to a depth of nearly 700 feet, and will then be used to flush the worked-out portions of the mine with Culm.

Under this flushing process a new support is furnished, and new chambers and breasts can be driven around the solidified Culm, thus making it possible to take out all but 5 per cent. of the entire deposit of Coal as it originally existed.

Financial.

The so-called "gold scare" is the feature of the week in financial circles, occasioned by the low state of the Treasury and the continued large exports, which exceeded $4,000,000 for the week ending 11th inst., and more orders for shipment remain to be executed. Exports of specie and bullion from New York in January were nearly $15,000,000, against only $2,000,000 for January, 1892. For the same month imports amounted to $59,540,000, of which more than half were free goods, the largest item being about $14,000,000 in coffee. At the same time exports dropped to $24,801,000, exclusive of specie, facts that are calculated to attract attention in their relation to the future balance of trade. For seven months exports from New York, exclusive of specie, amount to $208,506,000, against $254,341,000 for the seven months ending January 31, 1892. Secretary Foster, in a conference with local bankers, received assurances that sufficient amounts of gold would be transferred to the Treasury to tide over the present emergency, but this arrangement was looked upon only as a makeshift, until Congress can act. The proposed issue of bonds was generally regarded as only an additional issue of paper that would not avail as a remedy so long as silver purchases continue. The subject of "special deposits" of gold was discussed by the associated banks, with the conclusion that they could only be received as "lawful money." Bank deposits amounting to about $500,000,000 weekly could not be returned in gold, which, however, few customers could desire.

The Stock Exchange markets have been less active, the speculation in industrials having subsided.

A decision has been rendered by the United States Circuit Court of Appeals for the third circuit, in the case of John Wanamaker, appellant, vs. the Enterprise Mfg. Company of Pennsylvania, appellee. This was an appeal by John Wanamaker from the decision in the suit in which the court rendered a decree sustaining the patent (No. 271,398, January 3, 1883) relating to the Meat Chopper of the Enterprise Mfg. Company, and awarding injunction and damages against him. This decision, on appeal, was affirmed with costs. The Enterprise Company have thus again maintained their Meat Chopper patents against infringement.

An Egyptian scythe, dug up on the banks of the Nile in 1890, and said to be as old as Moses, is exhibited in a London museum. The shaft of the instrument is of wood, set with a row of fine flint saws, which are securely cemented in a groove.

Chicago Report.

Scrap.—Business is again resuming its old-time volume, but the demand is heaviest for cheap stock. Dealers quote the following buying prices:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.50	....
Machinery Cast	10.00	....
Malleable Cast	8.00	....
Stove Plate (free of burnt)	7.50	....
Burnt Iron and Grate Bars	5.50	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single sheets and Rings	12 00	....
Old Gas-Pipe and Boiler Tubes	9.00	..
Cast Borings	5.00	....
Turnings	7.00	....
Horseshoes	13.00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	¾¢

Anthracite.—The demand continues very active and stock piles in the local yards are rapidly diminishing, but prices are still unchanged.

	Egg, Grate.	Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.60
Leadville	8.60
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

Tin-Plate Production.

The Secretary of the Treasury, says our Washington correspondent, is very much gratified at the continued favorable output of tin and terne plate under the impetus given to that branch of industry through the stimulating effects of the protective provisions in the Tariff act of 1890. As those provisions are binding for the term specified, any change would be a breach of faith on the part of Congress and the Executive.

The report of Special Agent Ira Ayer on tin and terne plate production in the United States will not be completed for some days. The following is an extract from a letter to the Chief of the Customs Division, United States Treasury, on the subject:

"You will be glad to know that the production for the last quarter (December 31, 1892) is very nearly 20,000,000 pounds of tin and terne plates proper, besides the manufactures of American sheet steel tinned. This is nearly double the production for the previous quarter. The number of producers is the same as the previous quarter, viz., 32."

Some of the Panama Canal officials must go to prison for five years, including the veteran president, Ferdinand De Lesseps, and his son Charles. Eiffel, who received a lighter sentence, will appeal.

CONDITION OF THE

Hardware Trade.

CORRESPONDENTS from all over the country refer to the large volume of business, the demand apparently setting in very satisfactorily. The severe weather which has prevailed has interfered seriously with business in many parts of the country and especially with the delivery of goods on account of the congested condition of the railroads. Retailers are beginning to place their orders quite freely and the jobbing houses are thus well occupied. Larger buyers are purchasing freely of staple goods and of miscellaneous Hardware needed to complete or replenish their assortments. The impression prevails that in many lines, heavy goods especially, prices are low enough to justify liberal purchases, but notwithstanding the amount of business done there is but little improvement in the tone of the market. There is somewhat more complaint in regard to collections than there has been.

Notes on Prices.

Cut Nails.—Owing to only partial adoption of the price-list on Cut Nails, there is considerable confusion in the market in regard to quotations, but as a rule prices are named by the mills on the basis of the old card. Local dealers are endeavoring to adhere to the new list, but until it is generally adopted by the mills it is not easy to do this satisfactorily. The Western mills adopted the Wire Nail card at the meeting held in Pittsburgh, on the 15th inst. Small lots from store in New York are quoted regularly at $1 off the new list. There has been considerable activity, and the prospect is regarded as very promising for a large demand during the season.

Advices from Chicago.—Manufacturers' agents report a much better business in Cut Steel Nails, with occasional orders running into very respectable quantities, The discussion of the new Eastern card has not terminated in an overwhelming sentiment in its favor. Small lots from stock sell at $1.65.

Wire Nails.—The Wire Nail market is certainly in better condition than for some time. Prices are somewhat higher and well maintained on the basis established by the manufacturers at their meeting in Chicago, to which reference was made in our last issue. The market is represented by the quotation of $1.40 to $1.45, the former being the lowest manufacturers are willing to name. There is a large movement in this line and manufacturers are busy.

Advices from Chicago.—A much stronger feeling prevails in Wire Nail circles. The trade are waiting to see if present prices will be maintained. This is the natural result of failure to keep agreements in the past. Manufacturers, however, appear to be undisturbed, asserting that no signs of weakening are apparent, and that buyers cannot hold out much longer with spring so near at hand. They also claim that indications now favor closer relations than ever among the leading makers. The mills in Northern Ohio are reported to be arranging for a consolidation of the interests. If they unite and a single selling agency controls their vast output the situation will be greatly simplified and reckless competition will be nearing its end. Small lots from stock are unchanged at $1.60 to $1.65.

Barb Wire.—The market in Barb Wire is characterized by a somewhat better tone, and some of the extreme prices named by manufacturers have been withdrawn. The quotation of $2.40 to $2.45 for Galvanized Four Point at mill, carload lots, represents the market, though some manufacturers refuse to meet these figures. The demand for Barb Wire is setting in more actively and the prospect for a heavy trade is excellent.

Advices from Chicago. — Barb Wire manufacturers are in receipt of an increased number of orders, and the outlook steadily improves. The weather has not been favorable for the Barb Wire trade, but the severity of the winter is now broken and from this time forward orders are expected to flow in with an increasing current until the hight of the spring season is reached. Manufacturers report their agreed price of $2.20 for carload lots of Painted well sustained. Jobbers, however, continue to quote from stock at $2.60 to $2.65 for Galvanized, with 40¢ off for Painted.

Bright Wire Goods.—At the present time the market in Bright Wire Goods is not characterized by its usual evenness, and there has been something of a break in prices, resulting in considerably lower quotations in some cases.

Tinware.—The market for Tinware is somewhat irregular and the competition between the different manufacturers is animated. The tendency which has existed for some time of quoting net prices instead of per list and discount has developed so far that to all close buyers quotations are made in net figures. The manufacturers refer to the inconvenience of this method and buyers to the care which is necessary in ordering goods if there is a careful comparison of prices made by competing houses.

Iron Rivets.—The Rivet market is characterized by a good deal of demoralization. Competition between the manufacturers is active and lower prices have been developed during the past week or two.

Tackle Blocks.—The condition of the Tackle Block market is far from satisfactory and the competition has developed exceedingly low prices, and even the small trade are able to purchase at figures which some time ago would not be considered.

Lawn Mowers.—Graham, Passmore & Co., Philadelphia, issue the following discount sheet relating to their line of Mowers:

	Per cent.
All Hand Lawn Mowers, except Style A	70
Style A, malleable steel Mower	60
30 inch Pony Lawn Mowers	40
36-inch large Horse Mowers	30
Collectors	20
Lawn Sweepers, hand or horse sizes	30
Extra parts or repairs	40

The discount sheet also illustrates their Style A malleable steel Mower, which is listed at $28 and $31 for the 17-inch and 19-inch respectively. Their Grass Collector is also shown and the following list prices given:

	Each.
14 and 16 inch	$2.50
17, 18 and 19 inch	2.75

Soldering Fluids.—J. F. Farrington, 188 Grand street, New York, is sole agent for Gedney's Soldering Fluid. The manufacturers state that in using it there is no liability to rust or corrode the surface of the metal, but that it is left bright and clean; that it results in a saving of solder and causes it to flow freely; that its use is accompanied by only a small percentage of leakages; that there is a freedom from unhealthy and upleasant smells, and that it reduces labor and the cost of material. It is sold in carboys and barrels at 2 cents a pound, and $1.50 charged for the package, which amount will be refunded when the empty package is returned. Samples of the Fluid are furnished free upon application.

Baltimore Chemical Company, Seventh and Gough streets, Baltimore, Md., manufacture the Perfection Soldering Flux, which is put up in concentrated liquid form, and require about two parts of water to one of Flux, for general use. The point is made that the Flux ready for use costs less than 12¢ ℔ gallon. It is remarked that there is no risk of the extra strength being wasted, as the workman must dilute it, as it will not work otherwise. Samples are put up in 2 and 3 gallon kegs at 75¢, $1.30 and $1.85, including the kegs. Prices for regular packages are as follows, subject to a discount of 5 %:

Barrels, about 500 lb, ℔ lb	3½¢
Half barrels, about 300 lb, ℔ lb	4¢
Kegs, about 110 lb, ℔ lb	4¢
Kegs, about 55 lb, ℔ lb	4¢

A charge of 75¢ is made in 55 lb kegs, other packages being furnished without charge.

Rosin.—No very important change has recently taken place in the Rosin market, but prices are considerably higher than they were some time ago. The condition of the market is reflected in the following quotations (per 280 lb), which are made by F. W. Blossom, 124 Water street, New York:

A, black	$1.45
B, common	1.46
C, strained	1.47
D, good grained	1.48
E, No. 2	1.52
F, good No. 2	1.60
G, low No. 1	1.70
H, No. 1	2.05
I, good No. 1	2.30
K, low pale	2.85
M, pale	3.75
N, extra pale	3.95
WG, window glass	4.15
WW, water white	4.30

Oil Well Cordage.—The dealers in Oil Well Cordage held a meeting in Pittsburgh last week, at which a slight advance in prices was made, and it was mutually agreed that the established price be closely adhered to, which has not been done for some time past. Represented at the meeting were the Oil Well Supply Company, National Cordage Company, Jarecki Mfg. Company, Frick, Lindsay & Co., and Bovard & Seyfarg Mfg. Company. The price of Oil Well Cordage heretofore has been 12 cents per pound, but it was decided at the above meeting to advance the price to 12½ cents per pound, and it is claimed this price will be strictly maintained.

Glass.—There have been few developments of interest in the American Glass market during the past week, the attention of the trade having been directed to the new discounts made by the National Window Glass Company, as given in our last issue. Reports from factories indicate that the demand for Glass remains steady, while production is falling off and will continue to be lighter during the next few weeks than it has been. Some factories in the natural gas belt have suffered considerably from shortage of gas, causing pots to go out of operation in some cases. Local trade is fair, and out-of-town business is reported as satisfactory. It is understood that a movement is on foot among New York importers of Window Glass, having in view some definite arrangement to insure the stability of prices. At present the market is in a demoralized condition, and Glass is sold at from 80 and 5 per cent. discount to 80 and 10 per cent. discount. The Plate Glass market is quiet, with limited demand, and no change in quotations. Quotations on Glass are as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; 100 boxes or over, 80 and 10 per cent. discount; less than 100 boxes, 80 and 5 per cent. discount. French Window Glass, 80 per cent. discount to 80 and 10 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.		@	$0.03½
Rubber Shoes, in ton lots ℔ lb.		@	.03
Large Hose, ℔ ton		@	9.00
Wringer Rolls, ℔ lb		@	.04½
Wringer Wire Rolls, ℔ lb	.01	@	.02
Syringes, ℔ lb		@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb	10¢
Light and Tinned Copper	℔ lb	9¢
Heavy Brass	℔ lb	7¢
Light Brass	℔ lb	6¢
Lead	℔ lb	3½¢
Tea Lead	℔ lb	3½¢
Zinc	℔ lb	2½¢
No. 1 Pewter	℔ lb	14¢
No. 2 Pewter	℔ lb	7¢
Wrought Scrap Iron	℔ gross ton,	$17.00
Heavy Cast Scrap	℔ gross ton,	10.00
Stove Plate Scrap	℔ gross ton,	7.00
Burnt Iron	℔ gross ton,	5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags	℔ lb		4 ¢
No. 2 White Rags	℔ lb		3 ¢
Mixed Rags	℔ lb	1½ @	1¾¢
Blues and 3ds	℔ lb	1¾ @	2 ¢
Hard Sized White Shavings	℔ lb	2¾ @	3 ¢
No. 1 White Book Shavings	℔ lb	2½ @	2¾¢
No. 2 White Book Shavings	℔ lb	1½ @	1¾¢
Light Book Shavings	℔ lb	⅞ @	1 ¢
No. 1 Mixed Shavings	℔ lb		1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @	⅞¢
No. 1 Printed Books	℔ lb	1⅝ @	1½¢
Ordinary Mixed Books	℔ lb	¾ @	⅞¢
Newspapers	℔ lb		½¢
No. 1 Manila Paper	℔ lb	1¼ @	1½¢
No. 2 Manila Paper	℔ lb	¾ @	1 ¢
Bogus Paper	℔ lb	⅝ @	¾¢
Common Paper	℔ lb	¾ @	1¼¢
Straw Chips	℔ lb	½ @	⅝¢
Binders' Clippings	℔ lb	½ @	⅝¢
Jute Butts	℔ lb		1¼¢
No. 1 Jute Bagging	℔ lb	1¼ @	1⅝¢
Mixed Bagging	℔ lb		1 ¢
No. 2 Bagging	℔ lb		¾¢
Hemp Twine	℔ lb		2½¢
Manila Rope	℔ lb		2¾¢
Jute Rope	℔ lb	1½ @	2 ¢
Mixed Rope	℔ lb	¾ @	⅞¢

Trade Notes.

The Backus Mfg. Company, with factory at Williamsport, Pa., have issued a catalogue of Backus Patent Portable Steam Radiators for gaseous fuel, radiating mantels, open fire-place gas logs, &c. The goods are tastefully illustrated by means of engravings printed in colored ink, while full descriptive particulars tell how the goods are made and how they are operated. A long list of testimonials show the estimation in which the Backus Portable Steam Heater is held by those who have used it. A feature of the little pamphlet is a descriptive price list.

Edward A. Brigham, 40 Oliver street, Boston, Mass., issues a little circular telling about Parson's Manganese Bronze. This metal, which is manufactured in England, is described as the steel of the bronze alloys and is adapted to propeller blades and many other purposes. It is made in five qualities, the first three for use where strength is wanted and the fourth and fifth for anti friction purposes. It is said to be especially suitable for drop forgings and is used for stampings of all descriptions. Edward A. Brigham is United States agent, while the agent in New York is G. Douglas Petrie, 37 Broad street.

Chas. A. Conklin Mfg. Company, Atlanta, Ga., advise us that they are this month opening a branch of their Tin-Plate business at Savannah, Ga. They will in future carry most of their stock at that point, importing direct from England to Savannah and using that port as a distributing depot. Messrs. Conklin & Co. consider the facilities afforded at Savannah to be so favorable to this business that they anticipate great advantage both to themselves and their customers in the tinning and sheet-metal lines will accrue from the new arrangement.

James A. Coe & Co., 106 and 108 Mulberry street, Newark, N. J., inform us that they have secured the sale of a thoroughly reliable American Roofing Plate—the Staple Terne—which they are now offering to the trade, made IC, 14 x 20 and 20 x 28.

N. & G. Taylor Company, Philadelphia, make special mention elsewhere of Heater Pipe Bright Tin, made at their own works, which they are prepared to offer to the trade in IC and IX thickness, and of various sizes, as detailed.

Kankakee Mfg. Company, Kankakee, Ill., call attention in another column to their Kankakee Refrigerators, of which they have a number of new designs with improved fittings.

Thomas Sands, Nashua, N. H., announces in another column that he is prepared to enter into correspondence with parties desirous of using the Flandera process for tinning cast iron, which is stated to have been adopted by several large firms in this country. W. T. Flanders will superintend the building and starting of any new plants.

The Riehle Bros. Testing Machine Company announce that beginning April 1, J. R. Matlack, Jr., will act as their

representative at the World's Columbian Exposition, Chicago, and can be found, previous to the opening of the exposition, at the office of R. W. Hunt & Co., Rookery, Chicago.

Hibberd & Spinner, 9 Cliff street, New York, inform us that, complying with a demand from the trade for additional sizes of the Excelsior Oval Former recently brought out, they are now prepared to supply it in 1½ x 20 inch and 1½ x 31 inch sizes in addition to the 2 x 30 inch originally made.

Hart & Crouse, Utica, N. Y., in a prominent announcement elsewhere, show cuts of their Royal Hot-Water and Steam Boilers. They also show a Combination Heater, as well as Hot-Air Furnace.

The Pittsburgh Reduction Company of Pittsburgh, manufacturers of Aluminum, whose works are located at Kensington, Pa., will shortly commence to make extensive improvements and additions to their plant, which will very largely increase their capacity for the manufacture of Aluminum. It is said that upward of $150,00 will be expended for this purpose.

At a meeting of the stockholders of the Bostwick Fire Proof Steel Lathing Company, held at Wheeling, W. Va., last week, the following Board of Directors was elected: J. A. Miller, E. C. Myers, H. B. Baguely, W. D. Johnson and William Ellingham. A partial organization was effected by the selection of J. A. Miller for president. A meeting will be held some time in the latter part of this week for the purpose of finishing the selection of officers and taking steps to push the business more actively than ever before.

The Eustis Mfg. Company, Bayonne, N. J., issue a circular announcing that the Bronson Supply Company, Cleveland, Ohio, and 72 Beekman street, New York, have been appointed sole selling agents in the United States and Canada for the Puritan House-furnishing specialties manufactured by them. They suggest that all orders and communications relating to these specialties be sent to the Bronson Supply Company, and hope that this business change will facilitate the execution of orders and be a convenience to their customers.

The Central Expanded Metal Company of 531 Wood street, Pittsburgh, Pa., are meeting with a very gratifying demand for their Expanded Metal, and it is being specified in a number of prominent buildings in this and other cities. It is being largely employed in connection with the company's solid partitions, constructed of studding made of ⅞ x ⅞ inch channel iron or steel placed 16 inches on centers. The metal lathing is attached to the studding and is then covered with mortar or cement in the usual manner. These metal studs, metallic lathed and plastered on both sides, give a partition which is claimed to be not only light and strong, but of an absolutely incombustible nature. These partitions have been used in a large number of prominent buildings in Chicago, and are now specified in that of the New York Biscuit Bakery, which will require 11,000 yards of expanded metal; the De Gerald Apartment Building, requiring 15,000 yards; the Stiles Hotel, requiring 30,000 yards; Leland's "View" Hotel, now in course of erection in Jackson Park, which will require 52,000 yards and the Indiana Hotel, which will take 75,000 yards of Expanded Metal. In the latter case the Expanded Metal is used in connection with wooden studding and joist. The construction employed gives a solid partition, which is claimed to be substantially as strong as a brick wall, while possessing the advantages of saving floor space and economy of cost.

Among recently authorized corporations in Illinois are the following: McAleenan & Co., at Peoria; capital stock, $15,000; for the manufacture of boilers and sheet iron work; incorporators, William J. McAleenan, Eugene McAleenan and Maggie A. McAleenan. The Cushman Telephone Syndicate, at Chicago; capital stock, $1,000,000; for the manufacture of telephones and switchboards and to construct telephone exchanges; incorporators, H. L Hollister, Israel M. Hay, J. S. Given and John D. Cameron. The Havana Metal Wheel Company, Havana; to manuacture metal wheels; capital stock, $25,000; incorporators, Harvey J. Phelps, Lewis E. Waterman and Orlando B. Thoop. The North Side Electric Street Railway Company, at Chicago; capital stock, $500,000; for the construction and maintenance of a system of street railways in Chicago; incorporators, August Rieke, F. W. McNally and William Kilpatrick. The Augusta Electric Light & Mfg. Company, at Augusta, Hancock County; capital stock, $16,000; to furnish light and power for the manufacture of brick, tile and pottery; incorporators, William Gelm, B. C. Crain, D. P. Coffman, R. J. Crigson and O. L. Pitney. The Babcock Fire Extinguisher Company, at Chicago; capital stock, $100,000; for the manufacture of fire-extinguishing apparatus and appliances; incorporators, William C. Stoddard, William Wilkinson and Alfred Holman. The Bennars Hubless Adjustable Self Oiling Carriage Mfg. Company, at Chicago; capital stock, $200,000; for the manufacture of carriages; incorporators, William Bennars, Hector A. Bennars and Albert Jacobs. The Allan Maxwell Mfg. Company, at Chicago; capital stock, $300,000; for the manufacture of chilled gear wheels and electrical supplies; incorporators, J. G. Hambrick, R. R. Kerr and D. G. Laxson. The Henry Knapheide Wagon Company, at Quincy; capital stock, $20,000; for the manufacture of wagons and vehicles; incorporators, H. E. Knapheide, M. C. K. Germann and A. M. Knapheide. Chicago Carpet Sweeper Company, Chicago; capital stock, $50,000; incorporators, James Rosenthal, Herbert Till and Louis Hening. The Kaplar Patent Tinware Mfg. Company, Chicago; capital stock, $20,000; incorporators, Harris Kaplar, Jacob Burkhart and others. The Breitling Metal Ware Mfg. Company, at Chicago; capital stock, $75,000; for the manufacture of metal ware; incorporators, Charles Breitling, Gustav Steiglitz and Adolph Hartman. The Smith-Hill Foundry & Machine Company of Quincy, Ill., have increased their capital stock from $75,000 to $100,000.

J. Geo. Kurtz, Jr, & Bro., Philadelphia, Pa., who are agents for the Ringen Stove Company, St. Louis, Mo., report an excellent outlook for a large spring trade. This house have sold the Quick Meal gasoline and gas stoves for a number of years past, and report a steadily increasing demand for them. They recently placed an order for eight carloads, and this no doubt will be supplemented with additional orders as the season progresses.

The Smith & Anthony Stove Company have had a regular "fall boom" since they commenced advertising their new brick-lined furnace known as the Hub Heater, additional typewriters and other sure signs of a lively business having apsure signs of a lively business having appeared at their Boston office. It is possible our readers may hear further of this heater in the not very distant future.

Ice on the lakes is the heaviest for a century. In one place, eight miles from shore, it is eight feet thick.

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See Standard Lists on Following Pages.

CHICAGO, FEBRUARY 16, 1893.

Tin—

Straits pigs.....22¢@22½¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland and Melyn Grade	IC, 10 x 14	@ $6.75
	IC, 12 x 12	@ 6.75
	IC, 14 x 20	@ 6.75
	IC, 20 x 28	@ 13.50
	IX, 10 x 14	@ 8.75
	IX, 12 x 12	@ 8.75
	IX, 14 x 20	@ 8.75
	IX, 20 x 28	@ 17.50
	DC, 13½ x 17	@ 6.50
	DX, 13½ x 17	@ 8.50
Allaway Grade,	IC, 10 x 14	@ 6.50
"	IC, 12 x 12	@ 6.50
"	IC, 14 x 20	@ 6.50
"	IC, 20 x 28	@ 13.00
"	IX, 14 x 20	@ 8.00
"	IX, 20 x 28	@ 16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14.14x20	@$6.00
IC, 14x20.90 ℔	@ 5.75
IC, 14x20, 100 ℔	@ 5.85
10 x 20	@ 9.00
20 x 28	@12.00
IX, 10x14, 14 x 20	@ 7.50
BV Grade.—IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—	
IC, 14 x 20	@ $5.62½
20 x 28	@ 11.25
IX, 20 x 28	@ 14.25
Worcester Brand and equal.—	
IC, 14 x 20	6.12½@ ....
IC, 20 x 28	12.25 @ ....
IX, 14 x 20	7.62½@ ....
20 x 28	15.25 @ ....

American Tin Plates

Charcoal Plates.—Bright.

Irondale, A. A.—IC, 14 x 20	$7.00
" " IX, 14 x 20	9.00
" " IXX, 14 x 20	11.00
" " IC, 20 x 28	14.00
" " IX, 20 x 28	18.00
" " IXX, 20 x 28	22 00
Florence.—	
IC, 10 x 14, 12 x 12, 14 x 20	$7.00
IX, 10 x 14, 12 x 12, 14 x 20	9.00
Palma.—	
IC, 10 x 14, 12 x 12, 14 x 20	$7.50
IX, 10 x 14, 12 x 12, 14 x 20	9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, IC, 14 x 20	$9.25
Royal, extra, IC, 14 x 20	7.25
Merlon, IC, 14 x 20	6.75
Almond, IC, 14 x 20	6.50

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (No. 205), 20 x 28	@$11.50
Crescent, IC, 20 x 28	@ 12.00
" IX, 20 x 28	@ 15.00
Hickory, IC, 20 x 28	@ 13.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20 x 28	@$14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.50
" IX, 20 x 28	@ 18.50
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@$21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	$23.60
Irondale A:	
IC, 14 x 20	$6.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Kensington:	
IC, 14 x 20	6.62½
IX, 14 x 20	8.12½
IC, 20 x 28	13.25
IX, 20 x 28	16.25
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)	18.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.00
IC, 20 x 28	12.00
Globe, IC, 14 x 20	5.75
IC, 20 x 28	11.50
Miami, IC, 14 x 20	6.00
IC, 20 x 28	12.00
IX, 20 x 28	15.00
(Redipped), IC, 20 x 28	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50
		Per box of 56 sheets.
X, 14 x 56	29.50	16.50
XX, 14 x 56	32.50	18.20
X, 14 x 60	31.50	17.65
XX, 14 x 60	35.50	20.00

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 10	℔ ₵ 2 7-10¢	3 3-10¢
17 to 20	℔ ₵ 2 8-10¢	3 4-10¢
21 to 24	℔ ₵ 2 9-10¢	3½¢
25 and 26	℔ ₵ 3¢	3 6-10¢
27	℔ ₵ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ ₵ A, 10¾¢; B, 9½¢ dls. 5%
Craig Polished Sheet Steel.....℔ ₵ 8½¢

Galvanized.

List on following page.
Juniata, or first quality.....dls. 70&2½%

Copper—

Ingot.

Lake.....13¢ @ 13½¢
Casting Brands.....12¢ @ 12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 ℔.
Above 5-16 inch to 3 inch inclu....35¢
Plain, above 3 inch.....45¢
Plain, 5-16 inch.....45¢
Plain, ¼ inch.....60¢
Plain, 3-16 inch.....$1.00
Plain, ⅛ inch.....$1.50
Fancy Tubing, Brass, to No. 20 inch.....43¢ ℔
Bronze Tubing, 5¢ ℔ more than Brass.

35 @ 40%

Roll and Sheet Brass.

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 ℔ casks.....7¢
Less than Casks, ℔.....6¼¢

Lead—

Soft Pig Lead.....4¢
Bar.....4½¢@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10%

Solder—

½@½.....13¢@13½¢
Extra Piping.....13¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....13¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain	60&10%
1¼ and under, Galv	52½&10%
1½ and over, Plain	70&10%
1½ and over, Galv	60&10%
Boiler Tubes, list Oct. 24, 1892	65%
Casing, list Nov. 16, 1892	62½%
Inserted Joints Casing, list Nov. 16, 1892	47½%
Steel Boiler Tubes	27½%
Cold Drawn Seamless Steel Tubing	50%

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted	55%
Austin's Corrugated	60%
Gordon & Gilbert's Corrugated	55%
Ritchie's (Galv. Iron only) Cor'd	55%
Ritchie's Spiral Lock Seam, Galv'd	50%
Austin's Spiral Ribbed Pipe	55%
Plain Adjustable Elbows	55%
James A. Miller Bros. (Galv'd Iron only) Corrugated	55%

Steel Roofing—

Perfection	$3.75 square
Climax	$3.50 square

Metallic Shingles—

Cushman's	$1.25 square
Merchant & Co.'s Spanish Tiles:	
Copper, 14 oz.	$36.00 square
Steel, painted	$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	℔ ₵, ¢
" " Brown	℔ ₵, 1½¢
" " Purple	℔ ₵, 2½¢
" " Ground in oil, B. Red	℔ ₵, 6½¢
" " Ground in oil, Red	℔ ₵, 6½¢
" " Ground in oil, Brown	℔ ₵, 5½¢
" " Ground in oil, Purple	℔ ₵, 6 ¢
Linseed Oil, Boiled, in bbls	51¢
Linseed Oil, Raw, in bbls	48¢
Mineral Paints	2@4¢
Orange Mineral	10¼¢
Pure White Lead in Oil	6¾@7¼¢
Dry White Lead in bbls	6¼@6¾¢
Red Lead, American	7@7¼¢
Red Venetian, English, dry	$1.65@$1.70
Red Venetian in oil; ass'd cans, 8¾¢; kegs	7¼¢
Sipe's Japan Oil, in bbls, ℔ gal	34¢
Spirits Turpentine, in bbls., ℔ gal	40¢
Asphaltum, Trinidad Refined, ℔ ton	$45
Coal Tar, Felt, 1 Ply, ℔ 100 ℔	$1.05
Coal Tar, Felt, 2 Ply, ℔ roll 108 sq. feet	$1.50
Coal Tar, Felt, 3 Ply, ℔ roll of 108 sq. feet	$2.00
Roofing Pitch, ℔ bbl. of 300 ℔	$3.25

NEW YORK, FEBRUARY 17, 1893.

Aluminum—

Guaranteed over 98¾% pure.....℔ ₵ .75
Guaranteed 94@98¾% pure.....℔ ₵ .65
Lots under 100 ℔ 5¢ ℔ ₵ additional.

Antimony—

Cookson.....℔ ₵, 12½¢
Hallett's.....℔ ₵, 10¾@11¢

Brass—

Planished—

List on following page.....net

Roll and Sheet—

List on following page.....35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per ℔.
Plain, to No. 20 inclusive, above 5-10 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above ⅝ inch	45
Plain, 5-10 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu	43

35@40%

Copper and Bronze Tubing—

3¢ ℔ ₵ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¼ to 3¼ inches inclusive....17¢ ℔ ₵
Over 3½ to 5 inches inclusive....18¢ ℔ ₵

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3¼ inches inclusive....18¢ ℔ ₵
Over 3½ to 5 inches inclusive....19¢ ℔ ₵

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $2.50 per doz.....40&10%

Conductors—

Corrugated. Round or Square—

Lists on following page.

Galvanized	60%
Galvanized, Locked Joints	60%
Tin	60%

Spiral Riveted—

List on following page.
Galvanized.....50%

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.

List on following page.....15@25%

Ingot.

Lake.....12½¢
Ansonia Grade Arizona.....12¢
Ansonia Grade Casting.....11¾¢

Planished.

List on following page.....net

Sheet and Bolt.

List on following page.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

Soldering Coppers.....℔ ₵, 19@21¢
Covert's Adjustable, list Jan. 1, 1893, 30&2%

Damper Clips, Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

List on following page.
Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

List on following page.
Lap or Slip Joint.....list, net

Elbows—

List on following page.

Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tube—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four-Piece.

4 in.	5	5½	6	7 inch.
$0.78	.87	.96	.99	1.20 per doz. .20 %

Elbows and Shoes—

List on following page.

Flat Crimp.

Tin.....35%
Galvanized.....35%

Corrugated.

Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ ₵, 12@13¢
Patent Planished....℔ ₵, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ ₵, 8½¢

Galvanized.

	B. B.
Nos. 10 to 16	℔ ₵, 4 2-10¢
Nos. 17 to 22	℔ ₵, 4½¢
Nos. 23 to 24	℔ ₵, 4¾¢
Nos. 25 to 26	℔ ₵, 5¢
No. 27	℔ ₵, 5¼¢
No. 28	℔ ₵, 5½¢
Nos. 29 and 30	℔ ₵, 6¼¢

Lead—

American Pig.....4¼@4½¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....15¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ ₵, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ₵, .05½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Door Mats, Galvanized	35%
Window Guards, Paneled	15%
Tree Guards, Paneled	15%

Mitres, Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.—

Dry Yellow Ochre	1¾@3
Dry Venetian Red	1¾@3
Linseed Oil, Boiled, in bbls	48¢
Linseed Oil, Raw, in bbls	51¢
Brown Metallic Paint	1¾@3
Red Lead, American	7¼¢
Pure White Lead in Oil	7¼¢
Red Venetian, English dry	$1.65@$1.70
Red " in oil, ass'd cans, 11¢; kegs, 8¢	7½¢
Spirits Turpentine, in bbls	39¢
Asphaltum, Trinidad Refined, ℔ ton	$30.00@$35.00
Asphaltum, Rock, ℔ ton	$14.00
Coal Tar Felt, 1 Ply, ℔ ℔	2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl	$2.25
Plumbago, F. 1., Pure, ℔ ℔	4@6¢
Plumbago, American, ℔ ℔	6@10¢
Plumbago, Gunpowder Glazing, ℔ ℔	10¢
Plumbago, Shot Polish, ℔ ℔	10¢

Pipe, Drain—

List on following page.....50%

Pipe and Fittings, Cast Iron Soil—

List on following page.
Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive.....60@60&10%
Other sizes.....55@55&10%
Cast Iron Fittings, Tarred, sizes 2 to 6 inches.....60@60&10%
Other sizes.....55@55&10%

Pipe, Spiral—

List on following page.
Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

List on following page.

For discounts see Current Hardware Prices.

Rivets and Burrs—

List on following pages.

For discounts see Current Hardware Prices.

Rock and Slag Wool—

	℔ ₵	₵ cub. foot.
Slag Wool, ordinary	1¼	10¢
Slag Wool, extra	1¼	38½¢
Rock Wool, ordinary	2¼	27¢
Rock Wool, extra	7¼	43½¢

Rosin

Common and Good—Strained.

Rosin, C. & D.	℔ bbl. $1.45@$1.46
Rosin, E. & F.	℔ bbl. $1.50@$1.00
Rosin, G. & H.	℔ bbl. $1.70@$2.15
Rosin, I. & K.	℔ bbl. $2.35@$3.00
Rosin, M. & N.	℔ bbl. $3.75@$4.00

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, February 25, 1893.

DAVID WILLIAMS, - PUBLISHER

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CINCINNATI..... Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....219 Superior Street

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Natural Supplies of Fuel.

There has been much said about the ultimate exhaustion of the coal deposits, and the imaginations of some writers have enabled them to depict a woful state of affairs when this comes to pass. People who make such predictions are very much like those teachers of natural philosophy who look forward to a time when not only all available fuel will be exhausted, but when even the sun will have expended all its heat; that is to say, will have cooled down to a common temperature with all other bodies in the universe, so that there will be no longer any one thing hotter than any other, and therefore the motion and activity of the universe will cease. Should such a period ever come, we, the present generation, need not fear to live long enough to be frozen out of existence by the lack of means wherewith to supply warmth to our bodies. Such predictions, however, may be taken into brief consideration. In the first place, they are much like speculations as to what exists at the center of the earth, based upon what knowledge can be gained by scratching its skin. Valuable as are the researches of geologists and mineralogists, they can tell us nothing of the state of things more than thirty miles below the earth's surface. No upheaval of the crust of this planet that has ever been traced has been able to disclose what lies lower down than that. So all that these teachers have been able to see of the grand cycle of natural forces is, comparable to what we know of the earth's interior, a mere nothing in proportion to what might be known were our power to see and understand the hidden mysteries of all created things complete.

What Becomes of Burned Fuel?

Nothing is destroyed in nature or by any of the arts of man. Little as we know, we know this. Things change their form, but the material of which they consisted still remains. When coal, or wood, petroleum, gas—natural or artificial—is consumed in furnaces, stoves or lamps, carbon is combined with the oxygen of the air to form a gas that soon diffuses into and through the atmosphere, and hydrogen also combining with oxygen passes into the air as vapor of water. We therefore have brought about two changes by the process of combustion—a change of form and a change of location. What we dug out of the earth, what was pumped out, what flowed out spontaneously, or what grew by the slow process of vegetation, as the wood we have made use of as fuel, has been changed from a solid to a gaseous condition; or, if gas, changed from one kind of gas to another, and instead of being stored as formerly, in and upon the crust of the earth, has now been stored in the atmosphere. Let us follow it a little further. Presently the water vapor is condensed and falls as rain upon the earth. But plants and trees must feed as well as drink, and the carbonic acid we have sent shooting out of chimneys and smokestacks is absolutely essential to their subsistence. All their woody framework is built up principally of the carbon extracted from the carbonic gas in the air. They take no carbon from the soil. What they get through their roots is something very different from carbon. When wood is burned most of these latter substances remain in the ashes. The carbon from the atmosphere enters growing trees and plants through their leaves, and is again built up into wood. It was through this process that the carbon of the coal measures was originally collected from the atmosphere, and it has been going on since the world began.

Compensations.

We can see, therefore, that there are compensations in nature, and that these, so far, have been equal to all emergencies. The time may come when coal supplies will give out, when oil wells will cease to gush, when natural gas will fail. When this time comes there will be no ground to fear a scarcity of fuel. Nature is ready to manufacture it as needed. It may then become a profitable industry to grow fuel as cotton is now grown for market, and when this has become a necessity, we shall have learned how to make out of it an artificial fuel as dense and serviceable as the coal we now dig out of mines. It is not at all beyond the limits of possibility, or even of probability, that fuel so made will be supplied as cheaply as natural coal is at present put on the market by the "coal combines" that are, just now, the target of so much public censure. Peat is a fuel formed by carbonized vegetation. In this fuel, extensively used in some parts of the world, carbon from carbonic gas of the atmosphere is reduced to a solid form by vegetation, and then by slow processes the vegetation is carbonized again in the formation of peat. As confirmation of the opinion that a good dense and solid artificial fuel will be forthcoming when needed, it may be said that such fuel has already been made from peat by heavy pressure. But in the fuel of the future that will become a substitute for anthracite and bituminous coal when these are exhausted, we shall not wait for the slow natural processes of carbonization. As in charcoal burning, this will probably be done artificially.

Ventilation and Labor.

It is hardly conceivable that the large majority of people in this scientific and enlightened age and country continue to neglect the important and even vital subject of ventilation as they do. Notwithstanding all the agitation on the subject and all that has been written about it; notwithstanding the facilities within reach of all for the ventilation of dwellings and other buildings by means of simple and inexpensive devices; notwithstanding painful personal experiences of the baneful effects of impure and vitiated air, in loss of health and energy—headaches, prostration, irritability and other distressing symptoms directly due to this cause—the generality of people go on their way, for the most part, ignoring one of the most essential elements of comfort and well being. Not a tithe of the attention that is its due is yet paid to the proper ventilating of our houses, offices and other buildings wherein we live or work. Much solicitude is, as a rule, felt in regard to the efficiency of the drainage, while the arrangements for the escape of impure and the admission of fresh air are usually neglected. And yet they are almost of equal importance in the attainment of sanitation and wholesomeness.

Economy of Good Ventilation.

Many employers do not realize that their best interests are involved in securing efficient ventilation of the places where their employees pass their days. A little more attention to the matter would insure better health, and, therefore, better and more energetic brain and hand work, from those who are compelled to labor in confined spaces. The fixture of a little ventilation wheel in the window of an office has been known to effect the complete disappearance of headaches and lassitude which had previously prevailed among the clerks to the detriment of the business of the firm. Physical, and consequent mental, improvement has constantly been noticed among the workers in factories and shops after the introduction of an efficient ventilating system. Every one admits these facts, and then usually does nothing.

Chicago Railroads.

The magnitude of the railroad interests of Chicago is shown by some interesting facts recently compiled by a local paper. There are 28 distinct railroad companies, operating 41 roads, on which 1386 trains of all classes arrrive and depart daily. Freight trains constitute the smaller part of these arrivals and departures, comprising 274 merchandise trains and 164 grain,

stock and lumber trains. The passenger service is divided between 670 suburban and accommodation and 278 through express and mail trains. These 28 railroad companies own or control no less than 40,000 miles of road. Their direct connections, of course, would swell the mileage much higher, as solid trains run east from Chicago to the Atlantic, west to the Pacific, south to the Gulf, &c. It is believed that no other city in the world can make a showing in any way comparable with this.

Manufacturing Specialties.

A manufacturer of a line of standard goods had been complaining of the total lack of profits in his business to a sympathizing friend, when the latter was struck by a brilliant thought and asked, "Why don't you take up a specialty and drop staple articles that everybody is making?" The unexpected reply was, "There is too much competition in specialties themselves." We venture to say that this idea is as new to a majority of our readers as it was to the man who asked the question. But, with comparatively few exceptions, it is too true. The mechanical genius who can at this time devise some novelty which does not come in direct competition with something else capable of doing the same thing or answering the same purpose is a genius indeed. Take small wares, for instance, such as are used in the kitchen. The ingenuity of inventors has been racked to get up numberless devices for beating eggs, for sifting flour, for grinding coffee, &c. Appeals are mutely made by every form of apparatus to the housewife's neatness, celerity, mechanical taste or curiosity, but there are so many articles of such totally different kinds warranted to do the same thing precisely in the most satisfactory way that she is bewildered and is as likely to select the least efficient as the best. The same remarks would apply to mechanics' tools, to personal furnishings, to wagon and carriage supplies, to so-called railway specialties, &c. There was a time when labor-saving automatic machinery began to take the place of toilsome hand labor, when a man of acute perception and mechanical knowledge could easily see an opportunity for the invention of a device which would save labor, economize time, cheapen production and perhaps improve the quality and appearance of an article in quite common use, and the practical development of the thought brought him into prominence as a manufacturer of specialties, and perhaps in time made him wealthy, but to-day such opportunities are few. The ground has been pretty thoroughly covered.

Cheapening Production.

Mechanical talent at this time seems to be turning in a totally different direction. The capabilities of machinery having been very thoroughly developed and opportunities for new applications being discouragingly rare, the most notable achievements making seem to be in the direction of cheapening the production of staple articles. This is the keynote of the manufacturers who are now most successful. The search for specialties is not alluring, as specialty competes with specialty, and consumption is perforce limited. In staple articles, however, there is a constant trade. The manufacturer, therefore, who surpasses his fellows in the cheapness with which he can turn out staple articles of equal quality surpasses them also in securing a large share of the trade and better profits. Never before has mechanical genius so applied itself in this country as now to the solution of the question, how shall the cost of production be further decreased by the introduction of more efficient machinery?

Shop Stories.

THE SOLDERING COPPER.

There are few people who watch a tinner use a soldering copper that are aware how much practice is required to become an expert in its use. It looks so easy to place the copper on the solder, take off a drop, and then apply it to the work, that it would seem that any one could perform the operation. Mr. Jones was one of these credulous mortals. He had often taken his leaky tinware to the tinner to have it made tight, and while the price charged for the work was not exorbitant, Jones thought that by having a soldering outfit he could do the work at home and thus save himself the trouble of taking the various culinary utensils to the tinner. Besides this, there would be quite a saving in expense, as the tinner would charge five cents for applying one or two drops of solder, the cost of which was about nothing. Accordingly, Jones bought a soldering copper, solder, rosin and a small bottle of soldering acid.

With this combination in his possession he felt competent to perform almost any operation in the soldering line. Jones took his small tin shop home with a resolve to show his wife how convenient it would be to have an expert solderist in the house. The family tea kettle had been leaking about the spout for some time, and this article was the first selected for repairs. So Jones set himself down by the stove, placed the copper in the fire and with the other articles near at hand proceeded to proceed. A quantity of rosin was placed where the leak was and then the solder was applied by means of the copper. For some reason the solder failed to stick, and ran off in a most provoking manner. Jones' boy suggested that the tin about the leak should be scraped as that was the first operation the tinner usually performed before commencing to solder. Accordingly, Jones took his knife and gave the place a good scraping and then applied some of the acid, a few drops of which ran down on his pants. The next attempt at stopping the leak was not a success, as the solder would do nothing but bubble and sputter. By this time the family dog had become interested in the proceedings, and drew near to see what was going on. The few drops of hot solder that rolled off the tea kettle struck the dog on the nose and sent him off with howls that were both long and loud.

By this time Jones had come to the conclusion that the tea kettle spout was too complicated in its nature for him to solder, so he next tried his luck at stopping the leak in a britannia tea pot that had been in the family for years, and was considered to be of great value on that account. It would have been better for Jones and the tea pot if this experiment had not been tried, for the metal of which these tea pots are composed is of a kind that does not take kindly to solder, especially when applied by a novice. This fact was clearly demonstrated, for when the solder was applied it not only went through the tea pot but the copper started after it. The result was a hole of great magnitude and a ruined tea pot.

However, Jones would not give up and resolved to show the family that he could solder something. Accordingly a tin pan was selected, and as there was only a hole in the bottom it appeared easy to perform the operation of stopping the opening. Jones applied a drop of acid and then holding the solder in one hand and the copper in the other found there was not a third hand to hold the pan. He accordingly let it rest in his lap and then applied the solder, resolving in his own mind to put on enough so there would be a good job done this time. As the copper was quite hot the solder ran through the hole in the pan, and as a natural consequence came in contact with Jones' leg. This caused Jones to jump and dance more than the dog, and if there was no howling done there were many words said that were unnecessary. The copper and solder were thrown away with much violence, and went through the kitchen window. Jones found his pants were about ruined, as the acid had changed the color and the solder could not be removed. All of this trouble, including a broken glass, was caused by trying to save a little money that should have gone to the tinner. TIN CHIPS.

The repeal of the duty upon block tin is likely to be pressed before the close of the present session of the House. Representative Stump of Maryland, who represents one of the canning districts which suffer by the tin-plate duties, introduced a bill on the 16th inst. to repeal the duty of four cents per pound, which goes into effect on July 1 next. Chairman Springer of the Ways and Means Committee and Mr. Shively of Indiana, who reported the reduction of the duty on tin plate at the last session of Congress, both declare that the repeal of the duty on block tin is of prime importance.

The decline taking place in the export trade of the United States is made apparent in the following comparison of the outward movement of leading staples in January for three consecutive years:

	1893	1892	1891
Cotton	$19,583,638	$28,732,225	$35,638,339
Breadstuffs	13,567,068	30,247,281	9,718,586
Provisions	10,361,319	12,187,846	11,185,583
Oil	2,788,474	3,247,223	3,312,225
Animals	2,139,158	2,831,197	2,294,850
Total	$48,439,657	$77,245,772	$61,549,583

The reduction in wheat exports is most noticeable, and this, although the exporting price from New York was 82 3 cents per bushel, as compared with $1.053 cents per bushel last year.

Papers on file in the Surrogate's office in this city show that the valuation of Mr. Gould's personal property expanded from $500,000, as reported to the Tax Commissioner's office in recent years, to $70,000,000 at the time of his decease.

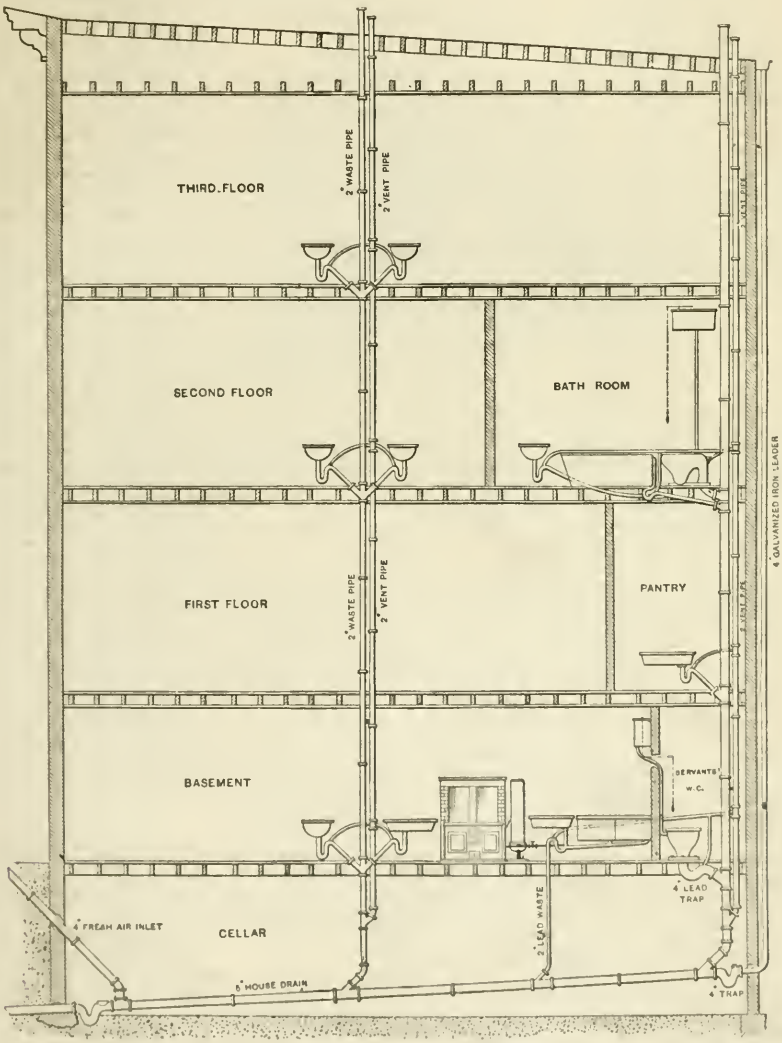
PLUMBING AND GAS FITTING.

Plumbing for a City House.

The demand for plumbing work of an advanced character has become so general at the present day as to place that portion of the plumbing trade who contented themselves with mastering only the mechanical part at a disadvantage. The time when the mere ability to make a joint and run a line of pipe by the readiest methods possible constituted a plumber has departed, and while the same dexterity in handling the tools is still necessary, the new conditions created by the requirements of Health Department standards and the necessity of showing the "reason why" for much of the work now called for inspire a considerable amount of inquiry in relation to the new order of things in the plumbing world. We deem it advisable, therefore, to present an outline of what constitutes the sanitary house plumbing system in New York City.

In selecting the class of house for illustration care has been taken to avoid extremes. The sectional view herewith presented is that of a popular style of private dwelling (a three-story and basement house) which is largely in vogue in the newer portions of this city, and is better calculated on that account to correctly represent the number and arrangement of fixtures throughout the building.

As it is always better to commence at the foundation, the house drain in the cellar and the soil, waste and vent pipes, rising therefrom to above the roof, claim



Plumbing for a City House.

first attention. The diameters of these pipes, respectively, are: The house drain, carried diagonally along the wall, is 5 inches; the vertical line of soil pipe into which the waste matters from bathroom and kitchen fixtures discharge, 4 inches; the vertical line of waste pipe receiving the discharge from basins, 2 inches; while that of the vent pipe, in each case for soil and waste pipes, is 2 inches. The fresh-air inlet pipe, which is set on the inlet side of the running trap on the house drain, is also 4 inches, and all of the iron pipes supposed to be of the grade known as "extra heavy."

THE HOUSE DRAIN.

In setting the house drain in position, care must be exercised that the descent is uniform, and as steep as the depth of the sewer in the street will allow without prejudice to the proper level of the trap at the front wall, the seal of which might be otherwise destroyed. Unless under exceptional circumstances, the house drain should be carried either along the ceiling, properly supported by pipe hangers bolted to the beams, or, as in the appended diagram, along the wall. The opening in the front foundation wall through which the drain is carried to connect with the house sewer outside the building should be larger than the outside diameter of the pipe, and the upper part thereof protected by a slab to prevent possible injury to the pipe by the settling of the building. If the house sewer—that is, the branch sewer from the house wall to the main sewer in the street—is earthen pipe, the iron pipe from the cellar should be carried so far beyond the house line, before connection with the earthen pipe is made, as to avoid all danger of breakage through the weight of area walls or steps above the earthen pipe.

In accord with New York Health Department rules, a disconnecting trap is set on the house drain, inside the front wall, for the purpose of serving as a barrier to the entrance of sewer gas into the pipe system of the house. This is a running or half S-trap, same quality and diameter as the house drain, and furnished with a hand hole hub for cleaning purposes on the inlet or house side. This hand hole is fitted with a gas-tight brass cleaning screw, which can be opened when required for the removal of obstruction from the trap. If the trap supplied is what is known as a double-hub trap—that is, with a hub opening on both the inlet and outlet side, the latter opening should be closed by means of an iron plug calked in in the usual manner. Both of these openings are, however, sometimes utilized, the one on the inlet side for connection for the fresh air inlet, and that on the outlet side as a cleaning hole, but this is a dangerous arrangement, as the latter opening is in direct communication with the street sewer, and if opened in the cellar for the purpose of removing obstructions from the trap, sewer gas, during such removal, will have unrestrained entrance into the building, and the trap as a preventive will become worse than useless.

The house drain should be well supported, and when carried along the cellar wall, as in the diagram, a pipe hook should be supplied for every 5-foot length, so as to relieve the joints from strain, and it is advisable where vertical pipes discharge into the house drain to have a brick support built at that point for the same purpose. The vertical or rising lines of soil and waste pipe should always discharge into the house drain through Y-branches and one-eighth bends, and not as sometimes done through T-openings. It is also good practice to have rain leaders discharge into house drains, so as to aid in cleansing them. In the sketch herewith the 4-inch galvanized leader at rear of building is so arranged that the roof water is utilized in this way, a 4-inch running trap being set inside the rear wall at junction with drain pipe to prevent the foul air from escaping up through the leader and entering windows contiguous thereto. The leader trap should be set with the hand hole for cleansing on the leader or inlet side and should also be provided with brass cleaning screw.

Yard and area drainage has to be provided and the surface water to be discharged through the house drain, the branch drains to be trapped inside the cellar before they enter the house drain. If the yard level inlet permit, the yard drain can connect with the leader at the bend where it enters the wall, in which case the leader trap will answer the double purpose. If the yard drain has to be brought into the cellar from some other point, it must be independently trapped before it connects with the house drain, and the same rule is applied to the front area drain, which must be trapped and discharged into house drain on the inlet side of trap at front wall. By this arrangement the roof water and the surface water of yard and area are utilized to keep the house drain properly scoured. Drains with perforated plates are set in the yard and area drain pipe.

FRESH AIR INLET.

The fresh air inlet pipe is inserted in a T-opening set in main drain on house side of main trap. It is intended to provide a current of fresh air for the pipe system in the building, and with this object in view it is carried, in this city, to the sidewalk near the curb, and the opening, which must be at least 10 feet from nearest opening, is covered with a metal grating. The hub of the T in the cellar, into which the inlet pipe is calked, should invariably be set perpendicularly. Sometimes it is set in the side of drain pipe, or horizontally, which is not good practice, as in the latter case the sewerage, if checked in its flow at the trap on main drain, will naturally turn aside into the inlet branch and by clogging the opening render it useless as a passage for fresh air. This cannot occur when the T is set in an upright position. And inasmuch as the regular flushing of the main drain will have little effect in cleansing the inlet, a recurrence of stoppages will in time render the inlet pipe of no value. In country places, however, better facilities offer for making the fresh air inlet pipe useful, and care should be taken that it is not omitted from the house plumbing system.

VENT PIPES.

In the diagram which we present it will be noticed that the vent pipes which are intended to vent the traps in the vertical soil and waste pipe lines, instead of starting upward from above the traps of the lowest fixtures, in each case they commence below the lowest fixture, starting from a Y-branch connection with the soil and waste pipes respectively. This is a rule adopted by the Health Department to afford means of disposing of the rust from the inside of the vent pipes, which is liable to settle in the lowest trap on the line. This, in many cases, is but a 2-inch trap, which would readily become choked up. Under the new arrangement the iron rust or other matter falling through the vent pipe, instead of lodging in a trap, is carried down into the house drain through the Y on soil and waste pipe and is carried away with the sewage into the street sewer. This arrangement of the vent pipe, by providing a foundation, as it were, makes the vent pipe firmer than under the old method and on the whole is considered a desirable one.

FITTINGS ON VERTICAL LINES.

In arranging the several fittings on the vertical lines it will be seen that separate branch openings are always called for in the case of water closets unless where space is limited. For instance, in the bathroom, as illustrated, a 4-inch Y-branch is provided for water closet and a 2-inch separate opening for the bath and basin waste. If circumstances, however, prevented the insertion of the 2-inch Y-branch in the vertical soil-pipe line, it would be permissible to discharge the wastes of the bath and basin into the lead soil pipe of water closet provided the discharge pipe was made to enter on the outlet side of the water-closet trap, not otherwise.

TESTING PIPES.

The testing of the pipes is something which should never be overlooked. The methods most in use are by water and air, while some of the more advanced claim that the smoke test is the best. We will confine ourselves to the two former methods, and will first deal with the water test. As the success of the test depends on how the joints are made, the plumber must bear in mind that a large quantity of oakum put carelessly in the hub and molten lead indifferently calked in will not resist the pressure of a column of water in the pipes. The joint must be made by using just sufficient oakum to form a bed for the lead, and ramming it so tightly home as to prevent any of the lead forcing its way through the joint into the pipe. For every inch in the diameter of the pipe 12 ounces of lead are required, all of which should be poured into the joint at once, as it is of very questionable advantage to make a second pouring of hot lead over the cold lead in the joint. For a 2-inch joint in iron pipe 1½ pounds of lead are required, for a 4-inch joint 3 pounds of lead, and for a 5-inch joint 3¾ pounds. The size of the ladle to be used will therefore be readily understood by the plumber. It is very desirable that the entire system of soil, waste and vent pipe, both lead and iron, should be tested at once. This can be done by securely plugging the opening of the house drain on the outside of the building before it is connected with the sewer, capping all the lead wastes before attaching the fixtures and then filling up the pipes to the roof. If the test is satisfactory every joint, both those of the iron pipe and the ferrule work, may be relied upon as proof against sewer gas, while if there is weakness in any joint or a defect in any of the pipes it will be readily detected. If from inability to procure water the air test is applied, the plugging is to be done in the same way, except that a piece of gas pipe is inserted in the plug in one of the hub openings and either a pressure gauge or a mercury gauge is attached. The air pump, connected with the gas pipe by a rubber tube, is put to work and air pumped into the pipes until the required pressure to the square inch is obtained. In determining this pressure preference is given to the mercury gauge, the pressure being indicated by the hight of the column of mercury in inches, each inch being considered equivalent to ½ pound pressure to the square inch. When the pressure test was first introduced the New York Health Department required 10 pounds, equal to a 20-inch column of mercury, but this extreme requirement has been modified and a 5-pound pressure test is now considered satisfactory. If a joint is suspected of leaking during the air test an application of soapy water will readily enable the plumber, by the appearance of air bubbles, to locate the exact spot where the application of the calking tool is required.

SETTING FIXTURES.

The fixtures represented in our diagram do not need much reference, if we except those in the bath and kitchen. In setting these in position it is desirable that each trap be as near as possible to its respective fixture, and the vent pipe from the crown so inclined that water of condensation will drain into the trap. Provision should be made, when setting up the vertical line of vent pipe, that the T openings to receive the trap vents are set sufficiently high to secure that incline without having to set the trap further from the fixture than good practice warrants, in order to secure the desired result.

The water closet in bathroom, which is presumably of porcelain, the trap and bowl in one piece, needs careful setting. The soil-pipe branch from closet to 4-inch opening in vertical soil pipe is lead, not less than 6 pounds to the square foot (the Health Department calls for 8 pounds) and is flanged over at bathroom floor level on a brass floor plate having a 4-inch opening, the edges around which are usually countersunk to admit of the lead

flanges. The closet is set on this floor plate, a rubber gasket or a cushion of red lead putty being set between the closet and the plate, both of which are then bolted together. Some of the floor plates have the edge of the opening in plate beveled instead of countersunk, in which case the lead soil pipe is not flanged over, but is cut flush with the plate and the beveled space filled with solder, uniting floor plate and soil pipe in an effective manner.

The servants' water closet is a flush rim hopper set in a compartment entered from the yard. The 4-inch lead trap, properly vented, is under floor and discharges into soil pipe in cellar. The cistern for flushing is set in the kitchen, over the washtubs, the chain and pull being brought through the wall. This is done to prevent the water in cistern freezing, which would be almost certain to occur if set directly over closet bowl. One trap suffices, under Health Department rules, for the sink and the washtubs in the kitchen, the 2-inch lead waste pipe from the tubs discharging into the sink waste pipe above the trap on the inlet side, which in turn empties itself through a Y-branch into the house drain in cellar.

Safes under fixtures and the safe wastes leading to the cellar are omitted from the diagrams, but plumbers, as a rule, know all about them.

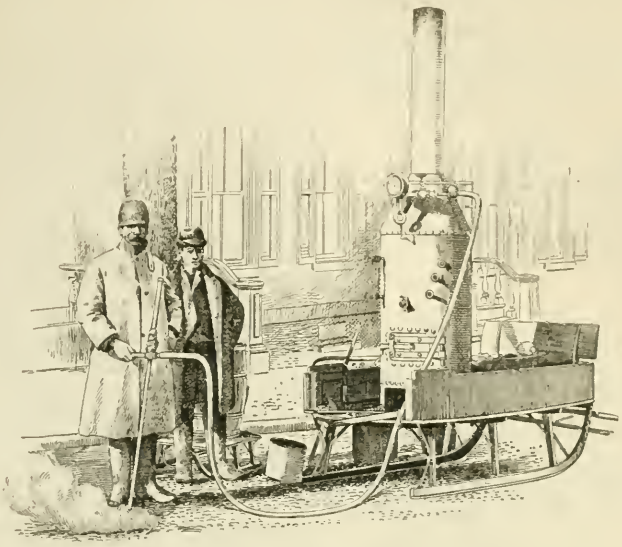
PIPES ABOVE ROOF.

In extending the vertical lines of pipe above the roof care should be taken to avoid the use of offsets, owing to the danger of lodgments of snow, and the resultant danger of being closed up by the formation of rust. The pipes should be extended full-bore straight through the roof—the hight of the extension of the soil (or waste) pipe and the vent pipes terminating at different levels, so as to avoid the consequences of down drafts—that is, the foul air discharged from one pipe being carried back into the dwelling by the other. Until recently the Health Department required all pipes 4 inches or more to be increased 1 inch in diameter above the roof, and no roof extension to be of less caliber than 4 inches. At the present time no enlargement of pipes above the roof is called for.

Thawing Frozen Water Pipes.

From W. C. V., *Schenectady, N. Y.*—It may be interesting to some of the readers of *The Metal Worker* to know how we fight the hold "Jack Frost" had on our water service pipes, and in fact on our water mains. While my men were at work on a frozen service a short time ago I thought it might be cooling during the warm weather next summer to look at a picture of the men at work thawing the ice out of a service some 5 feet below the surface of the street. I brought out my camera, and with a $6\frac{1}{2}$ x $8\frac{1}{2}$ plate took the picture, of which I send you a copy. You will notice that there is very little snow on the ground, a fact we became well satisfied of when we moved our outfit to another place. We have our boiler on a sleigh; and the only other part of the outfit, besides the usual boiler fixtures and small tools, is the pipe that we use for carrying the steam to the seat of the trouble. This is a piece of $\frac{3}{8}$-inch iron pipe about 6 feet long with a $\frac{3}{4}$-inch cross at one end. In this cross we have two pieces of $\frac{3}{4}$-inch pipe for handles and a piece of $\frac{1}{4}$-inch pipe to connect to $\frac{1}{2}$-inch steam hose that is in turn connected to the boiler. To use it we turn the steam on and start the pipe in the ground, and through the frost it goes in a few minutes. We usually start at the "goose-neck," as the connection to the main is called. The pipe here is about 1 foot above the remainder of the service and we often start the water running by letting the steam warm the ground up well at this point, by leaving the pipe in the ground for a time, after we have found the service pipe by feeling for it with our steam pipe. The picture will, I think, give you a good idea of the work without any further explanation.

This thawing out was a very common scene with us in January. A little while ago we had our boiler at work on a service when there were four other boilers at work on the same block. Since then I have seen five boilers working on a frozen main for the Water Department not 10 feet apart.

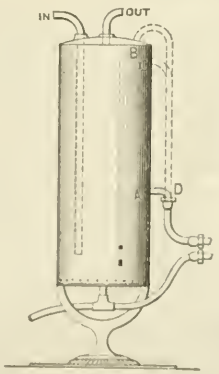


Thawing Frozen Water Pipes.

One advantage of this manner of thawing is that the ground around the pipe is well warmed up and is not so liable to freeze again during the winter so as to stop the water. This cannot be said of many other ways that the trade do the work, more especially from the inside of the house.

Change of Connections from a Kitchen Boiler.

From C. C., *Chicago, Ill.*—How could I improve the efficiency of a 50-gallon hot-water boiler so as to facilitate the rapid heating of at least a portion of, if not the entire, water contained in it? My case is this: A customer of mine recently moved into a house, in the kitchen of which a 50-gallon boiler is set up and connected with the usual hot-water piping found in most houses to sink, bath, &c. The tenant who lived in the house before, and whose range I also connected to the same boiler, had no difficulty in getting all the hot water he required. He, however, had a large No. 9 range, with a large water back. The range of the new tenant is somewhat smaller, and in my opinion should be considerably larger to perform the task required of it. He does not care to buy a larger range, but wants me to fix the matter so as to help him out if possible. To do this I propose to change the hot-water return from the range from where it enters the boiler now at A, to where it is shown at B, by the dotted outline of the pipe and stop up the hole at A. This arrangement I think will do the business; am I correct? I would like to have your opinion on this proposed change in the pipe.



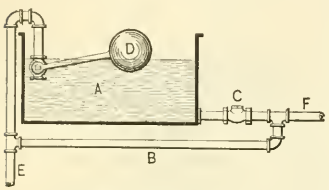
Change of Connections from a Kitchen Boiler.

Answer.—The expedient suggested by our correspondent will in all probability help him out of the difficulty. We would offer the suggestion, however, that it would be a better plan to connect the inlet at the joint C instead of at B, say 6 inches or 8 inches below the top of the boiler. This plan of putting the hot-water connection at the top of a boiler is a poor one at its best. It is true that in order to obtain hot water quickly the arrangement does well enough, but as a matter of fact it does not offer the ample reserve supply of heated water that the rational and well-tried mode of connecting the hot water return at A does. For this reason, the point C is a far better one for the purpose than B, at the top of the boiler. The supply of heated water taken in at point B would be exhausted in very short order, while the amount in reserve taken in at point C would be heated almost as quickly and would provide a better supply. Another point to consider is that the time required to heat the water in the whole boiler (if the hot-water feed is taken in at the top) will be considerably longer than if the connection were made at A. An improvement on the arrangement as suggested by our correspondent would be to make the proper pipe connections

with two inlets, one at C and the other at A, with a three-way cock at D, so that either could be shut off when it would be desirable to use the other.

Supply-Pipe Arrangement.

From J. T., *Brooklyn, N. Y.*—Inclosed I send sketch of an arrangement of supply pipes which I think would relieve "J. P.," whose letter appears in *The Metal Worker* of February 11. The principle is as follows: While the pump is working he would get at least 5 pounds pressure on the pipe B, which would close the check valve C and when the float D would close he could leave a little steam



Supply Pipe Arrangement.

on the pump that would keep just pressure enough on the discharge pipe E to supply the emergency. This would be done only at that particular time of day and he might be able to adjust the speed of the pump between the hours mentioned to keep the water level at a good point, and while it would only be doing the actual work required, the pump would give an extra pressure on the supply pipe F.

Bursting Pipes by Frost.

From S. H. B., *Geneva, N. Y.*—I have read with much interest the accounts of experiments in *The Metal Worker* of February 11, in regard to the bursting of water pipes by frost. In the latter part of the article the author says he did not experiment with lead pipe. I cannot say from actual experiment, but from what I have seen in my own experience as a tinsmith I believe that lead pipe is much more liable to burst than iron pipe. There is perhaps no tinsmith or plumber who has not been called upon to repair a lead pipe and found it enlarged at some point and burst open lengthwise about an inch. This could not have been done in this manner by ice forming at this point, but must have been caused by the pipe becoming in some way stopped at each side of the opening, and then ice continuing to form from one or both directions toward this point. The result would be the pipe must enlarge, which it would do at its weakest point, and the more it enlarged the less would be the resistance there, so that all the expansion would be confined to a space of about an inch in small pipes. The same result would occur if the water between the two plugs was warmed before the stoppage was removed from either side. In lead pipe the rupture must occur with some kind of an explosion, as the opening is usually found to be ¼ to ½ inch in width. I never saw a lead pipe burst by the direct pressure of ice formed or forming within it, and do not believe it would be possible for it to occur.

Electricity and Water Pipes.

Electrolysis of water pipes, says *Fire and Water*, was the principal topic of discussion at the last meeting of the New England Water Works Association, held at Young's Hotel, Boston, January 11, 1893. Charles H. Morse, electrician, of the city of Cambridge, gave an account of the result of his observations and opinion regarding the operation of the electric current in its effect upon water pipes in that city. He states that in some cases lead pipe had entirely disappeared by the action of the electric current, and the same result had followed in the case of iron, galvanized iron, brass and rustless pipes where they had been substituted. Mr. Morse claims that corrosive action takes place where the current leaves the pipe and not where it enters it. The electric current which occasioned the trouble came from the operation of electric street cars. The experiment of reversing the electric current was tried, and also soldering heavy wires to the pipes, as a means of conducting the current back to the power house. This last experiment obviated the trouble to a great extent, and by reversing the current and using the wire connections of the pipes as a medium, the trouble was still further reduced. A further discussion and inquiry revealed the statement that the return wires between the rails were too small to carry the current back to the power house. In some instances these wires had disappeared. It is intimated that if the water pipes could be insulated no electrolytic action would take place. With what information we have before us upon this question, it is quite apparent that if the return wires, now said to be too small for the purpose designed, were made larger, there would be no need of providing return connections from water pipes or reversing currents. Motive power by electricity seems to be an established fact; at the same time, corporations enjoying franchises for the right to use electricity as herein mentioned should be compelled by law to protect the water service pipes. It is laudable to consider primarily cost of construction in connection with maintenance; at the same time, false economy results in double expense. It will be cheaper in future for electric railway corporations to use the best materials in construction in first application. When suits are brought against the city for permitting private property to be injured through a franchise granted by the city, perhaps municipal officers will be more careful and be willing to employ competent electric engineers to pass judgment on all plans proposed for construction of electric railways. There is much to be done in the way of developing practically the electric science in connection with motive power

Plumbers' Examinations.

From G. G. U., *San Francisco, Cal.*—Will you kindly give in the columns of *The Metal Worker* a list of the questions put to plumbers by the examining board in New York City. Are they the same all over the States? Also, can a plumber do jobbing in New York without passing an examination?

Answer.—There is no regular list of questions propounded by the Examining Board of Plumbers in New York, as far as we can learn, because practical plumbers know very well that there is something more than the ability to answer technical questions required of applicants for license to do plumbing work. There are very few trades so exacting in their demands on the intelligence of the men pursuing them as that of plumbing. Difficulties are continually presenting themselves which call for good judgment and a knowledge of natural laws and their proper application in the solution of such difficulties. The New York Board of Plumbing Examiners has only recently organized, but for some years past the License Committee of the New York Master Plumbers' Association gave attendance gratuitously, once a week, at the office of the Department of Public Works, and subjected applicants for plumbing license to a very rigid examination. The applicant would be required to illustrate, by drawings, how he would run his soil and waste pipes to suit certain conditions of the job or the peculiarities of buildings; if pumps were to be used and obstacles to be encountered, what he would do to get them to work satisfactorily, if in the piping of a house for hot or cold water service deviation from usual methods was unavoidable, how he would adapt himself to circumstances—in fact, every problem necessary to test his ability to undertake plumbing contracts would be proposed by one or other of the committee in the exercise of his judgment, and a verdict would be rendered on the ability of the applicant to satisfactorily answer the problems. We are uncertain as to the practice in all the States, but we know that there are legal restrictions in Maryland and Pennsylvania. In the former State a plumbing law, resembling the New York law of 1892, has been in force for several years, the members of the examining board being appointed by the Governor.

In Pennsylvania there has been in operation also for several years a general law, the execution of which is in the hands of the boards of health of the respective cities, and the scope of which embraces the qualifications of plumbers.

The ordinances adopted in many cities where there is no State law which bears upon the subject frequently provide for examination into the fitness of applicants for plumbing licenses, and it is likely that the line of investigation pursued is largely a matter of judgment on the part of the examiner or examining body. In relation to the last inquiry, a plumber doing business in New York City after the first day of March, 1893, without having been examined by the examining board, and a license duly issued, does so in violation of law, and is subject to the penalties provided in the act establishing the board. If he should succeed in evading it, and do some job of plumbing work, and the party for whom he did the work afterward should refuse, on some pretext or other, to pay for it, the plumber, it would seem, would have no redress, as his suit, if he brought one, would be thrown out of court on the ground that not having complied with the license law he would have no standing in court.

TRAPS AND VENTS.

IT IS ALLEGED, says a foreign exchange, that some one has obtained a patent on a device for preventing the bursting of water pipes during the cold weather. The inventor, so it is said, has ascertained the amount of expansion to be looked for when water freezes, and has perfected a composition which contracts in equal proportion from cold. A thin rod of this latter is placed inside the pipe, and experiments show that no amount of freezing can make the pipe burst. The trouble is that the water may freeze first where the contracting rod is located, and after it is inclosed in solid ice burst out somewhere else. It often happens that a pipe freezes in spots, the remaining liquid contents taking up expansion until they too get below the expansion temperature just before freezing. To work properly, the rod would have to run from end to end in a pipe.

THE NEW plumbing board of Kingston, N. Y., consists of Henry E. Wieber, Bernard Loughran, John F. Halloran and E. B. Codwise.

IN THE COURSE of his address at the third annual convention of the Connecti-

cut State Master Plumbers' Association, held at New Britain, Conn., February 9, President Lyman D. Mills of Middletown said: "One of the most important steps this association could take at this time, or perhaps in the near future, would be to establish and maintain a trade school, for the education of apprentices, for by this means only are we assured of the plumber of years to come possessing the knowledge necessary for him to take his stand as a sanitary expert and to engage the confidence of the public."

H. C. MONTGOMERY, Brainerd Building, Cleveland, Ohio, issues an illustrated and descriptive catalogue of some of the lavatory specialties which he manufactures. The publication contains but a few pages, is neatly printed and the cuts are carefully made. The first few pages show a number of different forms of the Elite cast-brass traps. A pleasing effect is given by the gold bronze in which some of the illustrations are printed. The Elite waste and overflow and the Elite cast-brass lavatory brackets are noticed later in the pamphlet.

THE RAYMOND LEAD COMPANY, Lake and Clinton streets, Chicago, are now supplying plumbers with the American Plumbers' Supply Company's ebony gloss soil, which is guaranteed not to sour, ferment or become rancid, nor to rub, peel or burn off. It is put up in paste form in packages of 1 pint to 5 gallons.

THE HENRY HUBER COMPANY, New York, manufacturers of sanitary specialties, have moved their Chicago office and salesroom from 82 Dearborn street to 231 East Kinzie street, at which place they will remain until more commodious quarters can be secured.

P. W. HUDNER of Hudner & Regelsberger, St. Paul, Minn., was in Chicago for a few days buying plumbing goods for a large contract which the firm have in Duluth.

O. D. PECK, of Peck Bros. & Co., manufacturers and jobbers of plumbers' supplies, 259 Wabash avenue, Chicago, has left the city to attend the annual meeting of the stockholders of Peck Bros. & Co., to be held at New Haven, Conn.

THE DECECO COMPANY furnish through the Walcot Hurlbut Company, manufacturers and jobbers of sanitary specialties, 175–177 Lake street, Chicago, 77 Dececo closets for the Windermere Hotel, and 18 of the same closets for the Elsworth building.

ACTING under the provisions of the State Plumbing Law, Mayor Price of Jamestown, N. Y., has appointed to the board for plumbers in that city, William Swanson, journeyman plumber, Jonas Woodhead and George H. Chatfield, master plumbers, and J. Dana Littlefield, and Jonathan T. Pennock, members of the Board of Health.

Gathering of the Classes of the New York Trade School.

The delightful social gathering of the day and night classes of the Trade School on Tuesday evening, February 21, was a popular and profitable one. As the students and visitors entered the new auditorium there were many complimentary things said about its attractions and handsome appearance.

The evening's programme was conducted somewhat informally to subtract conventionality and add the charm of warm-hearted entertainment. That this was successfully done was attested by the hearty applause, eager interest and pleasant social intercourse during the rendering of it as well as by the farewell expressions of enjoyment.

The opening piano solo, played by C. F. Rudenauer, was followed by a humorous recitation from L. H. Hallen, which merited an encore. As soon as the name of Miss Radcliffe was mentioned (it will be remembered she sang at the last gathering) applause came from all parts of the auditorium. With remarkable effect on the audience she sang "Come Unto Me." Miss Krider played the accompaniment with skill. Then H. E. Claflin, in behalf of the Day Plumbing Class, presented to the singer an emblematic stand of beautiful flowers.

One of the principal events of the evening was the well-received address of John Byrns on the subject, "Duties of the Artisan Citizen." The thoughts uttered were useful to the young artisan, and his earnest delivery did not exceed the earnest attention given the speaker. After Mr. Hallen rendered a piano solo one of the Trade School's friends, Edward Murphy, spoke a few minutes on the institution's history and its struggle to progress and fame.

Messrs. Worth and Whelpley, in their harp and guitar selections, were heartily applauded and encored.

The announcement that Mr. Heatherton of the *Plumbers' Trade Journal* was present with practical suggestions for the students called forth applause.

C. E. Bevington, editor of the *Sanitary Plumber*, was called on and made a thoughtful address that kept the attention of his hearers. Just then came the conversational period, with light refreshments and several banjo selections. J. Stanly Thomas then proceeded with the programme and stated that Miss Radcliffe would sing by request the hymn "My Faith Looks Up to Thee," in a duet with Mr. Newman. At the close the plumbing class scattered flowers before the platform as an evidence of their appreciation.

It was the good fortune of the Auchmuty Musical Society, under whose auspices the gathering was held, to have secured the Rev. Dr. Rainsford to address them. Close attention was given as he eloquently presented striking thoughts in the most liberal and sympathetic manner.

James Muir of the Master Plumbers' Association said a few congratulatory parting words, and the evening was brought to a close with conversations and examining specimens of student work displayed in the auditorium.

Weekly Prize Competitions.

$25.00.

FOR MORE THAN six months Weekly Prize Competitions ($10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of $12.50, a second prize of $7.50 and a third prize of $5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. These competitions are open to every one, and it is hoped that there will be a general response from business men. Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers to the different questions will be favorably regarded as meeting the purpose for which these competitions are announced. We shall have the privilege of publishing any or all of the contributions received.

Prize Competition No. 13.

SUBJECT:

The Best Method of Changing a Credit Into a Cash Business.

It is generally conceded that an all cash business is preferable to one part cash and part credit, or to an all credit business. The object of this competition is to draw out practical suggestions for making such a change, and touches on such points as these:

Whether the change should be made on a certain announced date, or gradually;

How to acquaint customers with the proposed change, whether personally, through circulars, or newspaper advertising;

How to provide against shrinkage of sales under the new system; and

Whether lower prices can be advantageously offered as an inducement to purchase for cash.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

Replies are to be received not later than March 18, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Prize Competition No. 13.

Our Prize Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 4. Closing February 25.
Suggestions as to Improvements in Putting up Goods.

No. 5. Closing March 4.
A Method of Securing a Reliable and Prompt Delivery of Goods.

No. 12. Closing March 11.
Arrangement of Pocket Cutlery.

No. 13. Closing March 18.
The Best Method of Changing a Credit into a Cash Business.

Another subject will be announced in our next issue.

WORLD'S FAIR NOTES.

Withdrawals of Exhibitors.

More interest is now being taken in the stories current of the wholesale withdrawal of exhibitors than in any other subject connected with the exposition. These have been published in a way to convey the impression that general dissatisfaction exists with the allotment of space, the proposed system of awards, the regulations governing the installation of exhibits, &c. If these stories were but half true the public would be justified in believing that the exposition is on the eve of a flat failure. The troubles which have arisen, however, are greatly exaggerated. Prominent piano manufacturers have announced that they intended to make no exhibit, as they object to the system of awards which has been adopted, but other applicants for their space are so numerous that the piano manufacturing industry will certainly be well represented. It is a question whether the dissatisfied manufacturers will not injure themselves by the course they have taken. As to other cases of dissatisfaction these do not seem to cover exhibitors by classes, but only individuals. The writer has had occasion the past week to investigate a number of them. A few of the results of his investigations will be given.

A large manufacturer of machinery, who determined that he would not complete arrangements for an exhibit, stated that he had been refused adequate space. He had applied for 4000 square feet and was allotted but 3000, which was altogether too small. In explanation of this case, Chief Robinson of the Machinery Department points out that the entire space reserved for domestic machinery comprises 220,000 square feet, of which 20,000 feet will be needed for passages, leaving 200,000 feet for exhibits. The largest machinery manufacturers have been awarded 3000 square feet. This would divide the entire space among only 66 exhibitors, but fortunately all applicants were not equally prominent, there being some 1300 in all. The others have been able to secure space by reducing individual allotments as much as possible. It is regrettable that any prominent manufacturer should elect to be absent from this great display of American machinery products, but it is hard to see how more space than that assigned could have been granted without doing very great injustice to other deserving applicants.

Some manufacturers state that they have decided not to exhibit because their allotments of space were not made in time and they cannot now prepare a creditable exhibit. This could not be helped. Perhaps no previous World's Fair had such an overwhelming application for space, both as to number of applicants and space desired. The whole of Jackson Park would have had to be roofed over to accommodate them if all had been accepted and every one had been given the space designated. This was manifestly impossible, and the problem then arose how to treat the applicants. Their cases were passed upon critically, and, while some were rejected because their exhibits would have had no value in a World's Fair, the others were assigned the best space and the best positions available. Those who applied after the published date for closing the consideration of applications were not rigidly barred out, but their applications were filed in order and when an opportunity arose through the declination of some exhibitor previously favored the late comers were given a chance. In this way space will continue to be alloted up to nearly the opening of the exposition. No fault can be found with this, but, on the contrary, the dilatory applicant should consider himself fortunate if he gets space in that way.

Chief Skiff has had the same difficulties to contend with in Mines and Mining. A symmetrical plan for the distribution of exhibits by groups has been followed in his department. This, however, brings some exhibitors in galleries who prefer to be on the main floor and *vice versa*. Some are in corners when they prefer locations near main entrances or along principal passages. Some think their exhibits belong properly in Machinery Hall or in the Transportation Building, instead of the Mines and Mining Building. Individual dissatisfaction depends so largely on temperament that it is not strange that there have been cases of withdrawals, because all men are not blessed with good nature, and some men will insist on having their own way in defiance of necessary rules and regulations.

Preparations for Exhibits.

Machinery Hall would, ere this, have been a very busy scene, with exhibits being rapidly installed, if the winter had not been so severe. Not only were men unable to work for long periods, on account of the intense cold, but the roofs proved inadequate to the burden of snow and ice. Skylights gave way here and there, and, while the damage done was not at all serious, yet the admission of snow and rain deterred exhibitors from installing valuable machinery. About half the foundations for the engines are ready and some of the smaller engines are in place, but the weather will have to be a little more propitious to enable roofers to repair damages before the large engines are erected. There was another fall of nine inches of snow in the Northwest on Friday. Thus it goes. Installation under such circumstances is out of the question.

The Mines and Mining Building is in much better shape, being smaller, and therefore better roofed. Some 32 carloads of exhibits were on the floor on the 16th, which is in advance of any other department. The unpacking and arranging of these exhibits is being pushed vigorously. Many States will make exhibits as States, and all of these report their work in excellent shape. The technical library in this building will perhaps be the finest ever collected in connection with mining and metallurgy. The problem now confronts Mr. Skiff how to get the necessary room to display it properly.

An Unwise Rule Rescinded.

Members of the Council of Administration passed a rule on the 16th that exhibits and material intended for World's Fair buildings should enter Jackson Park without charge, provided the same were conveyed at the cost of the exhibitors.

There was a great hubbub at the Sixty-fourth street entrance to the park that morning when a score of wagons drew up waiting for admission to the grounds. According to a rule recently promulgated by Mr. Holcomb, General Manager of Transportation, cartage was to be charged for at the rate of 6 cents per 100 pounds. Commissioner Wermuth of Germany and representatives of Great Britain, New South Wales and France called on Director-General Davis to protest against the charge being exacted. Colonel Davis immediately applied to the Council of Administration, asking fair play for the foreign government representatives. The council decided that the charge of 6 cents per 100 pounds should not be exacted upon the entrance of material which might be carted to the several buildings at the expense of the intending exhibitor.

This decision on the part of the Council of Administration did not meet with the approval of Director of Works Burnham. Mr. Burnham thought that a toll should be exacted for the use of the exposition roads. He saw no other way of equitably providing for the expense of building them. The council, however, thought differently.

A Salt Water Pump.

At College Point, L. I., is a remarkable pump, which has been constructed to keep the supply of salt water for the fisheries exhibit of the proper quantity and quality. Two similar machines have been tested and operated successfully. When the fisheries exhibit was planned one of the puzzling details was how to secure a continuous supply of salt water for the sea fish and how to keep it free from contamination. A means of transporting the water right from the ocean by evaporizing it and subsequently restoring it was devised. Then a special pump had to be made, as the water must be used over and over again, and that with as little loss and contamination as possible. No ordinary pump can be used for salt water without the metals being corroded and acids injurious to animal life being formed. The new pump does not differ much in appearance from any ordinary machine of its kind, except that no metal beside a few nickel bolts can be seen. Inside, however, there are many differences, the valves, pistons, rings and springs all being made of hard rubber. In this way things have been arranged so that the supply of sea water will be constant and pure in the lakes from the opening of the fair to its close.

Relics from Yucatan.

One of the most interesting displays that will be seen at the fair will be that made within the "Ruined Palace of Mitla" by the department of ethnology. Prof. Edward H. Thompson, who has been consul at Merida for eight years, has prepared papier mache molds of the ancient sculptures found in the deserted cities of Yucatan, and 30 cases of these molds have already arrived at the park.

The ruins of Uxmal will be reproduced on an extensive scale, and among them will be a perfect *fac simile* of the temple and figure of the god Kukulkan, or the great feathered serpent. The body of the serpent is wrought in the stone work all around the building, and this will be represented entire. The original materials were principally marble and coarser varieties of limestone, and the work shows that the ancient Yucatecos possessed great skill in mechanical workmanship, though their industrial arts were but poorly developed.

The great forest or jungle covering the supposed kingdom of the ancient Mayas is about the size and shape of Ohio, and covers portions of Yucatan, Guatemala and adjacent Mexican States. There once lived in that area from 5,000,000 to 10,000,000 people, according to Captain Del Rio, who explored part of it late in the last century, and Captain Dupaix, Brasseur du Bourbourg, A. Le Plongeon, and other recent explorers. The ruins of their cities are now spoken of as buried. They are in fact buried only in dense masses of tropical growth, of which the thorny shrubs and parasitic vines present the greatest obstacles. One of the finest reproductions by Professor Thompson will be that of an arched gate of the ancient palace of Labra, which was literally chopped out of the jungle.

Miscellaneous.

From the Watervliet Arsenal gun shops at West Troy, N. Y., will be sent for exhibition six guns of different calibers and sizes. They will include a 12 inch gun, a 10-inch gun, a 7 inch howitzer, a 5 inch siege rifle, a 3.6-inch rifle and a 3.6-inch mortar. The largest and the smallest gun will be mounted alongside of each other. The largest is 37 feet long and weighs 52 tons and the smallest is 2 feet long and weighs 224 pounds.

A representative traveling man may be elected to a position on the Board of Directors of the World's Fair. Charles W. Clingman is receiving substantial support for the place, and, it is reported, has a good chance of election. He is making an effort to get proxies from the stockholders by means of a circular letter.

The Indiana Senate on the 16th decided to appropriate $75,000 for the Indiana World's Fair Commission. The House committee has recommended only $25,000, but it is believed the House will concur in the Senate's action.

The South Dakota Senate on the 16th passed the House World's Fair bill, with amendments increasing the amount to $65,000 and creating a commission to be appointed by the Governor.

Advices have been received of the arrival in New York of 41 cases containing parts of the great locomotive exhibition to be made by the Great Western Railway of London, Eng.

OBITUARY.

LYMAN WETMORE COE.

The Hon. Lyman Wetmore Coe, president of the Coe Brass Mfg. Company, died suddenly at his home in Torrington, Conn., on February 9, aged 73 years.

Lyman W. Coe was the son of Israel and Nancy Wetmore Coe, and was born January 20, 1820, at Torrington Hollow; received a common school education, and attended the high school at Waterbury, Morris Academy and the school of W. W. Andrews of South Cornwall. He began as a clerk in Waterbury, where he remained until the spring of 1834, when he went to Wolcottville (now Torrington) and engaged in the store of Wadhams, Coe & Co. for two years; then went to Terryville, into the store of Lewis McKee & Co., merchants, and the first cabinet lock manufacturers in the country; was with them three years in all, being at home and connected with the manufacturing at the brass mill one year. He left there in the spring of 1841 and was appointed secretary of the Wolcottville Brass Company, which office he retained until the summer of 1845, when he resigned. He then took charge of a brass-wire mill at Cotton Hollow, which then belonged to the Waterbury Brass Company, and in the spring of 1846 was appointed secretary and treasurer of the Waterbury Brass Company, and the business at Cotton Hollow was removed to Waterbury. He was connected with this brass company from its formation in 1845 to May, 1863, and during that time was its general financial and business manager.

In the spring of 1863 he resigned at Waterbury and bought all the stock of the Wolcottville Brass Company and formed a new company under the name of the Coe Brass Mfg. Company, of which he was president at the time of his death. This company ranks among the first in the brass business in the amount of its productions and extent of its manufacturing ability.

Mr. Coe was also president of the Torrington Savings Bank, a vestryman in Trinity Church, Torrington, a member for 20 years of the Union League Club, New York, and a trustee of the Berkeley Divinity School at Middletown.

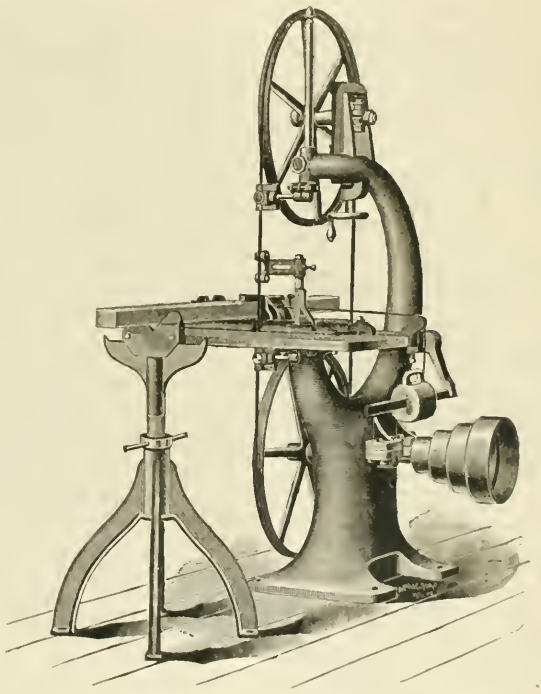
In 1845 Mr. Coe was elected to represent Torrington in the State House of Representatives, and to represent Waterbury in 1858. In 1862 he was elected to the Senate from the Fifth (Waterbury) District, and from 1876 to 1881 represented the Fifteenth District, the last two years being President of the Senate. In 1882 and 1884 he was nominated for Congress for the Fourth District, but was defeated.

A New England syndicate has purchased Texas timber lands valued at $750,000.

The Cross & Speirs Band Saw for Metals.

This machine was specially designed by the Cross & Speirs Machine Company of Waterbury, Conn., for sawing metals. The saws are made with a patent flexible back, or, in other words, the teeth are very hard and the rest of the blade is soft. This feature of soft back enables it to run over wheels without breaking.

The automatic feed attachment, as shown in the cut, can be removed instantly, leaving the table free for scroll work or hand feeding. With this attachment bars of steel and iron up to 5 inches in diameter can be cut. The material is led to the saw secured in the chuck or carriage by the weighted lever, as shown.



THE CROSS & SPEIRS BAND SAW FOR METALS.

This weight can be quickly adjusted to give the requisite pressure. The weight feed not being positive, it brings the metal against the saw only as fast as the saw can clear itself. When long, heavy bars are to be cut, the end is supported in a cradle which runs on rollers, and can be adjusted to the right hight by the hand nut on the iron support. This need not be used on short work. The carriage or chuck also runs on rolls and is brought to the saw by the weighted lever. The cone shaft is geared back 4 to 1, with cut gears which are concealed in the base. There are four changes of speeds which adapt it to steel, wrought iron, cast-iron, bronze, aluminum, or any metal that can be filed or cut by an ordinary hack saw. Each machine is provided with two Wright non-friction band saw guides, one below and one above the table. The carriage frame also has a special guide with side rolls attached, which carries and directs the saw slightly out of its natural course, when it is necessary to cut long pieces, enabling the long end of the bar to project beyond the part of the saw going up on the other side of the wheels. In short work it is not necessary to use the extra guide, as the regular guide is brought down close to the metal and holds the saw firmly up to its work.

The feed can be placed on either side of the saw as is best adapted to the floor space used.

The timber resources of Canada are being exhausted more rapidly than before since the export duty in logs was abolished. Mills on the Canadian shore of Georgian Bay and Lake Huron have been shut down and the material on which they used to operate is rafted across the lake to give employment to Michigan lumbermen and sawmills. Some Ontario villages have lost almost half of their inhabitants in consequence. Both logs and men are gone from the country. The budget speech just delivered in Parliament intimates that the Government intend to take means to preserve the forest resources.

The statement is made, without qualification, that three New York banking houses received $400,000 each from the Panama Canal Company for acting as members of the "American Committee;" $1,200,000 was divided among them in money, and one man got a salary of $24,000. Altogether there was disbursed in New York about $40,000,000 of the Panama Company's funds.

A company made up principally of gentlemen in Denver and Kansas City is pushing with vigor a railroad from the City of Mexico to Plazada Bay on the Pacific Coast, which will intersect "one of the richest mineral and agricultural regions of the country south of the Rio Grande." The immense coal fields at Coicoyan become the property of the railway company.

House Warming.—IV.

Having now ascertained the chemical composition of the combustible portion of the different fuels, together with the total heating power of each of the component elements and their aggregate, representing the calorific value of 1 pound of the fuel, we must consider, briefly, the fundamental principles of the elementary theory of heat; and also that of combustion from the chemical standpoint. This is absolutely necessary in order to demonstrate the application of the theoretical principles to practical operations; but we will endeavor to treat the subject in language sufficiently plain to render it easily understood by such readers as may possess but a limited knowledge of scientific matters.

MEASUREMENT OF HEAT.

The popular idea of the measurement of heat and cold is by the comparative temperature as indicated by the thermometer, an instrument with which all are familiar. Its principle of operation is the rising and falling of a thin column of mercury or colored alcohol in a glass tube having a bulb at its lower end filled with the liquid, the said movement being caused by the difference in the expansion of the glass tube and that of the mercury. The hight of the top of column with reference to the graduated scale indicates the temperature. Unfortunately, there is no universally standard thermometer. In this country and in England the scale of Fahrenheit is used; while in France, Germany, and, in fact, throughout the Continent of Europe, the Centigrade is the standard. Therefore, in most works treating of the subject of heat, the nationality of the writer will determine which of the two systems is used, though it is an almost invariable rule to designate it by the use of the abbreviations Fahr. or F. and Cent. or C.

As without a knowledge of the comparative relation of the two systems some of the most valuable literature on the subject becomes practically useless, the following simple formulæ are used for reducing from one scale to the other: Centigrade = (Fahrenheit − 32) ÷ 1.8. Fahrenheit = (Centigrade × 1.8) + 32. Thus (212° − 32°) ÷ 1.8 = 100° C. and (100° × 1.8) + 32 = 212° F. In the Centigrade scale the "freezing point"—or more properly, the temperature of melting ice—is the "zero," indicated by 0°; and the boiling point of water in an open vessel or at atmospheric pressure is 100° C. The Fahrenheit scale is based on the temperature given by a mixture of equal weights of pounded ice or snow and common salt. This is the zero, and the temperature of melting ice and that of boiling water are the other two important points in the scale. Of course, the zero and boiling temperatures are necessarily given arbitrary values—that is, any number of degrees might be given to designate boiling, and any desired effect of cold be called zero.

It is only necessary to divide the scale between the two points into equal spaces representing degrees, and measure all temperatures below and above zero and boiling to establish their comparative values. In case of the Fahrenheit scale, the space between 0° and 212° being divided into 212 equal graduations called "degrees," the temperature of melting ice—commonly called the "freezing point"—is found to be 32° and is therefore the resultant of the temperatures arbitrarily fixed for the freezing mixture and for boiling water. The Centigrade scale, however, having the 32° of Fahrenheit as its zero, would give a temperature of (0° + 32°) ÷ 1.8 = 17.78° minus (or say minus 18°) as the equivalent of Fahrenheit zero. All temperatures below zero are called "minus" quantities, and are distinguished by the subtraction sign placed before them, thus − 17.78° C. = 0° F. In the foregoing rules given for reducing the given temperature from one scale to the other it should have been mentioned that the formulæ as stated apply only to temperature above zero. For those below, the operation is merely reversed and would read: Centigrade = (Fahrenheit + 32) ÷ 1 8, and Fahrenheit = (Centigrade × 1.8) − 32. Thus: (0° + 32°) ÷ 1.8 = 17.78° C., and (17.78° × 1.8) − 32° = 0° F.

TEMPERATURE AND QUANTITY OF HEAT.

Temperature, however, is only the measure of the condition and not of the amount of heat contained in a body. For instance, if we apply the same degree of heat to a cubic inch of cast iron weighing 0.26 pound, and a cubic foot weighing 450 pounds, they will obviously have the same temperature. But in all calculations of this nature the important factor is the quantity of heat, and the temperature be comes merely an element in the calculation by which it is ascertained. It is clear that while a cubic inch and a cubic foot of cast iron at 100° will have the same temperature, yet the quantity contained by the cubic foot will be 1728 times as great as that in the cubic inch. And if we expend, say, 1 pound of coal in raising the temperature of the inch to the given point, it must necessarily require 1728 pounds to impart the same degree to the foot.

It is clear, therefore, that some standard of measure for quantity is required, and we have this in the thermal unit, or unit of heat. It is based upon the quantity of heat necessary to elevate the temperature of 1 pound of pure water from 32° to 33° F.* As this quantity varies slightly at different temperatures on account of the variable "specific heat," it is necessary to limit the measurement to the temperatures given; and it is readily seen that we have an absolutely exact standard of measurement, by means of which we may calculate quantities with the same accuracy as is possible in determining the degree of heat or temperature by means of the thermometer. But there are other factors entering into the problem quite as essential as the standard of measurement. It does not follow, nor is it true, that the same quantity of heat required to raise the temperature of 1 pound of water 1° will be required for, say, 1 pound of cast iron.

SPECIFIC HEAT.

This difference is termed the "specific heat" of bodies (solid, liquid and gaseous), and is the relative capacity for heat as compared with that of water as the standard. Thus, the specific heat of water being 1, and that of cast iron 0.13, the quantity of heat which would raise 1 pound of water 1° would increase that of the same weight of cast iron $\frac{1}{0.13} = 7.7°$ or, what is the same thing, 7.7 pounds increased 1°. While the specific heat is not uniform, but increases slightly with the temperature, it is not of sufficient importance in the present connection that it need be taken into account; and this is also true of many other details, from which we may eliminate considerations which, though absolutely necessary in exact calculations, will not materially affect the results of our practical application of the principles. As we progress in the investigation of our subject it will be necessary for us to consider the specific heat of numerous substances, and in the following table are given only such as will enter directly into the calculations. The figures given are the result of experiments, and are accepted as standard in all calculations of this nature.

* These are the temperatures generally used, though to be exact, it should be from 39° to 40°, as the latter is the temperature of maximum density of water.

Table IX.—Specific Heat of Various Substances, or the quantity of Heat Necessary to Raise the Temperature of 1 Pound 1° F. Also the Name of Authority by Whom Experiments Were Made. (Selected from Box "On Heat.")

Substance.	Specific heat.	Authority.
Water	1.00000	....
Fine wood	0.65000	Mayer.
Oak wood	0.57000	Mayer.
Coal	0.27770	Crawford.
Marble	0.21585	Regnault.
Coke	0.20085	Regnault.
Glass	0.19768	Regnault.
Burnt clay	0.18500	Gadolin.
Ice	0.50400	Person.
Cast iron	0.12983	Regnault.
Wrought iron	0.11379	Regnault.
Zinc	0.09555	Regnault.
Copper	0.09515	Regnault.
Brass	0.09391	Regnault.
Lead	0.03140	Regnault.
Tin	0.05695	Regnault.
Air	0.23790	Regnault.
Oxygen gas	0.21820	Regnault.
Hydrogen gas	3.40460	Regnault.
Nitrogen gas	0.24400	Regnault.
Carbonic acid gas	0.21640	Regnault.
Carbonic oxide gas	0.24790	Regnault.
Water vapor	0.47500	Regnault.

To illustrate the application of the above, and also for continual reference in our calculations, it is necessary to know the relative weights and volumes of air, at different temperatures, at atmospheric pressure. The next table gives the results of calculations by Box from a formula which need not here be given. The correctness of the result is sufficiently demonstrated by comparison with the figures obtained by Dulong and Petit from actual experiment in a range of temperatures from 32° below zero to 680° above.

Table X.—Weights and Volumes of Air.

Temperature. Degrees.	Volume.	Weight of 1 cubic foot, in pounds.	Temperature. Degrees.	Volume.	Weight of 1 cubic foot, in pounds.
0	0.935	0.0864	325	1.597	0.0506
12	0.960	0.0842	350	1.648	0.0490
22	0.980	0.0824	375	1.689	0.0477
32	1.000	0.0807	400	1.750	0.0461
42	1.020	0.0791	450	1.852	0.0436
52	1.041	0.0776	500	1.954	0.0413
62	1.061	0.0761	550	2.056	0.0384
72	1.082	0.0747	600	2.158	0.0376
82	1.102	0.0733	650	2.260	0.0357
92	1.122	0.0720	700	2.362	0.0338
102	1.143	0.0707	750	2.464	0.0328
112	1.163	0.0694	800	2.566	0.0315
122	1.184	0.0682	850	2.668	0.0303
132	1.204	0.0671	900	2.770	0.0292
142	1.224	0.0660	950	2.872	0.0281
152	1.245	0.0649	1,000	2.974	0.0268
162	1.265	0.0638	1,100	3.177	0.0254
172	1.285	0.0628	1,200	3.381	0.0239
182	1.306	0.0618	1,300	3.585	0.0225
192	1.326	0.0609	1,400	3.789	0.0213
202	1.347	0.0600	1,500	3.993	0.0202
212	1.367	0.0591	1,600	4.197	0.0192
230	1.404	0.0575	1,700	4.401	0.0183
250	1.444	0.0559	1,800	4.605	0.0175
275	1.495	0.0540	1,900	4.809	0.0168
300	1.546	0.0522	2,000	5.012	0.0161
1	2	3	1	2	3

From this table we see that a volume of air which at 32° would equal 1 cubic foot becomes at 2000°, 5.012 cubic feet; and that the weights of 1 cubic foot, at these temperatures, are 0.0807 pound and 0.0161 pound respectively. These variations of weight and volume are of the utmost importance in calculations for combustion, heating and ventilating.

Referring to the previous table, we find the specific heat of air to be 0.2379. The weight of a cubic foot of water at 32° is about 62.4 pounds, while that of air at the same temperature we find by the table to be 0.0807. Then $\frac{62\ 4}{0.0807}$ = say 774 cubic feet of air will weigh the same as 1 cubic

foot of water; and this volume divided by its specific heat $\frac{774}{0.2379}$ = say 3250 cubic feet of air will be raised 1° of temperature by the quantity of heat necessary to increase 1 cubic foot of water the same amount. Thus, while the relative capacity for heat of water and air by weight is as $\frac{1}{0.2379}$ = 4.2 to 1, we find that by volume it is as 3250 to 1—or, in other words, 62 4 heat units will alike increase by 1° the temperature of 1 cubic foot of water or 3250 cubic feet of air. And, as by the table we find also that the volume of air at 32° is 1, and at 2000° is 5.012, then 3250 × 5 012 = 16,339 cubic feet of air at 2000° will require the addition of 62.4 heat units to increase its temperature 1°, or to 2001°. In this calculation no account is taken of the variation of the specific heat due to increase of temperature; but, as before stated, it is unimportant in effect, and the above figures are practically correct.

Regnault has demonstrated that gases have, substantially, the same relative weight and volume at a given temperature as above given for air, and it is therefore only necessary to have their several weights at any given temperature, to enable us to calculate the weight and volume at any other temperature, by the use of the quantities given in the table. Thus, if oxygen at 62° has a volume of 0.9 as compared with air as 1, at same temperature, and weight per cubit foot of 0.08417 pound, we find that at 32° it will have a volume of 1.061 (as per table for air at 62°) × 0.9 = 0.9549; and the weight per cubit foot will be 0.08417 ÷ 0.9 and × 0 9549 = 0.08816 pound. As we know the volume of 1 pound to be approximately 0.9 that of 1 pound of air, and the weight at 62° to be 0.08417 pound per cubit foot, we have only to multiply the volume of air for the desired temperature (as given in the table) by 0.9 to obtain the relative volume of oxygen; and multiply the 0.08147 by this volume and divide by 0.9 to ascertain the weight per cubit foot. These figures are not exact, but are used merely by way of illustration. As we shall need to consider the several gases entering into, and resultant from, combustion and respiration, our next table will be in reference thereto—the quantities being based on a uniform temperature of 62°.

Table XI.—Weights and Volumes of Gases.

Gases.	Density—Air at same temperature = 1.	Volume at 62°.	Weight per Cubic foot, in pounds.	Cubic feet in 1 pound.
Atmospheric air.	1.00000	1.0610	0.07610	13.14
Oxygen	1.10563	0.9598	0.08414	11.88
Nitrogen	0.97137	1.0923	0 07393	13.54
Hydrogen	0.06926	15.3191	0.00527	189.70
Carbonic acid	1.52901	0.6939	0.11636	8.63
Carbonic oxide	0.96740	1.0967	0.07394	13.60
	1	2	3	4

Having now the necessary quantities, we may ascertain the volume, weight per cubic foot and cubic feet per pound for any temperature by the following very simple rules: For finding the relative volume, divide the number in column 2 of previous table, opposite the desired temperature in column 1, by the relative density of the gas in column 1 of last table. Thus, to find the volume of oxygen at 62°, we see that of air to be 1.061, and $\frac{1.061}{1.10563}$ = 0.9598, as per table. To ascertain the weight per cubic foot (for temperature above 62°) divide the weight as given in column 3, in Table XI, for 62°, by the new volume thus found, and multiply by the old, as given in column 2. For example, we desire to know the weight of 1 cubic foot of hydrogen at 82°, then $\frac{1.102}{0\ 06926}$ (as per col. 2, Table X) = 15.91 = volume at 82°; and $\frac{0.00527}{15\ 91} \times 15.3191$ = 0 005074 pound. If the required temperature is less than 62° the operation is reversed—that is, we multiply by the new volume and divide by the old. It is, therefore, but a question in simple proportion. It may be stated thus:

For temperatures above 62°:

15.91 : 15 3191 :: 0.00527 : 0.005074.

For temperatures below 62°:

15.3191 : 15.91 :: 0.005074 : 0.00527.

Asbestos.

In a very able paper read before the British Institute of Marine Engineers, J. Alfred Fisher, General Manager of the United Asbestos Company of London, gave some interesting information in regard to the manufacture and uses of asbestos, as illustrated in the works of the company with which he is connected.

As is commonly known, this valuable mineral is procured mainly from the mines of Italy and Canada. The product of these countries is stated to be the only kind of asbestos which answers the primary requirements of resistance to fire and fiber of suitable length for the purposes of manufacture. The Italian variety only is said by experts to be the mineral asbestos proper—belonging to the hornblende group of minerals; while that produced in Canada is in reality not asbestos proper, but a serpentine rock called chrysotite. Both descriptions, however, are of commercial value, as possessing the necessary qualities above mentioned. The asbestos obtained from the large veins, provided it contains no serious impurities, is classed as grade No. 1 and is used for spinning and weaving. The shorter stuff and such as contains impurities is classed as No. 2 and No. 3, respectively. These latter grades are used considerably in this country for various purposes.

PROCESS OF MANUFACTURE.

The works of the United Asbestos Company—who are an amalgamation of various companies which were started in Great Britain and Italy between 1871 and 1880—are located at Harefield, near London. There asbestos goods, in all the forms in which they are offered to-day, are manufactured.

Describing the process of manufacture, Mr. Fisher says: "Our works are divided into several departments. First, there is the sorting and opening department, where the crude asbestos is dealt with. The blocks of fiber or 'rock' are crushed and opened up in special machines in such a way as not to destroy the fiber, and are passed thence to 'shaking' machines, where the long fiber is separated from the short, and particles of rock removed. The long fiber suitable for spinning into thread is then taken into the carding and condensing department, and the short to the millboard and boiler covering departments. The treatment of the long fiber in the carding and condensing department is very similar to that in a textile factory, but its appearance would be scarcely encouraging to one who had been accustomed to wool or cotton. These latter staples, examined under the microscope, exhibit a notched or serrated appearance, which explains the ready way the material clings together when twisted. The peculiar nature of asbestos presents difficulties which are rendered more evident when its behavior in the machines is watched, but these difficulties are overcome by special appliances attached to the condensing machines. As the fiber comes from the condensers in the form of sliver or condensed thread without any twist, it lightly folds itself in cans placed there to receive it, and is then taken to the spinning and doubling department, where it is twisted into threads of every degree of fineness required. The thread then passes to the weaving and braiding department, where it is made into various forms of yarn packings, also into tapes and cloth. The cloth is then taken to the india rubber department, where it is proofed and made into what is known as asbestos and india-rubber woven sheeting, tape and rings for steam and other joints, and also into rolled cloth and square block packings for glands."

JOINTING AND PACKING MATERIALS.

Recognizing in these days of fast steaming and high pressures the supreme importance of jointing and packing materials on which reliance can be placed, the company produced six or seven years ago a combination of asbestos and metallic wire which, with further improvements, recently effected, fully answers their expectations. Attempts had been previously made in this direction, but the results were not considered satisfactory, inasmuch as the asbestos-metallic cloth referred to was simply woven either with a wire warp and asbestos weft, or with alternate threads of asbestos and wire. They inclose, by an improved method recently adopted, a fine brass wire in the center of every thread of asbestos in both warp and weft, thereby adding very largely to the strength of the cloth, while the wires are completely protected by the asbestos. This material is known as the Victor metallic cloth, and, being made into tapes and all sizes and shapes of joints as well as into round and square packings, is now largely used with satisfactory results by marine engineers and others.

Asbestos millboard is also produced at the works by a process very similar to that of ordinary cardboard; the fiber being beaten into a pulp with binding ingredients and then pressed into sheets and dried.

FIRE PROOF PAINT.

Another product of the works which is said to be most effective is asbestos paint, in which a considerable quantity of asbestos powder is used. In regard to this substance Mr. Fisher says: "Numerous public experiments have been carried out from time to time, proving the remarkable fire resisting qualities of this paint, the first being conducted under the patronage of the Lord Mayor and a distinguished company at the Crystal Palace in January, 1882. I had the honor, two or three years later, of carrying out experiments at South Kensington in the presence of H. R. H. the Prince of Wales, the Executive President of the Colonial and Indian Exhibition, which were pronounced satisfactory, and nearly 150 tons of the material were used on the buildings of that and the Fisheries, Health and Inventions Exhibitions held in 1883-4-5 6.

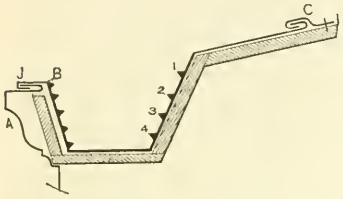
"At each of these exhibitions several small fires broke out at exhibition stalls, which might have proved very serious but for the protection afforded by the paint. I well remember one in which the fire occurred at a stall in a remote part of the buildings at 4 o'clock in the morning. The stall and contents were destroyed and the wooden floor of the building burnt through; but the wooden partition against which the stall stood, as well as the roof, both of which were painted, were scarcely injured. The paint was badly blistered, but the painted wood had not taken fire, as it doubtless would have done under ordinary conditions and probably with disastrous results."

Several other uses to which asbestos is put were briefly touched upon in the paper.

ROOFING AND CORNICE.

Material for Gutter.

From W. N., *New York.*—Replying to your correspondent, "W. D. M.," in *The Metal Worker* of January 7, who desired to know what material it was best to use for gutter lining, I submit the following: As the expense is not to be considered, it is best to use 18-ounce copper, by which is meant that a square foot or a piece 12 x 12 inches weighs 18 ounces. To show the allowance made for contraction or expansion the five illustrations have been prepared. Let A, of Fig. 1, represent a metal molding in which the gutter is planked of wood and lined with copper, as shown at B. Before bending the copper to the shape required the edges should be tinned on both sides, wherever a soldered seam is required. Care should be taken where the molding is of galvanized iron and the gutter lining of copper that the copper comes in contact with the galvanized iron, as shown at the lock J, Fig. 1. The copper should be well tinned on both sides to prevent the action of the copper upon the zinc coating when wet. It is a fact not well known to tinners that if we take a glass jar and fill it with water and place in it separately two clean strips, one of zinc and the other of copper and connect the two with thin copper wire, an electrical action is the result, and if it remained connected for a long time (as the action is very faint) the zinc would be destroyed, because, it may be said, the zinc furnishes the fuel for the electrical action, the same as wood furnishes the fuel for the fire. Therefore, if the lock J, of the copper gutter lining were not tinned outside and inside before being locked into the lock of the galvanized molding and it became wet with rain, the zinc coating would in time be destroyed by the electrical action of the two metals, and the iron would rust through. This applies to all copper work coming in contact with zinc or galvanized iron on outside work where rain would affect it.



Material for Gutter.—Fig. 1.—Wooden Gutter with Metal Molding.

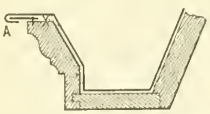


Fig. 2.—Lining for Wooden Gutter.

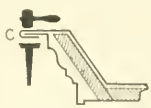


Fig. 3.—Metal Molding with Outward Flange.

The gutter lining shown in Fig. 1 should be locked as shown at J, and well soaked with solder, using heavy roofing coppers. The lock C should be fastened with cleats as shown, and the cross seams of gutter either be locked as in Fig. 4, or laid sharp as shown in Fig. 5, and a piece of tinned copper soldered over the seam, as shown at A. By having the copper tinned on the inside and outside at the edges of the sheet, and using a heavy soldering copper, the solder flows through the entire seam and makes a strong job.

The rugged heavy lines in the gutter in Fig. 1 show how the upright seams should be soldered. Forge the soldering coppers wedge shape, and in soldering the upright seams, soak them well with solder, using rosin or well-boiled acid. After the seam is soldered, place small ridges of solder at 1, 2, 3, 4, &c., on the inside of gutter as in Fig. 1; this makes a very strong seam. If the roof were of tin, it should be locked over the cleat C, shown in Fig. 1. By using this method there is not one nail driven into the entire gutter lining, it being only soldered at the lock J, if the molding were of metal, and at the lock C if the roof were of tin, and the cross seams soldered as described. If the entire gutter were of wood, as shown in Fig. 2, a strip of copper should be nailed to the top of the wooden molding, as shown at X, and the gutter lining locked into same, as shown at A. In Fig. 3 is shown a metal molding where the flange is bent outward, and the gutter lining locked over it, as shown at C. If the roofs were of slate in Figs. 2 and 3, the gutter lining would be fastened to roof by means of a cleat, as shown at C, in Fig. 1, and the entire gutter would be loose for contraction or expansion, with the exception of the soldered cross seams, which could be made as illustrated in Figs. 4 or 5. In Fig. 3 is shown how the seam is flattened by the use of a square head and mallet.

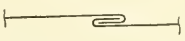


Fig. 4.—Lock for Cross Seam.

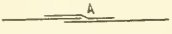


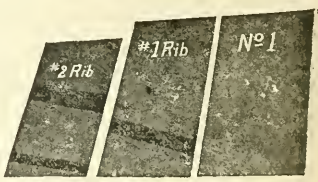
Fig. 5.—Laid with Seam Strip.

An item in these columns last week erroneously reported that an order for a 10-foot corrugating machine had been received from the Cambridge Roofing Company, Cambridge, Ohio, by Geo. C. Keene & Co. of Cincinnati, Ohio. The manufacturers desire to correct this statement. The order mentioned was received from the American Roofing Company of St. Louis, Mo.

Roofing Slate.

In the September issue of the "Transactions" of the American Society of Civil Engineers is a paper by Manafield Merriman discussing the strength and weathering qualities of roofing slates. After describing at some length the slate formation in Pennsylvania, the paper takes up the manufacture of roofing slates, some portions of which are likely to interest our readers. We therefore make the following extracts with accompanying illustration relative to the production of roof coverings of the character named:

"In the manufacture of roofing slates everything is done by hand except dressing the edges. The blocks delivered at the shanties are first split into thicknesses of about 2 inches. These are piled up in a shanty beside a workman called a splitter, who, with a wooden mallet and a long, thin chisel, divides each into halves, and continues the process until they are reduced to the required thickness of about $\frac{3}{16}$ inch. He then cuts out pieces in approximate sizes, and these are taken by an assistant and squared off into regular shape and size on a dressing machine.



Illustrations of Different Qualities of Roofing Slates.

The rock of some quarries requires to be kept damp from the time it is first exposed until it is split into the final sizes, otherwise the cleavage becomes difficult.

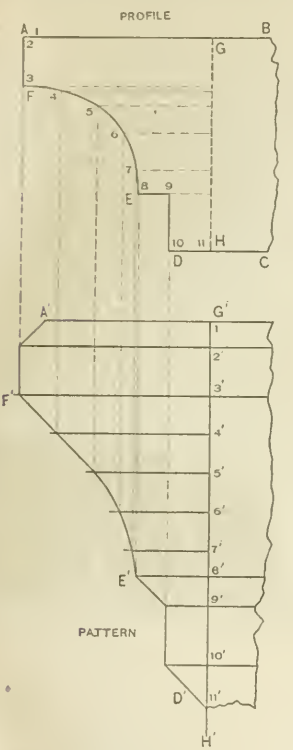
"Roofing slates are made in numerous sizes, from 14 x 24 inches down to 6 x 12 inches, the longer dimension being that which is placed parallel with the rafters of the roof. In all roofing which is properly done, a triple lap of 3 inches is allowed; thus, for a 24 inch slate 10½ inches are exposed, 10½ inches are covered by the slate above it, and 3 inches are covered by two slates above it. The amount of slate required to cover a space 10 x 10 feet in this manner is called a square, which is the unit by which they are sold. For slates 12 x 24 inches it takes 114 to make a square; for those 8 x 16 inches, 277 make a square, and so on.

"The normal product of roofing slates is called No. 1 stock, and this is entirely free from ribbons. Some quarries make second and third quality slates, called No. 1 Rib and No. 2 Rib, respectively, the former containing ribbons near one end only, so that when laid on the roof the exposed parts are free from them. These grades are illustrated in the accompanying cut. The color of the slate is a permanent dark bluish gray. The color of the ribbons, however, is nearly black at first, yet, on exposure to the weather, they exhibit a whitish efflorescence and soon show signs of crumbling and decomposition

This is due to the sulphide of iron which they contain, and also to their porosity and softness. Although the price of these inferior qualities is from 20 to 40 per cent. less than that of the standard stock, they should not be allowed on a roof which is to be regarded as a good piece of work."

Spacing Profiles.

From E. P., *Cleveland, Ohio.*—In the accompanying sketch let A B C D represent a section of cornice or molding, for which a rig t angled miter pattern is required. The usual method for obtaining the pattern will first be described. Divide



Spacing Profiles.—Diagram Submitted by "E. P."

the profile A D into any convenient number of parts, as shown by the small figures. At right angles to D C, draw G' H', upon which lay off the stretchout of the profile A D, through the points in which draw the usual measuring lines, drawing them parallel with the lines of the molding. With the T-square placed parallel with the stretchout line G' H', and brought successively against points in the profile A D, drop lines cutting measuring lines of similar number drawn from the stretchout line G' H'. A line traced through the points of intersection, as shown by A' F' E' D', will be the pattern required.

If it is not convenient to describe the pattern under the profile, as shown, proceed as follows: At right angles to the lines of molding draw G H, and divide the profile, as previously described Through the points in profile draw lines parallel with A B, cutting G H At any convenient place draw the line G' H', upon which lay out a stretchout of the profile A D. Through the points thus obtained draw the usual measuring lines, making them perpendicular to the stretchout line G' H'. With the dividers transfer the length of lines drawn from G H to profile, to lines of similar number drawn from G' H'. Through the points thus obtained, trace the pattern line A' F' E D', as shown. An inspection of the diagram will show that by taking the length of lines drawn from G H to A D, and transferring to the lines of similar number drawn from G' H', the same result is obtained as by dropping lines from the points in A D by means of the T-square.

When spacing curves, as E F, it is the custom with many pattern cutters to divide the curve into a certain number of equal parts. This requires some time, as a number of trials may be necessary before the exact division is secured. I seldom take the trouble to divide a curve into equal parts, but set my dividers according to the distance the measuring lines are to be apart, and space off the curve, as from F to 7 of profile. These spaces are also set off on the stretchout line, as shown from 3' to 7'. It is then easy to add the unequal space E 7 of profile, as shown by 7' 8' on stretchout line G' H'. I would like an expression of opinion from those readers of *The Metal Worker* who are interested in pattern cutting, regarding the most convenient manner of dividing curved lines. Should they be divided into a certain number of equal parts, or unequal, as shown in the diagram?

A Legal Question for Roofers.

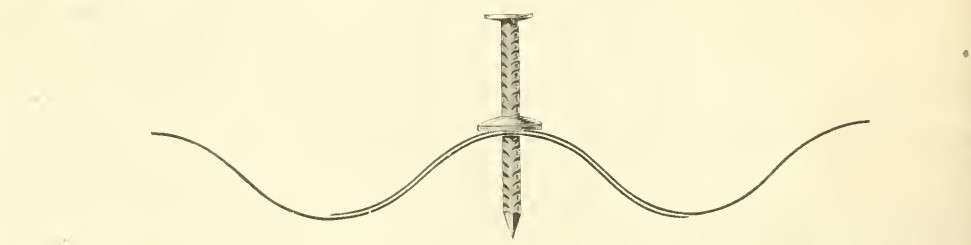
From J. H., *Washington, D. C.*—About a year ago I secured the work in my line from the builder (the general contractor) on a small residence to be built in this city. The specifications required the tin for the roof to be as follows: "A B's American-made roofing tin." When the building was nearly ready for the tin roof I wrote to Messrs. A B for samples and prices of their American roofing tin. Their answer was that they could not furnish any American tin for four weeks, but that they had plenty of other good tin, &c., Then I wrote to Messrs. C D for samples and prices of their American tin. After examining C D's samples I selected the cheapest as amply good enough (for I really thought it was well worth its price) Then I sent the sample from C D and A B's letter, and a letter of explantion of my own, to the builder, asking him what I should do in the matter. In my letter I said that the inclosed sample was American made, and, in my opinion, as good or better than the tin specified. A few days after this the builder told me to put the tin on like the sample I had sent him, but the architect stopped my men when the work was about half done. The contractor engaged another tinner to take off my tin and put on some of A B's American tin that the tinner had in stock at the time. Now the contractor wants to deduct the amount of the other tinner's bill from my contract. A clause in the specification gives the architect power to reject material that is not of the best, &c. Have I done my full duty or not, and should I pay the bill?

Answer.—The facts stated and the questions involved are so complicated that it is not surprising that doubt should arise in the minds of the parties as to their precise rights under the circumstances. We take the case to be that there was a complete and definite contract between the owner and the general contractor or builder. This contract was doubtless in writing, as such contracts usually are; certainly the specifications were written, and they constitute the principal and most important feature of the contract. The terms of this agreement are, of course, binding on the parties to it—the owner and the contractor. But they are not necessarily binding on a person not a party to it; a sub-contractor like "J. H.," for instance. In fact, just the reverse is the case. There is no duty or obligation, or contract liability, on the part of a sub-contractor to the owner; to no one, in fact, except the person with whom he made his contract, namely, the builder. This being so, it follows that "J. H." is not bound by the specifications in the main contract, but only by the terms and conditions of the agreement he makes with the builder; that is, by the sub-contract. Of course, the builder may have included, and probably did incorporate, the terms of the main contract in his contract with "J. H.," so far as the tin work was concerned. But it must be kept in mind that the only contract on which "J. H." is liable is that with the builder. It does not appear whether this agreement was in writing or not. It is immaterial which, except that if written, the exact language used might be of importance in determining the question. By this contract, "J. H." agreed to furnish "A B's American-made tin." Of course he is bound to carry out this promise literally and exactly. He cannot furnish any other tin, whether it is better or not. Furthermore, it makes no difference whether "J. H." can get the tin or not, or whether A B has any or not. The fact that it is or may be impossible to carry out the contract does not relieve the promisor—"J. H." in this case. As the law phrases it, "Impossibility of performance is no excuse." We suppose that under "J. H.'s" contract with the builder he was obliged to furnish the tin required at once when demanded. He could not be allowed to wait a month. If the builder had desired he could have compelled "J. H." to furnish the material, and if "J. H." could not do so, then the builder could have done the work himself or contracted with some one to do it and have charged all the damage from loss of time or increased cost to "J. H." But, at the same time, the builder had the right if he was willing to take the risk to vary the contract with "J. H.," to waive the exact performance as to the particular kind of tin, and to allow the use of another kind. And "J. H." had the right to rely on this change of terms and to go on with the work as he did. "J. H." was not, as we have shown before, bound by the builder's contract with the owner, even if he knew of it. The builder, however, still remained bound by it, and he took the risk of the material he consented to have used being rejected by the architect, and he must suffer the loss. This is all on the assumption, however, that the builder did not make an arrangement that if the tin was rejected "J. H." should sustain the loss, or, in other words, that "J. H." should take the risk. If nothing was said as to who should take the risk, then it falls on the builder. There is perhaps a further reason why the builder should bear the cost, and that is, that, acting as an ordinarily prudent man, he should have gone with the samples to the architect and ascertained, before the roofing work was

commenced, whether this material would be satisfactory and accepted. This was plainly his duty and not that of "J. H." Very likely he was anxious to have the work completed without delay, and feared that the architect would not accept the material on inspection of the sample. By consenting to the change of material he made a new contract with "J. H.," which abrogated the former contract to that extent; and when "J. H.," on the strength of this arrangement, proceeded to do the work in good faith, he simply did his duty and was not responsible for the subsequent action of the architect, and the consequences. More than that, it was a contract which the builder could have enforced against "J. H." if he had seen fit. If "J. H." had not gone on and done the work, the builder would have had a claim for damages against him. It was not a matter of convenience or concession to "J. H." when the builder directed him to put on the C D tin, although incidentally that was true, but it was a matter of strict contract duty and obligation. It follows naturally that not merely is "J. H." not liable for the cost of taking up the C D tin, but that he has a claim against the builder for the amount of the contract, less, of course, the value of the C D tin, which "J. H." still has on hand, and less the actual cost of doing the work. In other words, he has the right to the profits he would have made if the material had been accepted and the work completed.

Lead Washers.

As shown in the accompanying illustration, the lead washers, manufactured by Littleford Brothers, Cincinnati, Ohio, are



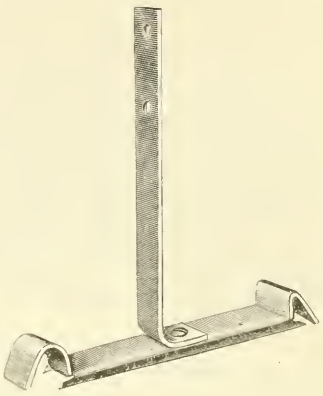
Lead Washers for Roofing.

used for putting on roofing and siding. These washers, it is claimed, make an absolutely water-tight joint on any surface, whether convex, concave or flat. They also, it is said, prevent rust below the nail head and the head from cutting into the sheet, and in this way they insure a more durable job. The washers are put up in boxes of 100 pounds, each containing 325 washers, which is sufficient for treating from two to three squares. The washer is made in two sizes, No. 8 with a hole in it $\frac{5}{32}$ inch in diameter, and No. 12 with a hole $\frac{3}{32}$ inch in diameter.

T. N. Bray has purchased the interest of his partner, J. M. Bolton, in the firm of T. N. Bray & Co., roofing and stove repairs, at Sioux City, Iowa, and the business will hereafter be conducted by a corporation under the name of T. N. Bray Company. They are also agents for H. W. John's asbestos roofing.

The Boss Eave-Trough Hanger.

In the accompanying illustration we present a new eave-trough hanger—the Boss—which is being placed on the market by Henry B. Todd, Meriden, Conn. This device, which is a new form of the Yankee hanger, and made under the same patent, is offered to meet the demand of the trade for a strong and convenient article, at a low price. It is non-adjustable, and made of soft steel, formed in dies under a press. The advantages claimed for the Boss hanger are that it will fit all sizes of beads, and that it has points that penetrate the trough just below the bead, making the attachment to this side of the trough as strong and substantial as the opposite one. The points on both ends of the hanger penetrate the trough from the inside; consequently, the weight of the gutter has a tendency to force it further on to the points; the more weight the stronger being the connection. The hanger is made with straps of assorted lengths, packed in one-gross boxes. Tongs to apply the hangers are also provided.



Boss Eave-Trough Hanger.

Operating a Cornice Brake.

From J. H. C., *Shelburne, Ont.*—If you could inform me where I could get general directions in print for operating an 8-foot cornice brake I would be much obliged to you.

Answer.—We are not aware of any directions published treating on this subject fully. Some manufacturers of cornice brakes give a few general directions in their catalogues as to the different shapes which may be formed upon the brakes they make, but further than this they seem to leave it to the ingenuity of the operator to manage for himself.

Laying Tin Roofs.

From E. P. B., *Osterville, Mass.*—I was very much interested in the letters lately published in *The Metal Worker* about buckling of tin roofs. Now, I think if more care was taken in making the roofs solid before placing the tin, the roofing would last much longer. In laying tin roofs I have often come across places where it was hard work to drive a nail owing to the boarding being springy.

Rhodes, Dickelman & Co., Forest, Ohio, issue an illustrated catalogue and price-list of steel roofing, galvanized eave trough, &c., of their manufacture. In an introductory note to the trade they mention that since the last catalogue was issued they have reorganized their business, enlarged its working capital, added several new departments, and made sundry improvements in old ones. In the early pages of the catalogue they direct attention to their double folding lock seam, Stuble's cap seam, standing pressed seam and roll and cap roofings, which are made of genuine steel and no iron enters into them. They also refer to the way the paint is applied as rendering it not liable to crack or peel off, and direct attention to the careful inspection which the sheets undergo. They state that the sheets will stand double seaming, lengthwise or crosswise, without breaking. The painting is done by machinery, the sheets being dipped into the paint and passed through a pair of rolls and from the rolls to a set of brushes. The paints used are mixed with boiled linseed oil with no driers. The first 35 pages of the catalogue contain a variety of illustrations respecting steel roofs, together with particulars of the material. The next division of the catalogue is devoted to the eave trough department, which embraces a full line of eave troughs, conductor pipes, pipe hangers, cut offs, &c. The manufacturers call particular attention to the fact that their eave troughs having no beads, are equally applicable to right or left side of building, and are in consequence very quickly hung. Toward the end of the catalogue attention is given to conductor pipes of various kinds, elbows, conductor hooks, ridging, &c., and the whole is concluded with testimonial letters and an alphabetical index.

The development of Northern Mexico will receive a new impulse on the completion next July of an extension of the Mexican International line from Monclova to Sierra Mojada, one of the most thriving cities in that region and an important mining and agricultural center, within 35 miles of illimitable salt beds.

"The Metal Worker" Competition in Skylight Pattern Cutting.

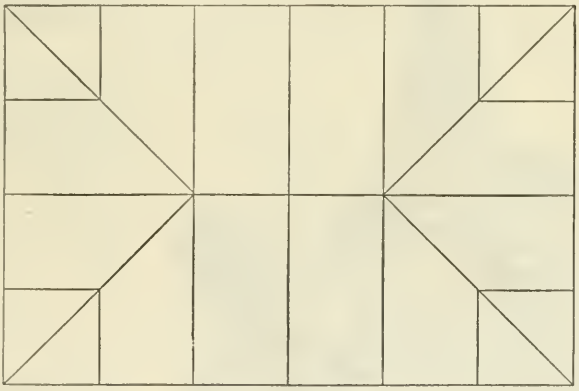
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

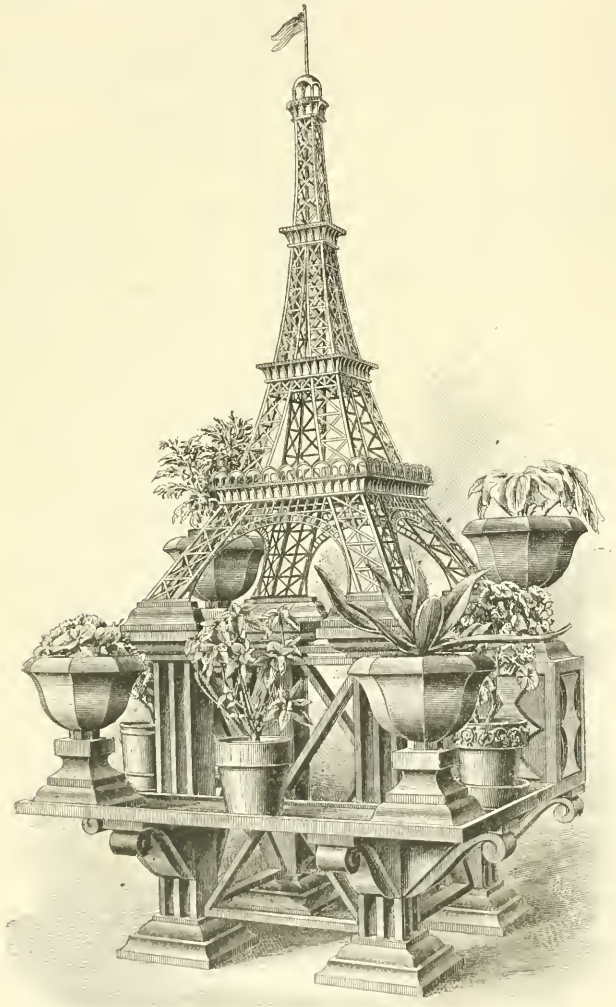
The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

THE TIN SHOP.

The Eiffel Tower in Sheet Metal.

We present herewith an illustration of a very elaborate piece of sheet-metal work, made by John Engel of Helena, Montana, who favored us with a photograph of the article, together with a description, which we condense as follows from his letter: The reproduction of the Eiffel Tower is made for a flower stand, bird cage and fish stand combined. The fish glass, which should be in front of the front arch of the tower in the picture, is taken off, so as to give a better view of the tower. The bird cage occupies the part from the first to the second gallery, the bars fitting inside of the tower on each side, and fastened by catches; but they also are removed to give a better effect. The lower part, or flower stand, is made entirely of No. 27 galvanized sheet iron, and consists, as will be seen, of four posts, on which there is a base and top mold, the four posts being held together by galvanized iron bars, ¾ x 2½ inches. On each front post are two brackets, and on the back posts one, on which a shelf rests, the shelf being 9 inches wide and made in the form of a shallow trough, so that the water draining out of the flower pots will not fall to the floor. In addition to the four vases there is space for seven more flower pots, three being shown in the photograph. The vases at the back, it will be noticed, rest on pedestals. These octagon vases are also made of galvanized iron, and have a square base. At the center of each vase is a ½-inch hole for the water to drain off.

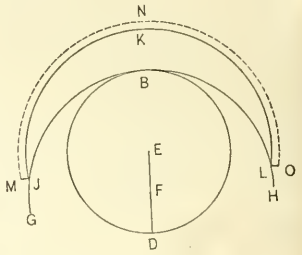
The tower itself is made of tin, and all the bars, beams and cross-pieces are folded on both sides, so that there are no sharp edges. The cross-pieces do not lap over one another, but are put together flush and soldered. There are nearly 1000 pieces in the entire structure. The lower part is tinted like gray sandstone, while the tower is gold bronze and the gallery is silver bronze. The entire hight from the stand to the tower is 7 feet.



The Eiffel Tower in Sheet Metal.

Pattern for Measure Lip.

From T. M., *Boston.*—A convenient method of describing the pattern for a measure lip, which can be used for measures of any size, is shown in the accompanying diagram. Let A B C D represent the top of measure for which a lip is required. From the center E draw E D, and bisect E D at F. With F B as radius, and F as center, strike the arc G B H. With the same radius, and with E as center, strike the arc J K L. An allowance for edge or wire can be made, as indicated by the dotted line M N O.

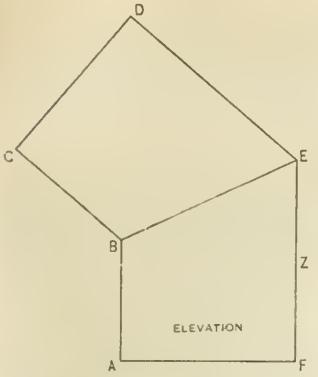


Pattern for Measure Lip.

Pattern for Beveling Elbow.

From C. M. S., *Bridgewater, Mass.*—Among the numerous methods shown in *The Metal Worker* for obtaining the pattern of a beveling elbow, I have seen none so easy to follow or comprehend as the following. While the method may not be geometrically correct, it is near enough so for practical purposes. In Fig. 1, let A B C D E F be the elevation of elbow for which a pattern is required. Draw the line G K in Fig. 2, in length equal to the circumference of elbow. Bisect G K at L, and erect the perpendicular L M, which gives the center line of pattern. Also erect the perpendiculars G H and K J. From G and K of pattern set off the distance A B of elevation, as shown by G P, K O of pattern. Also from L of pattern set off the distance F E of elevation, as shown by L N of pattern. Draw P N and N O. Divide N O into eight equal parts, and set off distances equal to three of these divisions from points, O N P, as shown at T S Q and R. Set the dividers

so as to strike the arc S N Q, as shown, and with the same radius strike the arcs



Pattern for Beveling Elbow.—Fig. 1.—Elevation of Elbow.

P T and R O. Then draw the lines *d c* and *a b*, touching the arcs P T, S N Q and R O, as shown. The lines *a b* and *c d* can be drawn free hand if desired.

The Lalance & Grosjean Mfg. Company's New Mill.

Wednesday, the 22d inst., was fitly celebrated in all parts of the country. Among the events which marked the anniversary of Washington's birth, not the least noteworthy was the formal opening of the new rolling mill which the Lalance & Grosjean Mfg. Company of Woodhaven, L. I., have erected at Harrisburg, Pa. The rolling mill, which is among the most complete establishments of its kind, is destined for the production of light sheet iron to be used in the manufacture of the enameled ware and domestic utensils for which the concern have long been famous. It will yield an output of from 250 to 300 tons of 24 to 26 wire gauge sheets weekly, the bulk of which will be consumed by the Long Island factory. The sheets will also be cut into the desired patterns at the Harrisburg mill, ready for stamping and finishing at the company's main establishment, thus greatly expediting the manufacture and augmenting the capacity of the concern, while relieving the factory of the handling of scrap, which has hitherto been a great drawback there.

The new mill is situated in a lot of 12½ acres, which the company secured in West Harrisburg. It possesses great advantages of location, being on the line of the Pennsylvania Railroad, and in close vicinity to the coal and iron regions of Pennsylvania.

BUILDING AND CONTENTS.

The building, which was erected by the Pennsylvania Steel Company, is 220 x 208 feet, supported by iron columns, and a "lean-to" 40 feet wide. It is completely fire proof, in that iron and glass have been exclusively used in the construction. The equipment consists of two sheet mills, each having five pairs of rolls, independently worked; 12 heating and two annealing furnaces, a bar mill run by its own engine, five refining furnaces, a 6000 pound steam hammer, and an ample provision of shears and other tools of the latest and most efficient type. A special feature of the establishment is that these shears and other portions of the equipment are provided with separate engines for operating them, instead of being connected with the main engines, thus obviating the necessity for a multiplicity of shafting, belting, &c. The power is supplied from a battery of ten horizontal tubular boilers, 6 x 8 feet, and a 30 inch stroke blowing engine with 18-inch steam cylinder and 48 inch air cylinder supplies air to the refineries. In all respects no care or expense has been spared to make the mill a model of its class, special attention having been paid to efficiency and economy of manufacture, and the adoption of all facilities in the way of machinery and construction to attain that end, as well as to secure good lighting and ventilation in the building.

ADDITIONS TO FOLLOW.

The works were commenced early last summer under the supervision of J. J. Thomas, who remains as superintendent, while J P. Luce, assistant manager, will have charge of the clerical and business part of the new establishment. The firm's engineer, J. B Barrody, has had charge of the erection of the mill, and we understand that he is now engaged upon plans for extensions, which will be shortly carried out. The additions contemplated are a second building for making tin plates, for home use by the company, and a third structure in which will be manufactured "black iron goods," as distinct from the coated ware made at Woodhaven.

OPENING EXERCISES.

The officers of the Lalance & Grosjean Company are: Florian Grosjean, president; Augustus J. Cordier, vice president; and E. W. Martin, secretary and treasurer.

As previously stated the mill was started on the afternoon of Wednesday, February 22. Special cars attached to the Pennsylvania express conveyed President Grosjean and the members of the company's staff and their families, together with several guests, from New York to Harrisburg, where on arrival they were met by a number of prominent citizens of that place, who accompanied the party to the mill. The opening ceremony was simple and brief, consisting in the starting of the machinery by the little son and daughter of Vice-President Cordier. On their pressing a lever which released attached weights the busy wheels and engines were instantaneously set into play all over the building. After thorough inspection of the plant a banquet was spread in the mill, to which the firm and their guests, all the employees of the mill and a number of visitors from Harrisburg and its vicinity were invited. A brief address of hearty welcome to the city was made by M. W McAlarney, editor of the Harrisburg *Telegraph*, and responded to by George L. Nichols, Jr., one of the directors of the company, on behalf of the venerable president, Mr. Grosjean. Among the visitors who accompanied the New York party were F. G. Niedringhaus and E B. Brown of the St. Louis Stamping Company; A. M. Brush of Holbrook, Merrill & Stetson, San Francisco, Cal; H. A. Manning of Manning, Bowman & Co., Meriden, Conn.; Charles X Cordier of Waterbury Brass Company; H V. B. Nash of T. B. Coddington & Co., New York. In addition to President Grosjean, Vice-President Cordier and Messrs. J. H. Smith and Geo. L. Nichols, Jr., directors of the company, occupied the position of hosts.

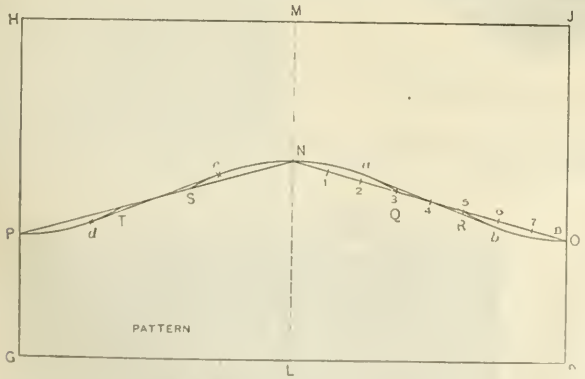


Fig. 2.—Method of Obtaining Pattern.

Manual Training Schools.

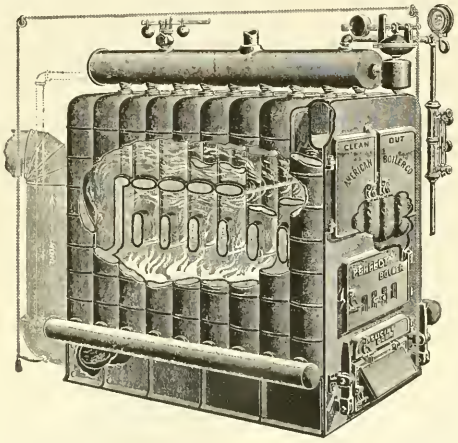
An eloquent plea for the American apprentice was made by President Ittner of the National Association of Builders, in his annual address delivered before that body in St Louis, 14th inst. Mr. Ittner advocated the founding of manual training schools and night trade schools for the benefit of apprentices. He spoke of J. Pierpont Morgan's gift of $500,000 to Colonel R. T. Auchmuty of New York, the pioneer of trade schools, and said that he wrote Mr. Morgan a letter of thanks in the name of the National Association of Builders and the American boy, to whose advancement Colonel Auchmuty is devoting the remainder of his days. Mr. Ittner said favorable reports were received of the trade school established by the National Association at Philadelphia, although no progress had been made in the trade school project for St. Louis. He hoped the day would come when no American boy would be deprived of the privilege to become a skilled workman; that there was no reason for the present discrepancy in wages between skilled and unskilled labor, and that the dearth of skilled labor to-day is due to the proscription of the apprentice system by labor organizations. As a man who had the benefit of an apprenticeship in two trades, Mr. Ittner expressed his sympathy for the youth who was debarred from a trade by arbitrary regulation. He looked to the trade school to remedy this state of affairs.

The report of the formation of a flour trust by Western millers is discredited in Buffalo. There are 28,000 mills in the United States, according to last statistics, about one-half of which are spring wheat mills. This trust scheme has been attempted in years past, but without success, and spring wheat millers could not expect any better success, now, as competition is much keener in the spring wheat product than the winter wheat.

STEAM AND HOT-WATER.

Perfect Heating Boiler.

W. M. Mackay, manager of the School and Public Building Heating and Ventilating Department of the American Boiler Company, was recently granted a patent on a cast iron sectional water-tube boiler, which is to be manufactured by the American Boiler Company. This apparatus, to be known as the Perfect, is an improvement on a boiler of somewhat similar design formerly made by the Richardson & Boynton Company, one of the three concerns which sold out to the American Boiler Company. Fig. 1 is a broken view of the boiler, while Fig. 2 shows the separate sections of which it is composed. The improvement in this apparatus is said to be longer fire travel and internal circulation, besides other new features. All the surfaces, it will be noticed, are tubular in form, which is referred to as giving greater strength than the flat surface, and permit it to carry higher pressure. The internal circulation is specially emphasized, which insures a uniform and steady water line. The sections are connected together by means of return manifolds and steam drums and long screw connections. The boiler has a cast-iron base and a rocking grate, the steam outlet being taken from a separate chamber in the base, at the back of the ashpit. Reference is made to an ingeniously arranged damper elbow which operates automatically, checking the draft and admitting cold air. When soft coal is used as fuel a plate is provided for covering the air inlet, the operation of the damper, however, being the same as where hard coal is burned. The new apparatus is said to be particularly easy to clean, for by the opening of a single clean-out door on the front of the heater, all the surfaces can be easily reached with an ordinary 3 inch wire cleaning brush. The boiler, which is to be made in a number of different sizes in lengths and widths of grates, is intended to be used in portable form. The manufacturers recommend, however, that it be covered with non-conducting material to increase its power and reduce the consumption of fuel by preventing the radiation of heat.



Perfect Steam Boiler.—Fig. 1.—Broken View of Boiler.

HEATING NOTES.

THE *Electrical World* says: "The first practical use of electricity to heat hot-water coils, the inventor claims, was made recently, when R. A. McCormack of Ottawa, Ontario, installed the Ahearn electric heaters in his store. The switch was turned on at 8.30. The temperature was then 50°. In 20 minutes the cold was out of the pipes, and at 9 o'clock the temperature had risen to 68°. The water for the coils is contained in five heaters in the cellar, the total capacity being about 23 gallons. As in the regulation heaters, the water is heated by coils of wire of poor conductivity that pass between the inner and outer sheets of the heater. The hot water is then forced up by the laws of hydrostatics to the coils above. By having five separate heaters the heat and expense can thus be regulated. On a mild day one or two sections may be used. About 300 feet of pipe are used in the store proper, and the heaters keep the cellar warm. Mr. McCormack says the beauty of the system is that it takes up only one-quarter of the space of a furnace and boiler, requires no bother with coal or ashes, and the cost of putting in is less than half that of a furnace.

THE RAYMOND & CAMPBELL MFG. COMPANY, Middletown, Pa., issue very pretty circulars relating to the Lindemuth Sun steam heaters of their manufacture. An outside and sectional view of the heater are shown, which clearly illustrate the construction and special features of the apparatus. A general description is presented in the circular, as well as the chief merits alluded to.

THE AMERICAN RADIATOR COMPANY, 111 and 113 Lake street, Chicago, have prepared a large sheet illustrating their various types of radiators. It is mounted with rollers for hanging. Some 37 different styles of radiators are shown, covering all possible requirements in steam and hot-water radiation, both direct and direct-indirect, as well as a number of constructions for indirect radiation alone. This sample sheet is very handsomely executed. It will be found a great convenience by architects, builders and fitters.

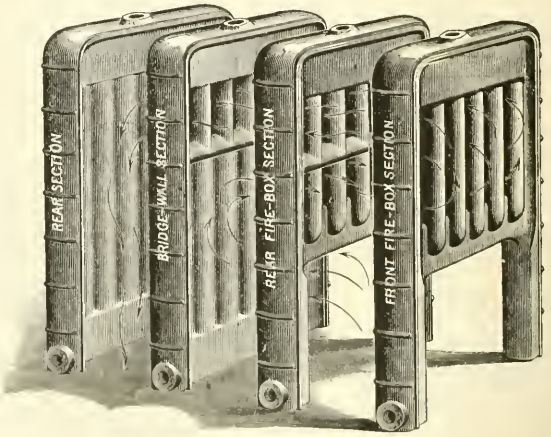


Fig. 2.—General View of Separate Sections.

English Practice In Hot-Water Heating.—XXI.*

BUILDING WORKS.—GENERAL INFORMATION.—QUANTITIES.

In treating of the heating of the buildings the various phenomena relating to circulation, radiation, &c., are governed by precisely the same natural laws as in glass house works. The circumstances and general conditions and the general points to be considered are, however, so different that it becomes almost a distinct calling from horticultural works, and in many cases a man who can execute one may be almost at a loss with the other. The difference is as great as with those works for the supply of hot water for baths and domestic purposes, this being a quite distinct branch of practice.

One peculiarity of building works is the pressure that manifests itself when the pipes extend up two or more floors of a building; a pressure that needs consideration in many ways, particularly as to the joints of pipes, &c., which must be capable of withstanding it.

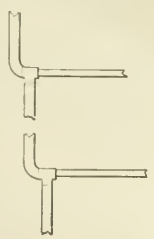
The pressure comes about in this way. When pipes extend any distance above a boiler, and they are charged with water, the weight of this water must be pressing downward toward the boiler, and we learn from any work upon hydrostatics that the pressure so exerted is 1 pound per square inch for every 2 feet 4 inches hight. In other words, if a pipe of 1 square inch area and 2 feet 4 inches high be filled with water, its contents will weigh 1 pound. If the pipe was set up on its end the weight of its contents, 1 pound, would be pressing upon what it was supported by. It is very necessary to avoid the notion that the pressure is in any way associated with the heat; it is merely weight of water. An apparatus extending, say, 42 feet in hight would cause a pressure of 18 pounds to be exerted upon every square inch surface in the boiler, or in the pipes near the boiler. As we rise above the boiler the pressure decreases in like ratio, that is, every 2 feet 4 inches above the boiler the pressure becomes 1 pound less, until we arrive at the top, where the pressure is *nil*. It is only vertical hight that counts; it matters not how the pipes may be carried, the distance from the supply cistern at top to the boiler at bottom, in a vertical line, is the sum of the pressure exerted. It may be noted that the pressure is identically the same whatever the size of the pipe, whether they be, say, 1 inch or 4 inch; but the reader is referred to my elementary work on hydrostatics for these details.

It should be mentioned, as there is an idea rather prevalent that the size or area of the feed cistern in some way governs the pressure, that this impression is wrong. The contents of this reservoir make no difference in pressure except as to its hight. If in one case a very shallow cistern was used, and in another instance a very high cistern, and this latter filled quite full, then the higher cistern would bring a greater pressure to bear, but only 1 pound for every 2 feet 4 inches of its hight, the same as in a pipe. If we wanted to get the exact pressure we should measure from the level of the water in the cistern to the center of the boiler; the shape or extent of the cistern need not be considered. It may be well at the same time to explode the idea that pressure assists the circulation. It does not do so, yet at the same time as a high pressure means a high apparatus, a good circulation is always (or nearly so) obtained when a good pressure exists. It is, however, the hight of the apparatus that increases the motive power; the pressure is merely a consequence, and has no active part in aiding circulation. If the pressure was down one pipe and up the other it would be a different thing, but the pressure is equal down all pipes, irrespective of whether the water has to travel up or down them.

The strain upon the boiler and pipes need not have any injurious effect. It makes care necessary in jointing the pipes, as just mentioned, and when the apparatus extends a good hight, the shape of the boiler has to be considered. Many a saddle boiler has been bulged inside by this cause, as it must be remembered that, say, 40 pounds pressure per square inch amounts to between 2 and 3 tons per square foot. Of course, the larger the boiler the greater likelihood of its becoming misshapen by the strain. If the vertical hight of the apparatus is mentioned to the boiler maker he will say if the boiler selected is suitable.

If an apparatus burst through this great strain or pressure of water, no harm would ensue unless any one be near enough to be scalded by the outrush of hot water (supposing it to be hot). The fracture would be merely a fissure and no expansive or rending force would be felt. If the apparatus had its expansion pipe and other outlets closed an explosion would occur, which would have very different results.

In works of this kind there is, we may say, never any lack of motive power or strength of circulation. The extent to which the pipes always run vertically gives us this. It is so different to horticultural work, in which vertical pipe is absent. When the mains are quite vertical, which is often the case, the circulation is so rapid sometimes as to carry the water right past the branches, ignore them, so to speak, and provision has frequently to be made to obviate this. Sometimes the provision is in the form of stop valves; but a natural and simple arrangement, if found necessary, is to joint the pipe at every branch, as Fig. 87.



English Practice in Hot-Water Heating.—Fig. 87.—Showing Joints in Pipe at Every Branch.

The size of the mains differs more in these works than with horticultural apparatus. They vary from 1¼ inches to 3 inches or even 4 inches. The former size is only suited for moderate sized works, but with vertical pipes it is quite astonishing what a quantity of hot water small pipes can deal with. When these mains are not used for radiating purposes they should be covered carefully, as already described. There should be no loss of heat. Where cost will admit, it is best to err toward having mains of sufficiently full size; it is a real gain, provided they are covered and cause no loss of heat. It will have been gathered that the higher the apparatus extends, the smaller the mains may be, to give certain results; but never run the risk of their being too small.

The water supply to these works is provided by a cistern of the necessary capacity, as per the rule already given. Sometimes the water is added by hand, but in these works it is usually a ball valve that automatically makes good the loss. The particular objection to these articles is that, at the best, they are not very reliable, and in fulfilling this duty, the demand for water being so small, they get stuck and out of order for want of regular use. They should be looked to regularly. It is a not uncommon practice to terminate the upper extremities of the main flow and return in a small tank; it is a very good plan, and in several little ways is found a convenience. If the apparatus is hand filled, the water is put into this tank, which will answer as a filling cistern. In

Fig. 88.—Ordinary Form of Air Cock.

many cases the highest part of the circulating pipes may be a coil, and no tank is permissible. The tank is only suggested when conditions are quite favorable.

The discharge of air from the apparatus is quite different to anything we have yet spoken of. It is practically impossible to use air pipes; they would sometimes have to be 60 feet long, as it would be imperative that they reach up to a point above the level of the supply cistern, and as we should require one from every branch of pipes and every coil or radiator, the expense would be great, and they would be visible in all directions. The customary arrangement is to use air cocks, one at each highest point: if pipes, one at each furthest extremity; if coils or radiators, then one upon the extreme top of each of these. The ordinary form of air cock is as Fig. 88, but a new one having several good features has been introduced, as Fig. 89 (section). Air cocks need regular attention about once a fortnight, as air is continually finding its way into the apparatus, and collects at the highest points. When opening air cocks to discharge air it is necessary to hold a cloth over, as we cannot tell whether the air is out until water issues, and the issue of water under pressure, however little, may do damage to wall papers or decorations, &c.

When an apparatus is wholly devoid of air pipes it is very desirable to have an expansion pipe at some point. It is not absolutely necessary, as the cold supply pipe and cistern allow for the actual increase in bulk of water, but if the apparatus overheats and other such possible happenings, the expansion pipe becomes useful. It is never a great expense.

Fig. 89.—Sectional View of Improved Air Cock.

QUANTITIES.

A cubical contents table is about the only practical means of arriving at the quantity of pipe needed in works of this character. There is a rule, which is based upon the area of glass (windows), the loss of heat by walls (certain thicknesses, materials and position), and the degree of ventilation, &c. This rule, however, is rarely if ever resorted to. If it were

*Reprinted from the London *Builder*.

discussed here it would involve so many points, particularly as to aspects and ventilation, as to complete the rest of these papers by itself.

Hood, when he gave his excellent, though complex, rule to the world, applied it almost wholly to glass-house work, which it is well adapted for, but he also, unfortunately, endeavored to make it apply to building works by allowing so many cubic feet of air per person occupying the room or place. It will be seen what a weakness this introduces, in the fact that, firstly and chiefly, the number of people has no relation to the size of the apartment. A small lecture room may be calculated to have an average of 200 people in it, yet some private reception rooms would be nearly as large and yet not exceed an average of 20 occupants. A rule founded this way will not work at all satisfactorily unless a variety of allowances be made, with doubtful results. It would be better to calculate the wall and window surface, but this is not so good as basing calculations on cubic contents.

In arriving at quantities in these works there is always some guesswork introduced and allowances needed—in fact, the tables given by all writers are subject to this. In the use of the following table it must be seen that, 1, the glass or windows are of ordinary area or number; 2, that the ventilation is normal (except in drying rooms, &c., where unusual ventilation is allowed for). The place to be heated must not be naturally damp or exposed by being an addition to a main building, or standing out so that it is liable to greater cooling influences than ordinary. Again, consideration must be given as to whether the boiler fire has skilled or indifferent attention. In buildings, particularly residences, the attendant is very commonly a page boy or man servant, who only knows that the fire must not be allowed to go out. All these things occur readily to the mind after a little experience. It is hard to say what allowance is necessary in these different cases, but supposing all of them to exist at once, it would necessitate doubling the quanity of pipe given in the following table:

Temperature required.	Quantity of 4-inch pipe through which to circulate per 1000 cubic feet capacity in a brick-built room. Windows as usual.	Some of the uses for which the heat may be required.
Deg. F.	Feet.	
50	6	Coach houses, &c.
55	7	Work rooms, &c
60	8 to 9	Churches, bedrooms.
65	10	Living rooms.
70	35	Drying rooms, herbs, paper, &c. Free ventilation. This heat when empty and dry.
75	45	
80	60	
100	110	Drying rooms for moist articles, laundry work, &c. Full ventilation. This heat when empty and dry.
110	140	
120	180	

This table is based upon the water in the pipes being at a temperature of 180° F., and the lowest external temperature 20° F. Ordinary conditions: A foot length of 4-inch pipe is as nearly as possible a superficial foot of surface; for 3-inch pipe add one third; for 2-inch pipe the quantity must be doubled.

For the higher temperatures given good attention at the boiler is necessary, and the water kept or as near boiling point as possible. The allowance necessary if pipes are in channels with gratings over (or coils beneath floors) is the same as with glass house work, viz, one-third more pipe needed. This commonly occurs in church work which has either lines of pipes in channels, or stacks of pipe here and there beneath the floor, with gratings over. The latter causes a very disagreeable amount of heat to be felt by those whose seats are near these openings.

Utilization of Wind Power.

An instructive article in *The Iron Age*, by G. D. Hiscox, M E, treats of "Possibilities in Utilizing the Power of the Wind," describing the purposes to which the time-honored windmill is adapted at the present day, and demonstrating the advantages of gathering the free power of the wind for our every-day uses. The direct application of wind power, except for the propulsion of vessels, says Mr. Hiscox, apparently began, in a crude form, about the seventh century; and the windmill, with its four great arms, which wasted three-fourths of the wind power, continued to retain more or less of its original form down to a late date in Europe and the East. The American form, consisting of numerous blades, utilizing every available foot of space within the area of revolution, marked a great advance in the cost and efficiency of wind power. This type is now fast gaining ground in Europe, as, with the same breeze, the same power may be had from a modern mill of one-half the size of the clumsy inheritance of antiquity prevalent in the Old World.

Although the general use of windmills for power purposes declined during the present century, owing to the general use of the steam engine, still wind power holds its own for many purposes, and may be applied to still further uses. There is, for instance, no power so cheap for water supply at the present day, and within its range of power, as the windmill. For the supply of small towns, through a regular water-works system, the windmill takes the lead for economy over even a water wheel, and it may be located at the source of pure water. In a town of 1000 inhabitants, requiring a supply of, say, 50 gallons a head per day, the requirement can be met by the work of a windmill 25 feet in diameter, lifting the water into a reservoir 100 feet above the spring, or a 30-foot mill lifting 200 feet.

The question of a practicable means of storage and transmission of an intermittent power like the wind, in order to utilize that power at any time desired—that is, to transform it into a uniform power available for immediate application—is disposed of by Mr. Hiscox, who suggests three methods:

1. Storage of power by compressing air.
2. Storage of water by pumping into a reservoir.
3. Storage of electrical power by charging storage batteries.

Each of these offices can be performed by a windmill, and have been actually carried out in practice with complete success. In the case of air power the mill, when combined with a pump for water supply, becomes a valuable adjunct of thousands of farms and country seats, providing, in addition to irrigating and general water facilities, a small power for other uses, as for running lathes or small machinery, at a small expense compared with steam or electricity. The water storage of wind power is a most economical form for house, farm and irrigation purposes, when combined with large reservoirs. The storage of 300,000 gallons in a reservoir, 100 feet square by 4 feet in depth, can easily be attained by means of a 30 foot windmill under normal conditions. The mechanical work requiring power on a farm or plantation, for grinding, sawing, threshing, ginning and pressing cotton, or grinding sugar cane may also be undertaken.

In the storage of electricity for power and light from the operation of a windmill there is a wide field of usefulness. A 30-foot windmill will be equal to the supply of 32 16 candle power lamps, and supply the water required for a large country house. This has been tested for over three years on a large scale in Cleveland, Ohio, where, by means of a 56-foot windmill, power has been stored successfully and kept in constant readiness in a storage system of 408 cells, each with a capacity of 100 amperes, for all the power requirements of a large establishment fitted with 350 incandescent lamps.

The following are the estimated costs of plant for the various systems of power storage above detailed:

One 20-foot windmill, with all necessary adjuncts, for compressed air power plant, $1800.

One 30-foot windmill, with reservoir for water storage of wind power, $2175.

One 20-foot windmill, with dynamo, storage batteries, &c., for electric storage plant, $1715.

These, although apparently high prices for from 1 to 6 horse-power, are not really high when the utility and freedom from running expenses, attendance and danger are duly considered; and this is what particularly recommends wind power to every farmer, small manufacturer or country dweller.

A Mammoth Chimney.

From a Western paper we extract the following details respecting a chimney recently erected in Denver, Col., which is said to be the highest structure of its kind on this continent:

The tall chimney of the Omaha and Grant Smelter has just been put into use and is giving complete satisfaction. Some trouble was experienced in getting the smoke through it at first, owing to the large amount of frost which had collected on the inside. This stack, which is the tallest in the United States, consists of an outer shell and a core. The total hight of the chimney is 352 feet 7 inches, and it weighs, including the foundation, 12,876 500 pounds.

There were consumed in the construction of the chimney 1,943,000 brick, 8,480 bushels of lime, 1508 barrels of Portland cement; 131,143 pounds of iron of various shapes, including the cap, which weighs 22 000 pounds; 930 yards of concrete, and 233 cubic yards of sand. The outer shell is 48½ inches thick at the base, 13 inches thick at the top and has a pressure at the bottom of 148 pounds to the square inch. The thickness of the core is 26 inches at the base and 9 inches at the top, with a pressure of 160 pounds.

The whole structure stands upon a foundation 18 feet high, and has an exposure to the wind of 9230 square feet. Should the big chimney ever stand in the way of a tornado it would be capable of resisting a wind pressure of 369,200 pounds. The force of the wind in a tornado would amount to 255 pounds per square inch on the windward side and 5 pounds on the leeward side.

Before entering the chimney the smoke passes through an immense number of dust chambers in which the minerals which are held in suspension in the gases are condensed and collected. When the plant is completed there will be some 2 miles of these conduits, but at present there are but about three quarters of a mile in use. It is expected that the entire system will be finished and in use early in the year.

Immigration into the United States during January was 14,831, against an immigration in January, 1892, of 18,057.

THE LETTER BOX.

Moisture in Hot Air.

From J. H. C., *Galion, Ohio.*—I wish to ask through the columns of *The Metal Worker* if cold air taken from out of doors loses any of the moisture it contained in passing through a warm-air furnace? Has not the air as much moisture after it is heated as before? Is it necessary in taking air from the outside to have a water pan in the furnace? Does not the air taken from without the house contain all the moisture needed without a water pan?

Answer.—It is quite certain that the passage of the air through the heating drum of a hot-air furnace does not either increase or decrease the amount of moisture contained. Apparently, however, it would decrease it, and the explanation of this is the fact that air has a greater capacity for moisture at a high temperature. For instance, the air may be taken in from out of doors when it is nearly at the point of saturation—that is, holding all the water it can. On passing through the hot-air furnace and being highly heated, the total amount of moisture remains the same, but the air is then capable of taking up a great deal more water, so it will seem to be much drier because it will evaporate the water from all moist surfaces. What gives the feeling of dryness to the air is that the water from the skin is carried off, and that is the only means of testing the air, unless we use regular instruments to do so. Although, as we said before, the total amount of moisture is not altered by the passage of the air through the heater, it should be borne in mind that the relative amount or percentage per cubic foot is decreased. If a certain amount of air contains a certain amount of water, and that volume of air be increased to twice its volume in passing through a hot-air furnace, it stands to reason that the percentage of water in the heated air per cubic foot will be only half as great as in the cold air entering the furnace. When it comes to the matter of advising our correspondent on the use of a water pan, all that we can say is that opinions differ. Some of the furnacemen think that a water pan is useless, if not a positive disadvantage. They do not argue against the addition of moisture to the heated air, but they say that the water pan becomes a receptacle for all sorts of dirt, and is likely to give a bad odor to the air, if not introduce impurities in it. Of course, this argument does not hold where a water pan is carefully attended to, but then, as a matter of fact, are water pans carefully attended to in the majority of cases? This is a question that the ordinary furnaceman who objects to the water pan presents. Another objection urged is that the amount of water that the air will take up in passing through the furnace is insignificant, and really would not be noticeable. Our correspondent can figure this out himself, taking the capacity of an ordinary water pan, measuring the velocity of the air as it passes through the cold-air box, and the area of the cold-air box and the length of time it takes to dry up the water in the pan, he can calculate how much water is taken up by each cubic foot of air entering the house.

Suggestion to Hollow-Ware Makers.

From J. F. D., *Grayson, Col.*—I have often wondered why the stove, pot and kettle makers did not put better shaped

Suggestion to Hollow-Ware Makers.—Fig. 1 —Ears Cramping Cover.

ears on their pots and kettles. When you lift one by the bail the bail comes close against the side of the pot, cramps the cover and lifts it up before lifting the pot, as shown in Fig. 1. Why don't they put good lugs on so that the bail will pull away from the pot when you lift it and let the lid rest on top of the pot? Fig. 2

Fig. 2.—Ears to Free the Bail.

will show the idea that I mean in recommending the use of better shaped ears. Why don't the makers put on ears of this kind is what I want to know every time I have to trim the pot cover and be so very particular about the size.

Painting Conductor Pipe.

From S. H., *McConnelsville, Ohio.*—I would say, for the benefit of your correspondent "G. R. C.," Mansfield, Pa., that my way of painting conductors is to make them ready to go up, so as not to have any soldering to do, as the heat burns the paint off. I then take wooden plugs and plug up one end of the pipe, pour about half a gallon of paint into the conductor and then plug up the other end. After running the paint backward and forward so as to cover the whole of the inside, I stand the pipe up and let it drain. I find this an effectual, speedy and cleanly way.

Size of Cold-Air Duct for Furnace.

From E. P. S.—What should be the capacity of cold-air duct to supply furnace having three 11-inch and two 10-inch heating pipes?

Answer.—We are not aware that there is any fixed rule to be used in estimating the size of cold-air duct for a furnace, as much would depend upon location, length of duct, number of angles, &c. Some furnacemen make the cold-air duct eqnal in area to one-half the total area of the hot-air pipes, while others consider two-thirds or three-fourths to be the proper size. Considering the area of an 11-inch pipe to be 95 square inches and that of a 10-inch pipe to be 78 square inches, we would have $95 \times 3 = 285$, the area of the three 11-inch pipes, $78 \times 2 = 156$, the area of the two 10-inch pipes, and $285 + 156 = 441$, the total area of the three 11 and two 10 inch pipes. If the cold-air duct was to be made one-half the area of the hot-air pipes the capacity of duct should be one-half of 441, or $220\frac{1}{2}$ square inches. For this size the duct could be made $12 \times 18\frac{1}{4}$ inches, inside measure. If the duct was to be made two-thirds the area of hot-air pipes (441) its capacity should be 294 square inches. For this size the duct could be made $12 \times 24\frac{1}{2}$ inches, inside measure. If the duct was to be made three-fourths the area of hot-air pipes (441) its capacity should be $330\frac{3}{4}$ square inches. For this size the duct could be made $12 \times 27\frac{1}{2}$ or $14 \times 23\frac{1}{2}$ inches, inside measure. By using a duct of large size an abundance of fresh air could be secured when required, and by placing a damper or slide in the duct the air supply can be regulated as desired.

Keeping Track of Too's.

From R. E. C., *Mansfield, Pa.*—I would like to get, through the columns of *The Metal Worker*, the ideas of other tinners on keeping track of odd tools in the shop. My men have been in the habit of taking tools out and losing them and not reporting the same. And often they would return the tools to the shop and throw them down almost anywhere, so that when they were wanted it was difficult to find them. The tools I mean are of the odd kind, such as wrenches, hammers, ropes, pulleys and the like, kept in a first-class tinshop, and which have to be used in some work. I thought of several ways, but they all seemed to take up too much time. What I want to learn is some shorter way that will not take so much of the foreman's time to keep track of the tools of this kind that are taken ont of the shop by the other men.

Alloying Tin and Zinc.

From J. H. L., *Kansas City, Mo.*—Will you please inform me through the columns of *The Metal Worker* how to mix tin and zinc to make them unite?

Answer.—In a recent work on mixed metals, it is stated that tin and zinc can be alloyed by fusion producing more or less malleable combinations. The list of alloys given in the work show various compositions from the proportion of 1 part of tin to 99 parts of zinc at the one extreme to 99 parts of tin and 1 part of zinc at the other extreme. An investigation of the character of tin and zinc was made by Guettier, and he describes the characteristics of the variously proportioned alloys. It appears that when the tin is in small proportion there is a tendency for the metals to separate at the bottom of the mold. An alloy of 50 parts of tin and 50 parts of zinc, however, is recommended as giving good results, and it is stated that more zinc would produce an alloy not so well mixed, besides being more crystalline and brittle.

Tinning Soldering Coppers.

From C. L. F., *Clay City, Ill.*—I would suggest to "E. T.," Milwaukee, Wis., whose letter appeared in *The Metal Worker* of January 28, that he use a brick with rosin to tin his coppers, on account of it having more grit than a board and a better coat of tin will stick to it. Sal-ammoniac will do good work in tinning coppers, if very hot. To the apprentice, I would say, file clean all four sides, then file off sharp corners and round the point a little.

Cement for Glass and Metal.

From D. M. G., *London, Ont.*—In reply to "G. A.," Akron, Pa., whose inquiry appears in *The Metal Worker* of February 4, I send herewith a recipe for cementing glass and metal. Take ground white lead, mix with furniture varnish, then sift in some litharge. Mix well with the white lead and let it stand for about 20 minutes, when it will be of the consistency of mixed putty. The metal to receive the glass should be coated with a quick-drying brown baking japan or furniture varnish and allowed to get tacky before putting the cement and glass in place. Finally bake with a slow heat for about 10 hours.

Size of Registers for Round Pipes.

From J. G. S., *Portland, Ore.*—In reply to the question in *The Metal Worker* of January 28, respecting the relative sizes of registers necessary for 9, 10 and 11 inch round warm air pipes, I would inform your correspondent that 66⅔ per cent. of the opening in a register is figured as the open spaces and 33⅓ per cent. as the solid metal. Hence, for a 9-inch pipe to carry 63 square inches we use a register 9 x 12, which discharges 72 square inches. An 8 x 12 will do, as with it the discharge is 64 inches, but we prefer a little more than is necessary. A 10-inch pipe has a capacity of 78 inches, and for this we use a 10 x 12 register with 80 inches capacity. For 11-inch pipe and 95-inch area we use a 10 x 16 register with 107 square inches of capacity.

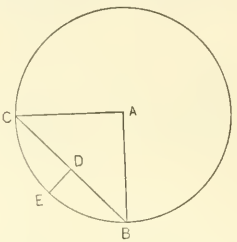
Piston Packing.

From A. McA., *Kearny, N. J.*—I have an air pump 4-inch bore and 4-inch stroke, double acting, the chamber is of cast iron. To prevent friction I use cast rings for packing. I want to compress from 10 to 15 pounds. Would you please advise me what would be the most practicable packing for the piston, best in operation, &c.

Answer.—Use oak-tanned cup leathers for packing the piston; these can be procured from any pump-supply house.

How to Find Circumference of a Circle.

From C. W. F., *Onawa, Iowa.*—Your correspondent in New Haven, Conn., "C. E. S.," in *The Metal Worker* of January 21, asks for a simple rule for finding the circumference of a circle of a given diameter. Here is one which, no doubt, most old tinners know, and which is exactly correct every time. I send a diagram, as it is the best way I can explain it, and it may be some help to the boys. Describe the circle of the given diameter, then mark off ¼ of the circle B C. This is easily done by laying the square on the circle with the corner of the square at the center and draw the lines A B and A C, then draw the line C B. Bisect the line B C and draw the line D E at right angles to it. Three times the diameter of the circle plus the line D E will be the exact circumference of the circle. I do not know that I can explain just why this is true, but you can



How to Find Circumference of a Circle.

try it, boys, and you will find that it is a simple and absolutely correct rule. I wish some one who is higher up in mathematics than myself would explain why this rule is correct.

Note.—We do not think there is any particular explanation of the correctness of this rule beyond pointing out the fact that the line D E should be a certain fraction of the circumference, for, according to our correspondent's letter, the line D E must be equal to 0.1416th part of the circumference. As C B is a quarter of the circumference, it is very evident it must be the same proportion of the total length in circles of all sizes. It must be borne in mind, however, in talking about rules being absolutely correct, &c., that these terms are only relative. What is absolutely exact in measuring lumber would not be considered exact in measuring silk, and a pair of scales that will weigh a ton of coal will not be used in determining the weight of a diamond. What we mean to say is, that for all practical purposes, a rule may be so closely correct that with ordinary instruments we cannot find any error, and yet if we had very delicate instruments and tested these rules, they might be found wrong by some very small amounts that, however, need be taken no account of by practical men.

Origin of "Carpenter" and "Plumber."

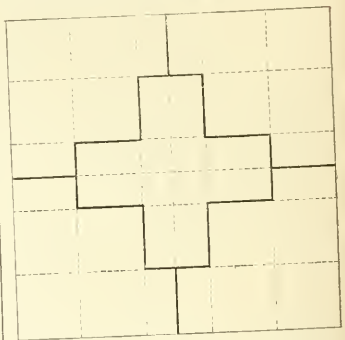
From F. D., *Union City, Tenn.*—Why is a carpenter called a "carpenter," and a plumber a "plumber?"

Answer.—Both words are of Latin origin; "carpenter" being derived from *carpentum*, a wagon or carriage, and *carpentarius*, a maker of the same. The word has in course of time widened its meaning, so as to include all artificers in wood. "Plumber" takes its rise from the Latin word *plumbum*, lead, and literally means a worker in lead. The French equivalent, *plombier*, explains itself in that language, *plomb* being the French for lead.

The Farm Problem.

From P. H., *New Madrid, Mo.*—When I spent 6 cents postage on the apple problem, I had no idea of being made the recipient of so valuable a benefit as that submitted by your Troy, N. Y., correspondent in *The Metal Worker* of January 28. As to the man with his thousand-acre farm, I think he can have his way easy enough and get located in the center of the plot and surrounded by his sons, provided he wishes no outlet for himself. By measuring off 200 acres in the center, no matter whether round or square, there will be left at the corners 200 acres for each of the other four lots. If this is not correct I leave the matter to the farmer and his sons, who ought to be more interested in the division than the writer. The sketches sent do not represent the shape of the farm I would like, but they are my solution of that problem as near as I can get at it.

From C. A. J., *Cobden, Ill.*—In the *Metal Worker* of January 28, the problem was stated by "S. J.," Troy, N. Y., respecting a thousand-acre farm intended to



Sketch Showing Solution of Farm Problem by "C. A. J." and "H. O."

be divided into five equal plots, one in the center. The accompanying sketch shows the way that I would divide the farm.

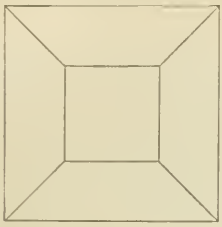
From H. O., *New Orleans.*—Let the old farmer divide his farm into 25 squares of 40 acres each, in the manner shown in accompanying sketch, and I think he will get matters about right.

Note.—Both the above correspondents have hit upon the same method, as shown in the accompanying illustration. A criticism to be made on this solution, as well as on several others received, is that it is merely graphical, the dimensions of the several farms not being figured out.

From T. S, *Philadelphia.*—I forward inclosed rough sketches, as my solution to the farm problem given by "S. J.," in your issue of January 28. If the old man should get on the outs with his children, how would he get out without trespassing?

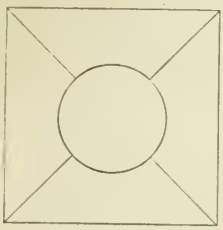
Note.—Our correspondent, "T. S.," gives us three methods of dividing the farm, proceeding on the fact that 200 acres comprise 8,712,000 square feet, the square

root of which is 2951 feet 8 inches. In the first example he places the father's farm, 2951 feet 8 inches square, in the center of the plot, drawing lines from the corners to the corners of the outer square, forming four equal divisions for the four sons in the same manner as illustrated in solu-



Solution No. 1 of Farm Problem by "P. H."

tion No. 1 by "P. H." In the second solution the dividing lines are drawn from the centers of the four sides of the inner square, forming four L-shaped spaces of equal size. In the third, the



Solution No. 2 of Farm Problem by "P. H."

lines are drawn from the corners of the inner to the edge of the outer square, forming four long rectangles of equal size.

From S. J. H., *Bristol, Vt.*—As a solution of the farm problem by "S. J." in *The Metal Worker* of January 28, I submit inclosed diagram with dimensions of farms.

Note.—The diagram gives a similar solution to the third figure presented by "T. S.," Philadelphia, namely, a rectangular space in the center of the plot, 178.9 rods square, with four rectangular spaces of 110.55 rods by 289.75 rods at the sides.

From A. P. E., *Ottawa, Kansas.*—I herewith submit the following solution to the 1000-acre problem by "S. J." in *The Metal Worker* of January 28:

Note.—This correspondent presents a figure containing a rectangular space in the center, 200 x 160 rods, equal to 32,000 rods, or 200 acres. From the center of the sides he draws straight lines to the outer edge, inclosing four L-shaped spaces containing in the larger limb 200 x 120 = 24,000 rods, and in the smaller limb 100 x 80 = 8000 rods, or 32,000 rods = 200 acres in each portion.

From J. H. C., *Groton, Conn.*—I have seen the problem given by "S. J." in *The Metal Worker*, or its equivalent, put in this way: A farm of 1000 acres to be equally divided between a father and four sons; the father to retain 200 acres with buildings in the center of the original farm, the four sons to have 200 acres each of land adjoining the homestead. These to be of uniform shape. All turns of division fences to be at right angles. Inclosed find diagram of the solution of above.

From J. C. F., *Grand Forks, N. Dak.*—I send you a solution of "A Country Problem" given in *The Metal Worker* of January 28. The father's farm is square in center of the 1000 acres. His four sons' farms will have the L shape on the corners of their father's farm, as in inclosed diagram.

Note.—The sketches supplied by "J. H. C." and "J. C. F." (without, however, noting the dimensions) are both similar to that described as the second solution of "T. S.," Philadelphia, namely, dividing the outer space into four by lines drawn from the centers of the four sides of the inner square, forming four L-shaped spaces for the sons—the limbs being of equal size.

From H. W., *Tacoma, Wash.*—I herewith submit a solution to the problem of "S. J.," Troy, N. Y., in *The Metal Worker* of January 28. One acre contains 160 square rods, 1000 acres contain 160,000 square rods; hence the original piece was 400 rods each way. Each to have an equal share must have 32,000 square rods.

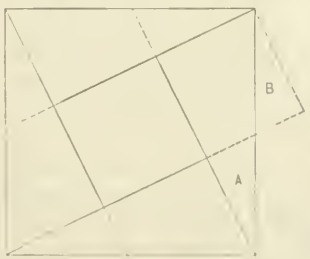
Note.—This correspondent proceeds in an ingenious manner by placing the father in the center in a farm measuring 240 x 133⅓ rods, with a son on each side in a farm of similar dimensions. This leaves a long narrow rectangular space on the top and bottom, 400 x 80 rods, for the third and fourth sons.

From W. E. W., *San Diego, Cal.*—Inclose solution of problem given by "S. J." of a 1000 acre farm to be divided equally between a farmer and his four sons. The farm being square and containing 1,000 acres to be divided among five persons, gives 200 acres to each. Dividing the farm into squares of 10 acres each, to give the four sons equal portions of like shape and size, let each son take a share as shown in inclosed diagram, leaving the old man's portion in the center of like size but different shape.

Note.—The diagram inclosed shows the center, or father's farm, as a square of 160 acres, with four spurs of 10 acres each at the corners; the four sons' portions being placed at the corners of the plot.

From S. J., *Troy, N. Y.*—I inclose herewith sketch showing method of solving the problem that I presented in a recent issue of *The Metal Worker*. You will notice that my plan is to find the middle of each side of the plot, then from each opposite corner draw lines to these points.

Note.—We reproduce herewith our correspondent's sketch. We regret that he



Solution of Farm Problem by "S. J."

has not gone into careful explanation of this, for while it would be generally accepted that the solution is correct, each one will have to study out the matter for himself. In fact, he presents quite a geometrical problem. We would say, however, for the benefit of those who do not wish to puzzle over the matter that the solution depends upon the two triangles A and B being equal to one another in area. Furthermore, each of these triangles is equal to one-twentieth of the entire 1000-acre lot, or one-fourth of each of the farms. As it is therefore equal to one-fourth of the square farm belonging to the father, and to one-fourth of the triangular farms allotted to the sons, the triangular farms must be the same area as the square one. It is not necessary to prove this, as it would require a good many lines and figures and explanation.

We have printed a number of the solutions received, as well as several diagrams, but we cannot undertake to publish any more answers, for if we did those of our readers who are not interested in agricultural matters might justly complain that their rights were being trespassed upon.

Combination Heaters.

From N. W., *Newark Valley, N. Y.*—I am in trouble. I have a pipe radiator 9 feet long with 6 lengths of ¾-inch pipes, and there is just room enough to put it under the bay window on the floor. I put a 1½-inch coil in the hot air furnace to heat the water and 10 feet from the furnace put a T with 1¼ and ¾ inch pipe and later expect to add more radiating surface, but have only put the ¾ pipe radiator in as yet and that one is the one that bothers me with the air or steam. After the air or steam is let out of the pet cock it works all right, until the fire gets down, and then when the fire is raised again it fails to work, as there is air or steam in the pipe. I want to put the other two radiators to take the heat off, so the pipe will return the water cold to the furnace, which, I think, will keep it from making steam, for I believe the trouble is due to steam. I think there is not enough radiator surface to take the heat as fast as the furnace will make it. Is the trouble steam or what is the cause of it? Do combination furnaces work evenly? Are they a success generally and would either steam, hot water or air alone work better?

Answer.—Our correspondent's trouble is caused by the formation of steam. This is due to the fact that the coil in the furnace and the surface in the radiators are not correctly proportioned one to the other. The even working of the apparatus may be effected by either reducing the coil in the furnace or by adding surface to the radiators. When combination furnaces are set and adjusted properly they work as evenly as other systems. Those who use well-designed combination systems of heating speak as highly of them as those who use simple systems of steam, hot water or hot air.

The Manhattan Railroad has lost an important suit. Judge Ingraham of the Supreme Court decided on February 13 that the company should pay into the City Treasury 5 per cent. of the net receipts from 1880 to 1890, and also from this time forward. The amount will aggregate about $2,000,000. Judge Ingraham's decision relieves the city from all responsibility for damages in suits instituted by property holders against the elevated road. The company will appeal from this decision.

THE RETAIL STORE.

The Hardware Dinner.

THE FIFTH ANNUAL DINNER of the Hardware, Metal and related trades of New York was given at Sherry's, Fifth avenue and Thirty-seventh street, on Tuesday evening. The gathering was notable and representative, and while naturally a majority of those present were from New York, New England and near-by States, the far West and intermediate territory was well represented. Irving M. Scott, president of the Union Iron Works at San Francisco, the progressive shipbuilding plant that has added such cruisers and battle ships as the "Charleston," "Monterey" and "Oregon" to the new navy, had expected to be present, but was unavoidably detained at the last moment. The New York Produce Exchange and Massachusetts Board of Trade contributed to the number seated at the guests' table, which was worthily presided over by President Williams of the Hardware Club. The trade centers of St. Louis, St. Paul, Cleveland, Pittsburgh, Buffalo and other cities sent their quota, while Congress, the clergy and press did honor to the occasion in the presence of notables who responded to various toasts. The method of arranging tables and seats was much the same as that followed a year ago, while the admirable plan of providing each guest with a programme showing his place at table avoided the confusion otherwise inseparable in such a large gathering. The committee decided to fill the large room comfortably and no more, and while the tables were the same in number the space allotted to individuals permitted more freedom. An opportunity for social intercourse was afforded from six to seven o'clock for the renewal of old acquaintanceships and the forming of new ones, a feature regarded by some as one of the pleasantest of the evening. The large and handsomely furnished rooms adjacent to the banquet hall were admirably adapted for this purpose. It may be said that the Hardware trade have known each other without being acquainted; a seeming anomaly that will fast disappear under the influence of such reunions as the one just past.

The banqueting hall was arranged with seven tables besides the guests' table, seats at the latter table being assigned as follows:

CHARLES E. ADAMS.
JAMES H. KENNEDY.
PRODUCE EXCHANGE.
ARCHIBALD P. MITCHELL.
BRACE HAYDEN.
WEBSTER R. WALKLEY.
ANDREW S. UPSON.
THOMAS F. KEATING.
HENRY R. TOWNE.
EDWARD S. CLINCH.
REV. W. C. BITTING.
ST. CLAIR MCKELWAY.
WILLIAM H. WILLIAMS, President.
CHARLES A. MOORE.
OAKES A. AMES.
HON WILLIAM J. COOMBS.
COL. JOHN A. COCKERILL.
MAHLON J. WOODRUFF.
RICHARD R. WILLIAMS.
CHARLES L. MEAD.
WILLIAM H. HART.
DAVID WILLIAMS.
CHARLES MILLER.
GEORGE HENRY SARGENT.
HON. JOHN H. GRAHAM.

The absence of St. Clair McKelway, who it was expected would respond to the toast "The State," and from whom a letter was read; Congressman-elect John H. Graham, who is confined to his home by illness, and Geo. H. Sargent, whose previous engagement at the Harvard dinner prevented his attendance, was much regretted by those present. George J. Laighton occupied the seat assigned to Mahlon J. Woodruff, who was absent.

While dinner was being enjoyed the orchestra discoursed classical music and popular airs of the day, including selections from "Wang," "A Trip to Chinatown," and others, which struck so responsive a chord among those present that a large number joined in the chorus. At different times during the evening Ericsson T. Bushnell favored the company with vocal selections, which added much to the pleasure of the evening. His superb voice was greatly appreciated by all.

The dinner was an excellent one, and at its conclusion the toast list, which had been carefully prepared, was taken up. William H. Williams, president of the club, was a very efficient and acceptable presiding officer, and his speech of greeting was admirably adapted to the occasion and listened to with closest attention. Mr. Williams was especially felicitous in introducing the several speakers of the evening. It was a matter of congratulation that all the speakers, with the exception of St. Clair McKelway, whose absence is above referred to, were present.

After coffee had been disposed of and cigars lighted, Chairman William H. Williams called the assemblage to order and extended his greeting in a witty and eloquent address, at the conclusion of which he introduced Hon. William J. Coombs, who responded to the toast, "Trade and Finance." He was followed by the Rev. William C. Bitting, who spoke on Tubal-cain's place in life. The address was exceedingly clever, and amused the audience very much. Col. John A. Cockerill next spoke on the "Sword and Pen." He was followed by Charles A. Moore, who responded to the toast, "The Amenities of Business." Next, Henry R. Towne spoke on "Tendencies," Richard R. Williams on "Our Club," and at the end Webster R. Walkley of the Peck, Stow & Wilcox Company spoke in verse to the toast of "Sketches." The poem was excellently recited, and was greatly enjoyed by the audience. We print below the full text of this entertaining speech.

Mr. Walkley's Poem.

My theme is complex, a queer mixture of things,
A compound quite rare of which a Muse seldom sings.
How to fix it and mix it, and how best to serve it
To that body elect whom you know best deserve it
Is a difficult task at this stage of our meeting,
When wit has exploded, and the joy of your greeting
Has been dulled by much thinking and quite as much drinking—
While smoke is ascending the spirits keep sinking.
The tallest one, you know her name,
By daring deeds she won her fame;
A friend of truth in every age,
A guide to youth or wisest sage,

We saw approach; with lifted hand
She bade me come and join the band;
With parted lips in silver speech
She uttered truths that I would teach.

What is truth? Pray critic tell.
Canst thou weigh or measure well
This rarest gem in all the earth?
Dost thou know where it had birth?

If the truth thou wouldst seek,
Then thy lips the truth must speak;
If the truth thou wouldst know
Then the truth thy heart must show.

If the truth thou wouldst teach,
If some heart thou ear'st to reach,
If thou wouldst lead some trusting youth,
Thou thyself must be the truth.

Hardware, Implements of Iron and Steel,
Like swords and plows, the first men feel,
When in some Moses' hand it falls
To avenge a wrong in Israel's hosts or Pharaoh's halls;
Or when it cuts some Gordian knot that binds
A man or race of men. Freed, each finds
How sharp the edge, how keen the blade.
Of what Damascan stuff 'twas made!
As mighty as the pen—one made of steel—
Which throbs with life as throbs a steamer's keel.

In what a forge, in what a heat, were wrought
These mighty engines of our modern thought!
Progress, born of each, will cease to live
When swords are sheathed and pens no impulse give,
Each a mighty lever to uplist a sinking world,
And from decaying bastions have freedom's flag unfurled.
The sword oft cuts a way through mountains of despair,
And oft it hangs suspended by a single thread or hair;
It reeks with blood; it cries aloud from every battle plain,
Yet by the sword the world has reaped great gain.
It has been drawn for tyrants and for the oppressed unsheathed;
It has fought for Slavery, yet has Liberty bequeathed.
From plain of Askelon to Richmond's bloody field
It ever struck for Freedom when yeoman's hand did wield.
The Plow, almost as old as Mother Earth,
In times of Tubal-cain had birth.
Perchance was used in Eden's bowers,
Where beauty blushed mid sweetest flowers.
The upturned soil rich harvests bears,
Alike the rich and poor its bounties share.

In every age, in almost every race,
The Plow and Sword have symboled wealth and grace.
The corn of Egypt and the grapes from Eschol's vines
Are offspring of the Plow, as diamonds are of mines
By some translator's fault, I ween,
Or by some Hebrew points unseen,
The names of the men in the Hardware trade
Who sold the tools when the Ark was made
Are not recorded in Holy Writ,
Though Hammer and Nails, the Axe and the Bit,
Plows and Swords, Anchors and Chain,
Iron, Copper and Gold, which to our art pertained,
You will certainly find if you diligently read
The Book of Books, to whose counsels give heed.
There are the three Georges, at Sargent's, I mean,
And Tommy sits near, with Ladd in between.
He figures the discounts, adds and subtracts,
And has published a book to exemplify facts.
The others can multiply and often divide
The large profits on Locks, and Cottins beside;
They deal in all tools like the Axe, Hatchet and Hammer,
But the Head of the firm knows most about grammar.

And now with my guide we will walk down the street
And tell you of friends who perchance we shall meet.
Here is Laighton, who sits in a soft cushioned chair.
His hands, like Lamartine's, thrust through his hair,
Evidently solving some intricate problem
Concerning his customers (not how to rob them).
Scanning hexameters, his learning doth shame us.
"Tempora metantur et nos illis mutamus,"
Which, by the way, is exemplified here,
If you will just watch, as our guests disappear.

There is Smythe, so polite, and Germond, of great nerve,
Each vieing with each how best he may serve
The man who strays in to buy watches or clocks,
By changing his mind to want sheet metal Locks.
Men take no note of time, when in security they rest,
With these Locks upon the doors they dream of Araby, the blest.
The music of the tumblers as the key turns to and fro
Is sweeter than a chime of bells, ten thousand tell you so.

Clinch, a fine fellow, with Underhill near him,
Though the boys, it is said, most awfully fear him,
He has done what he could, and that as he would
To make this dinner the best—better than good,
With methods precise and a mechanic's devise
He keeps everything in strict order.
When he rides in the car he ne'er smokes a cigar,
Though sometimes he thinks that he orter.

There are Charlie and Abe, the Quackenbush boys,
Sharers of sorrows, yet many more joys,
With a host of kind friends in country and town
Feeling quite sad that their sign is pulled down.
There is John Graham, 'tis a pleasure to show him,
Honorable John Graham, as now you must know him;
He has carved his own way from poverty up,
And sips sweetest nectar from the winner's gold cup.
Hurrah! for our Congressman, honest John Graham!
A man of the People, he ne'er will betray them;
Right shall be Might and his honor kept bright.
Though the struggle be long,
In opposing the wrong,
After the night
Will surely come light,
And then the victor's song.

Peter McCartee, the pet of the street,
Always well dressed from his head to his feet;
A jolly good fellow, fair and square all around
The most popular man in the trade to be found

Have you heard of the firm, Smith, Bonsall & Field?
Sowing wide acres, expecting rich yield;
Selling Spades, Hoes and Rakes for planting the corn
To feed an on-coming race—children unborn.
Smith ever ready to bind up the sheaves:
The gleaners quite welcome to what Enterprise leaves.
There are Sickels and Sweet, with a Lyon to eat,
Though Sickels has garnered rich harvests of wheat.
Like bees in their hives, these earnest lives—
Still looking and struggling for meat.

What's in a name? As cunning as a Fox.
The phrase is not mine. Who's in a box?

There was William the Conqueror, and William his son;
Their race, we all know, is not yet run
William the Kaiser, and William the Great,
William the Prince of the Netherland State.
This William of Orange was Liberty's son,
Great and as good as our own Washington.
The light of these lives illumes history's page,
Which will ever grow brighter as time gathers age.
Sweet Williams that blossom in colors most rare,
And the Williams who sits in the President's chair;
The Williams who crown this occasion with grace,
Who spend time and thought to better their race,
Whose figures and fancies impress every page
Of the paper they edit and call *The Iron Age*.

Here are Kittredge and Kennedy, editors too—
What a host of fine fellows all pass in review—
In the van of the battle upholding the right,
Defending the truth with their pens and their might!

Here are Biddle and Bonbright, Irvin and Greeo—
The rarest of gems are often unseen—
And keen-eyed Supplee watching his chance
To always get in before an advance.

Have you read of Jack Horner who sat in the corner?
The name of the author I'm sure I've forgotten,
But the Plumb he secured through ill has endured
And other Plumbs has begotten.
They're all rigot, they sit here to-night,
With Hammer and Sledge and Pick for a fight.

There are a lot of good fellows all up through the State
Whose virtues and follies we surely can mate,
McCarthy so gracious, and Walbridge so cool,
And Matthews, most learned in Nature's own school.

Everson and Kennedy, Hamilton and Weed,
Men of culture and thought, sowers of seed,
Reeping rich harvest which Enterprise yields
To the tillers and toilers in life's fertile fields.

Barker, broad and square shouldered, upright and tall,
I'll say if I may, "the noblest Roman of them all;"
Brave, honest and true, a man through and through,
Unyielding, unbending, refreshing as dew.

There are Hibbard and Bartlett, with Spencer away
In a land which is fairer and brighter than day,
While Dezendorf sits exhausting his wits
How to buy better than they.
Conover square and Warren as fair,
While others are blowing
They keep a growing—
Lyford and Charles are still there.

Horton and Gilmore, McWilliams and Black,
With steam always up they keep on the track,
Not whistling and puffing for a mile in a minute,
Though if the race be close they'll surely win it.

Markley and Alling, Scoville and Crane,
Traveling through valleys, o'er mountain and plain,
Selling Sickles and Scythes for the old reaper, Time—
Their lives, like a song, in sweet melody chime.

Here are Sanford and Harvey, and Morley himself,
As cunning as mice nibbling cheese on a shelf,
Selling Lumber and Salt, Harness and Nails,
Old oaken Buckets and Leather-bound Flails.

The names we have mentioned, you'll agree, are the least—
The unnoticed the best, like the wine at the feast.

We drink to our friend, William J. Coombs,
The weaver of thought in the mind's great looms;
A builder of State, where the People are King
And the songs of the nation with Liberty ring.

We drink to our guests from pulpit and press,
Who always are striving some wrong redress;
Who stand with bows drawn, to shoot arrows of steel,
Yet ever found ready the wounded to heal.

We drink to that host, throughout our broad land,
Who toil with the brain or toil with the hand;
We welcome all climbers, and point to that light
Which alone they can reach by the ladder of Right.

We drink to the men who sell Iron, Steel and Nails
To lay the broad tracks or fasten the rails;
Who play with the lightning or harness the steam,
And awaken the age from its long troubled dream.

While I speak, the night wears on;
The morning star and rising sun
Will soon denote the day's begun—
The Birthday of our Washington.

This fading flower, whose breath perfumed the morning air, whose pe als kissed the dewy drops that night distilled, then gave promise of a life most beautiful and fair. Yester'eve the moon's pale beams and light of glimmering stars shone upon the open bud. At early dawn Aurora from her gilded couch looked across the Eastern hills and smiled upon its beauty. At sunlight's touch it blushed in crimson, as the water blushed at Master's voice at wedding feast in Cana. Painted by a hand divine, in colors rich which limner's brush nor art can trace. Ere the noontide hour, plucked from the parent stem through which it drew its breath, it lost its life and power, yet in dying yields sweet fragrance. O! simple flower, thy life of but a day shall teach us, pilgrims on the way, by grace of speech, by purity of thought and life, by kindly deeds of charity and love, to yield sweet fragrance like thyself.

At the conclusion of Mr. Walkley's poem, which was listened to with the closest attention, the president introduced Hon. Charles E. Mitchell, ex-Commissioner of Patents, who referred in a brief speech to the important part which the American patent system has had in the development of the country and its manufacturing interests.

At the conclusion of Mr. Mitchell's remarks, which were appreciated by the company and heartily applauded, the president dismissed the assemblage by quoting the sentiment from Ben Jonson with which the toast list closes:

In the hope to meet
Shortly again and make our absence sweet.

Officers of the Hardware Club.

WE GIVE on an accompanying page portraits of the officers of the Hardware Club of New York. These gentlemen are as as follows: William H. Williams, president; K. H. Swayze, vice-president; Thomas F. Keating, treasurer; and J. L. Varick, secretary. The gentlemen mentioned were very active in organizing the Club, and we take pleasure in giving below sketches of their business careers, which will doubtless be of interest to the trade:

WILLIAM HILTON WILLIAMS.

William Hilton Williams was born in Schoharie County, N. Y., November 7, 1847, of New England parentage, being descended in the ninth generation from Robert Williams of Norwich, England,

who settled in Roxbury, Mass., in 1638. Mr. Williams came alone to New York in quest of fortune in March, 1862, and found employment with Brooks Brothers, clothiers, of Catharine street, and was in the store when it was sacked by rioters in July, 1863, and did military duty during all that turbulent week. In 1865 he entered the Cutlery and Commission Hardware house of Clement, Hawkes & Maynard, at 14 Beekman street, and subsequently entered the employ of J. Russell & Co. In 1871 Mr. Williams formed a partnership with Cornelius S. Van Wagoner, with whom he has ever since been associated in the manufacture of Hardware. The two are brothers-in-law, having married daughters of Edward E. Bowen, an old and highly respected merchant of New York and resident of Brooklyn. The business of Van Wagoner & Williams was conducted for many years at 82 Beekman street, New York, but in 1892 the firm (which had been recently incorporated) removed their factories to Cleveland, Ohio, retaining New York headquarters at 14 Warren street. Mr. Williams is well known to the wholesale Hardware trade of the East and West, having traveled extensively in the prosecution of his business for many years. He resides on Prospect Heights, Brooklyn, and has a summer home at Woodstock, Conn., where his ancestors came from.

Mr. Williams has been somewhat actively identified with the social and political life of Brooklyn for 20 years. He was elected president of the Brooklyn Young Republican Club during the memorable Blaine campaign of 1884, and held that office until after Mr. Harrison's election, has been several times tendered the Republican nomination for Mayor of Brooklyn, and Mayor Chapin wished to appoint him one of the Civil Service Commission, but he has always declined political office. He was a delegate to the Republican State Convention of 1891, where he nominated General Woodford for Governor, and was chairman of the Executive Committee of the State League of Republican Clubs in 1888.

Mr. Williams is president of the Brook-

The Officers of the Hardware Club of New York.

lyn Choral Society and corresponding secretary and a director of the New England Society. He is a member of the Young Republican, Montauk, Hamilton and Union League clubs of Brooklyn, and is also connected with other social, military and business organizations.

Despite his activity in social and political organizations Mr. Williams is a careful, energetic and exact business man, and few men are more diligent in the attention given to their business.

ROBERT H. SWAYZE.

Robert H. Swayze, the club's vice-president, is the secretary of the Plume & Atwood Mfg. Company, a representative concern in the manufacture of Brass and Copper goods. He has been associated with this company since 1885, and is now in charge of the business in this city. Mr Swayze has given much time and effort in the way of promoting the interests of the club and is a valuable acquisition to its roll of members.

THOMAS F. KEATING.

Thomas F. Keating was born in Pittsburgh in 1845, his parents having been among the early settlers in that city. Mr. Keating attended school until he was 16 years old, when he went to work for the firm of John Dunlap & Co., manufacturers of Stamped and Japanned Tinware, in that city. His first work was on a screw press, edging fruit can tops and bottoms at one cent per gross. Mr. Keating was subsequently graduated to the store, where he was made successively packer, porter and assistant shipping clerk. Four years were thus spent and then Mr. Keating engaged in the real estate business for about a year, when he received an offer from the contractor on the Hoosac Tunnel and Troy & Greenfield Railroad in Western Massachusetts, and entered his employ as bookkeeper and paymaster, with headquarters at Shelburne Falls, Mass. It was here that he made the acquaintance of the Messrs. Yale, as the lock factory was then located at that place. He spent two and a half years with Mr. Farren, and in 1869, entered the employ of the Yale Lock Mfg. Company, their New York office being at that time at 1 Barclay street, as their traveling salesman. His first sale of a Yale Lock was to Jos. Woodwell & Co. of Pittsburgh. The territory he covered embraced the United States and Canada, and his trip usually occupied the entire year. With the exception of about six months when he was in Boston handling the Time Lock trade, Mr. Keating spent nine years on the road. In 1878 he assumed the management of the Company's New York office at 53 Chambers street, and in 1880 he became a stockholder and director in the company. Mr. Keating is at present assistant treasurer of the company and manager of its New York warehouse, which is now at 84 and 86 Chambers street. Mr. Keating is married and has two children. He resides at 317 West Twenty-third street.

J. LEONARD VARICK.

J. Leonard Varick, the secretary of the Hardware Club, who has done yeoman service throughout the various stages of its organization and incorporation, was born in Poughkeepsie, N. Y. Graduating from Yale College, Class of '68, he connected himself with the Union Nut Company in New York in March of the following year, and has been with the company ever since, now filling the position of assistant treasurer. Besides being a director of the Miller's Falls Company he is identified with the following social organizations, viz.: The University Club, Colonial Club, Yale Alumni Association of this city and the Holland Society of New York.

Attractive Show Windows.

Successful hardwaremen, as well as those engaged in many other lines of similar business, says a correspondent, have come to recognize the fact that the art of window dressing is one which ought to be given a great deal of consideration. It has been the experience of the writer that those hardware stores which make an effort to attract the attention of the people profit thereby.

This is the age of display. Everything goes to prove the correctness of this statement. A good window display is good advertising, if that term can be used to express its effect. There are two hardware dealers, we will say, for illustration, in a certain city or town. One has a big stock, but it is all jumbled up together. Not only is there disorder, in fact, practically chaos, but there is also an ancient air about the place, sort of an "old curiosity shop," as it were. The dust here and there is sufficient evidence that something or somebody is behind the times. You might have passed by the store a year ago and the window would look familiar now, but the chances are that you would not take the trouble to look at it, unless intuitively or without being aware that you were so doing.

Unless somebody has been into the establishment to purchase a rat trap or fire shovel, the only one of which in stock was in the window, there has been no change, and the absence of the rat trap would scarcely be noticeable. If you asked the proprietor why he did not dress up his window he would probably inquire what was meant. Truly he sells something once in a while, probably enough to live on. He may be a very friendly sort of a man, too. Those who patronize him do so because they know him. But those who know him will pass away in time.

We come to another kind of a hardware store not many blocks away. The very contrast makes it noticeable. There is an air of the hustler about it—and the word "hustler" is a very good one to use in reference to the business men who are making a success. The second hardware store has no cobwebs about it. Everything in and concerning it is bright and attractive. Ten chances to one there is not so much stock in it, either, as there was in the first store. But there seems to be more. We go in and look around. Perhaps we did not want to purchase anything when we went in, but we see some sort of a useful device or article that is "just the thing," and we buy it. It is absolutely a pleasure to look around at the well-arranged and "up to the times" stock which Hardware Dealer No. 2 has put in, and not only put in but kept bright and shining. We see a number of articles which we make up our minds to purchase later. We are very well pleased with this hardware store.

But now the main point in this little informal argument is reached. What was it that brought us into hardware store number two? What was the magnet that attracted? The answer is a very simple one, when you stop to think a moment.

When we passed hardware store number one, we were not even drawn to note it particularly, and probably could not have told a moment after having passed it that we had actually passed it. But what drew us into the second hardware store was an attractive window. In that window the goods had some degree of an artistic form of arrangement that attracted the eye, and where the eye went the purchaser followed. The well-dressed window was the secret of the whole thing. It did what it was intended it should do, as far as we were concerned, and will probably do the same many times again. Perhaps to-morrow or the next day the window will be put in another attractive and new dress. There may not be a single new article used, either, but the man who runs that hardware store is an artist in his way. He will get trade wherever he goes.

Steel Shop Box.

The Shop Box shown herewith is offered by the Avery Steel Mfg. Company, Forty-third street and Stewart avenue, Chicago, Ill. The box, including body and handles, is made of one piece of steel, turned on the upper edge, and is provided with an aperture at each end for the insertion

Steel Shop Box.

of a hook for moving it around the shop. The boxes are made in three sizes, from 18 to 21 inches long, 10 inches wide and 5 inches deep, of 16 and 18 gauge steel. They are designed for use by nail mills, bolt and nut works, &c., for handling the small stuff about their works.

MEMORANDA.

LLOYD PADDOCK, the Preston Hollow, N. Y., hardware merchant, who is also postmaster, is about to enlarge his establishment and add a large building to it. He also expects to have a first-class tin shop, and will enlarge his store, and his stock will be increased.

L. V. GARDNER of Centreville Station, N. Y., is making a number of improvements in his hardware store, enlarging it and adding new features. He has secured the services of George J. Warren.

HENRY J. FEGAN, dealer in hardware at 14 Palisade avenue, Yonkers, N. Y., died suddenly on Wednesday evening, February 15. Mr. Fegan was the youngest of four brothers, the oldest of whom started a tinware business on the premises now occupied by the City Hall Hotel in 1850. The venture proving successful, he was subsequently joined by his three brothers. They purchased the land at 14 Palisade avenue and erected a three-story brick structure, where the hardware business has since been conducted.

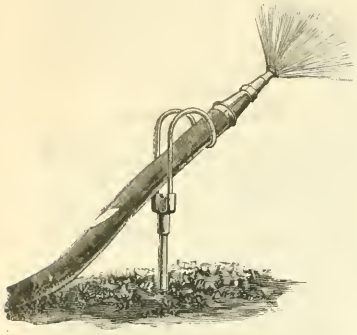
A financial writer remarks: Where the country is drifting in the matter of its currency is forcibly shown by comparing the ratio of note obligations payable in gold to the gold available for their redemption February 1, and upon the date nearest that of the Sherman silver act:

	July 1, 1890.	February 1, 1893.
Note obligations	$346,800,000	$474,800,000
Net gold in treasury...	19,500,000	108,200,000
Ratio gold to notes....	55 per cent.	23 per cent.

The gold balance has fallen 43 per cent., while the note obligations have increased 37 per cent,, all on account of the issue of $128,000,000 notes under the law of 1890.

Gem Nozzle Holder.

Gibbs Mfg. Company, Canton, Ohio, are putting an improved form of their Gem nozzle holder for sprinkling lawns on the market, as shown herewith. It is made of malleable iron and spring-steel wire, galvanized to avoid rusting. It is remarked that the hose is held firmly in the holder and can be adjusted to any elevation in an instant without the annoyance of thumb nuts or other contrivances. The



Gem Nozzle Holder.

point is made, that with the use of the holder water can be thrown where wanted, the position of the nozzle changed as desired without shutting off the water before approaching it, or without having to pass over wet grass, and that on small or narrow strips of lawn and garden the stream is directed to any desired point without splashing water upon other surfaces.

Improved Acme Steam-Jacketed Kettle.

The kettle herewith illustrated is manufactured by the Stuart & Peterson Company, Philadelphia, Pa., which embodies

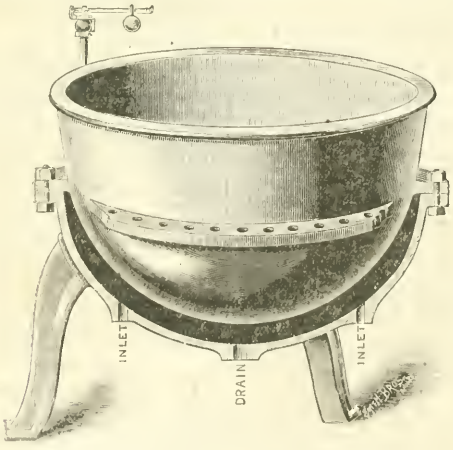


Fig. 1.—Improved Acme Steam-Jacketed Kettle.

improvements for this class of kettles. The point is made that the boiling commences midway or near the bottom, resulting in uniformity of the boiling process, obviating the boiling at the top and boiling over with other unsatisfactory results. The kettles are furnished with or without safety valves, the valve cut off to 60 pounds. The kettle is cut away in Fig. 1, showing the interior construction and the hight of the jacket, while Fig. 2 gives a sectional view. The kettles are designed for the use or butchers, canners, chemists, confectioners, curriers, hotels, paper manufacturers, printers, public institutions, soap manufacturers, varnish makers, &c., and are made in 10, 13, 24, 43 and 52 gallon sizes.

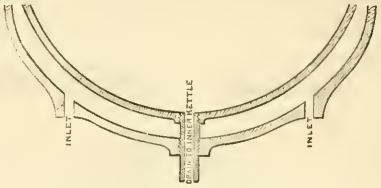
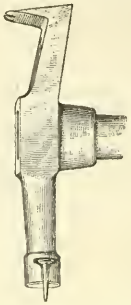


Fig. 2.—Sectional View of the Kettle Bottom.

The Richardson Tack Hammer.

Smethport Machine Company, Smethport, Pa., are offering the hammer illustrated herewith. A feature of the hammer is the peculiar shaped claw, the angle of which is such that a tack may be removed by simple downward pressure, and will remove closely driven tacks without injury to the base board or the surrounding wood work. The steel claw is ground to a sharp edge, and the manufacturers state that they will replace any hammer on which the claw has been broken by legitimate use. One grade of hammer is magnetized, and has a recess in the head corresponding in shape to a tack. This grade or style is designed for ceiling work, and for driving tacks where only one hand can be used. The unmagnetized grade is designed for all other kinds of work. The manufacturers remark that the hammer is perfectly balanced, and has a fine round handle, and, while not highly finished, is strong and durable, and a superior tool for a cheap hammer.



The Richardson Tack Hammer.

Murrin's Hat Rest.

The Murrin Hat Rest Company, 1515 South Jefferson avenue, St. Louis, Mo., are offering this article as shown in the accompanying cuts. The points of excellence claimed by the makers for the rest are that the hat is positively and firmly held, and not allowed to sway to the right or to the left; that the hat cannot come off, as its own weight locks it automatically between the upper and lower bars; that the hat when lifted to a horizontal position, goes off or on with ease; that there is nothing to catch and tear the lining of the hat, and that with a silk hat it is impossible to ruffle the fur in going on or off. The point is made that it preserves the shape of a hat in its original contour, and the hat is saved from the innumerable tumbles the ordinary hook inflicts, keeping it in shape to a good old age.

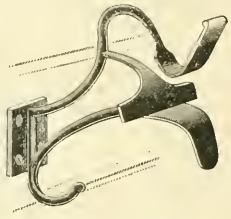


Fig. 1.—Murrin's Hat Rest.

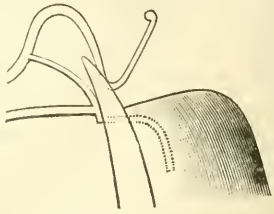


Fig. 2.—Hat Rest in Use.

THE FIRM of Van De Water & Burtiss, dealers in stoves, tinware, etc., at 152 and 154 Jay street, Schenectady, N. Y., have dissolved copartnership. Robert J. Van De Water has retired, and the business will be continued by Albert R. Burtiss. Mr. Burtiss is popular and has many friends who wish him success in continuing the progressive establishment.

Challenge Refrigerator Lock.

The refrigerator lock, the parts of which are shown in detail in the accompanying cuts, is made by the Challenge Corn Planter Company, Grand Haven, Mich., for whom B. B. Neal, 106 Chambers street, New York is agent. It is used only on their refrigerators. It is pointed out that the operation of the lock is the same as an ordinary spring bolt lock in opening and closing the door, with this addition, that a slight turn of the knob after the door is closed draws the door to a close, tight joint. The manufacturers claim that the lock is strong and durable, that the locking bolt catches automatically when the door is closed without the use of the hands, and that it has the qualification of easily drawing the door to a close, tight joint, thus preventing rattling and the escape of the cold air from the provision chamber.

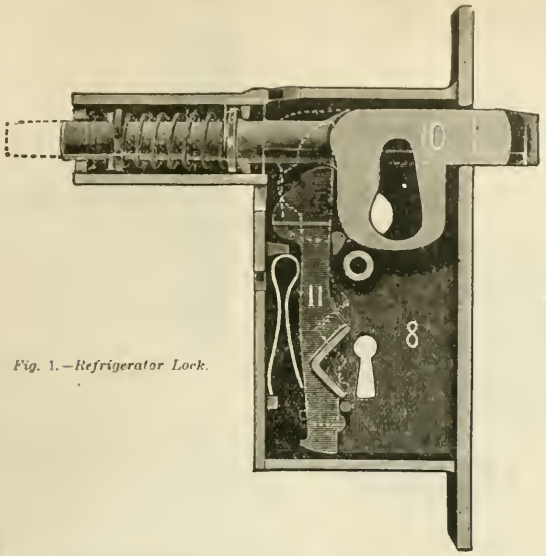


Fig. 1.—Refrigerator Lock.

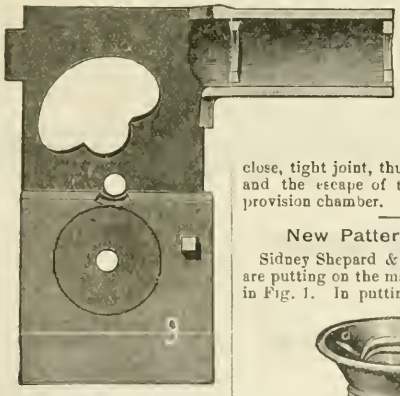


Fig. 2.—Lock Cop.

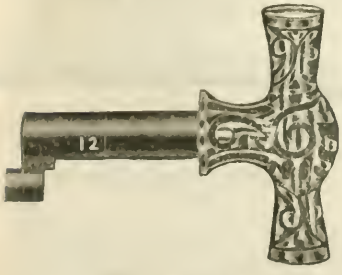


Fig. 3.—Handle of Lock.

New Pattern Milk Can.

Sidney Shepard & Co., Buffalo, N. Y., are putting on the market the can shown in Fig. 1. In putting the parts together, Figs. 2 and 3, the body is riveted in the side seams, and breast and bottom are offset, forming shoulders upon which the body rests. The shoulder on the bottom is designed to give support to the inside hoops and the body, making it, it is stated, impossible for the rivets to be sheared off in rough usage, or the soldered joints to be broken by the can being thrown down. The edge of the breast is folded completely around a reinforcing half-round rod, the whole overlapping the edge of the body. The cans are furnished made up, or the stock complete, with the bodies squared and punched, to be constructed in the tin shop. The can is especially designed to supply the demand for a cheaper can than their Buffalo milk can. The manufacturers remark, however, that by means of patent devices they have been able to secure a strength and resistance which renders this can unusually serviceable.

Fig. 1.—New Pattern Milk Can.

Fig. 2.—Body of Milk Can.

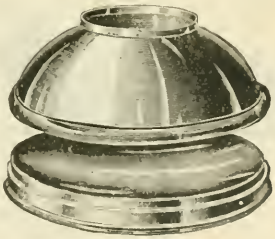


Fig. 3.—Breast and Bottom.

Avery's Never-Leak Steel Hods.

The accompanying illustrations represent hods manufactured by the Avery Steel Mfg. Company, Forty-third street and Stewart avenue, Chicago. The hods are made from one piece of 18-gauge steel, reinforced on the edges and at the dumping

Fig. 1.—Never-Leak Steel Mortar Hod.

point, the ends of the bodies being fastened together by a peculiar method. The fork and shoulder saddle, as shown in Fig. 1, is of malleable iron, to which cloth may be attached if desired, on the under side

Fig. 2.—Mortar Hod with Wrought-Iron Fork.

of the saddle. The socket is arranged to hold the hardwood handle, and to take up any shrinkage; or to replace a broken handle. In Fig. 2 the forks are made of wrought iron and the shoulder saddle of

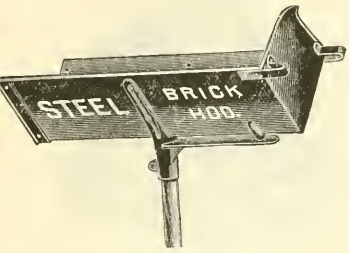


Fig. 3.—Steel Brick Hod.

wood, these being attached to the body of the hod, as shown in the illustration. Hardwood handles are also used with this hod, and broken handles may be replaced. The manufacturers claim that the hods are water tight, and are 25 to 50 per cent. lighter, when in use, than the common wooden hod; also, that the malleable iron fork and shoulder saddle make it easier for the user to carry. The brick hod shown in Fig. 3 is made with malleable-iron fork and shoulder saddle, also with wrought-iron fork and wood saddle, as in Fig. 2. The hods are furnished either black or galvanized, and are shipped knocked down.

Nonpareil Ratchet Wrenches and Combinations.

The Keystone Mfg. Company, 312 Terrace, Buffalo, N. Y., are introducing these goods, which are illustrated in the accom-

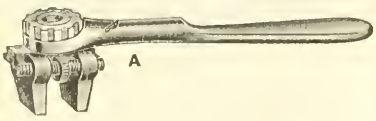


Fig. 1.—Nonpareil Ratchet Wrench.

panying cuts. These tools are described by them as made of the best material, highly polished and nickel-plated throughout and of excellent mechanical construction. The tools are designed to be used in combination; combination No. 1 including those shown in Figs. 1, 2, 3 and 4, except that only two of the sockets in Fig. 4 are included in the price for the combination. Socket B, Fig. 4, is for screw-driver bit or reamer shank and is used with the wood handle, Fig. 2.

Fig. 2.—Wood Handle.

Socket D, the bottom one shown in Fig. 4, is for drill shank and is used with the feed nut, Fig. 3. The center socket in Fig. 4 is for Morse taper shank drills and is used with feed nut, Fig. 3, but is sent only when ordered. The socket attachments are made to take different sizes of bit, drill and reamer shanks, and are quickly and easily adjusted in the wrench. The wrench, Fig. 1, is 9 inches long, having jaws which open from $\frac{3}{16}$ to $1\frac{1}{4}$ inches, ad-

Fig. 3.—Feed Nut.

justed and regulated by a right and left screw by means of the thumb nut A, with right and left hand ratchet. The shank of the socket is passed between the jaws of the wrench and up through the circular hole in the ratchet plate, when the jaws are closed firmly with the thumb nut A. The top of the jaws are thus brought under the shoulders of the socket, firmly locking the attachment in the wrench. In using socket B, Fig. 4, the wood handle C is placed upon the socket and the thumb nut screwed down, thereby securing it while in use, as shown in Fig. 5. In using the

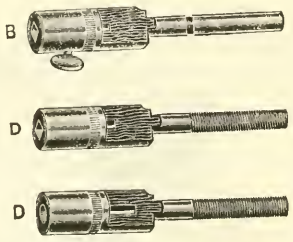


Fig. 4.—Bit and Drill Sockets.

drill attachments D, either square or Morse taper, the socket is attached in the same manner, but the feed nut, Fig. 3, is screwed down on the socket, forming a complete drill, Fig. 6. The wrench may be made reversible instantly without removal from the work simply by throwing over the lever in the slot of the handle, which changes the direction of the ratchet.

The wrench may be used by itself for hexagon and octagon nuts, and also for square nuts. The combination, Fig. 5, may be used to advantage in many places as a wrench for small nuts; for instance, on the nuts inside of wheel felloes, &c. The tools can be used successfully at almost any angle, or in any position, and are referred to as being adapted to the uses of engineers, machinists, boiler makers, electricians, plumbers and gas fitters, millwrights, agricultural implement manufacturers and dealers, carriage and wagon makers, wood workers, &c. Owing to the peculiar and improved mechanical

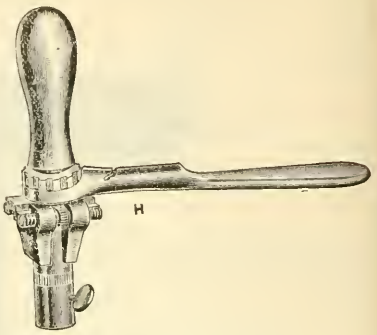


Fig. 5.—Bit Socket and Handle Combined.

construction of the tools, the manufacturers claim a great degree of strength, durability and latitude of usefulness, with handsome finish. A combination, known as Mammoth No. 5, is made similar to combination No. 1, only larger, constructed especially for heavy work, such as boiler making, bridge building, &c., and general heavy machine work. Combination No. 3 is wrench, Fig. 1, with a

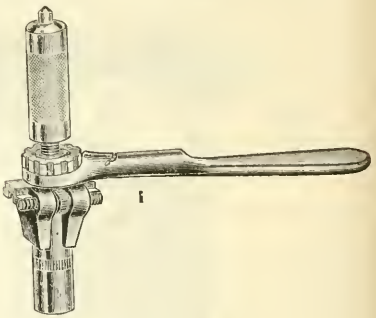


Fig. 6.—Drill Socket and Feed Nut Combined

drill attachment, feeding with a screw instead of a nut, as in No. 1 combination. It is designed especially for light work in limited space, and is furnished with a square socket only. The round jaw, No. 2 wrench, Fig. 7, without combination, is intended especially for use on axle nuts of carriages, buggies, wagons, &c., also

Fig. 7.—Round Jaw Nonpareil Ratchet Wrench.

for the various requirements of all agricultural implements and machinery and for domestic purposes. The jaws of this wrench are adjusted the same as Fig. 1, and the wrench is also made in a No. 5 round jaw, on exactly the same principle as Fig. 7, only of increased size.

STOVE TRADE NOTES.

Misleading Directions.

From T. I. P., *Springfield, Mass* — By carefully studying all of the ideas advanced in my line I have been able to find the true cause of many effects and successfully avoid their consequent annoyances. Nothing that I have read of late has so impressed me as capable of possible harm as some of the laws laid down in the two circulars, for the benefit of stove dealers, prepared as the result of special provision made at the last Convention of the National Association of Stove Manufacturers and appearing in the last issue of *The Metal Worker* under the head of "Chimneys and Drafts in Operating Stoves." In my opinion the last assertion in the circular entitled "Directions for Operating Stoves," given below, is far from correct:

"It is possible that the draft of the chimney is so strong as to carry the heat so rapidly round the oven as not to be absorbed by the plates, and the oven fails to heat sufficiently from that cause. A damper in the pipe will relieve this."

All of my force think this pretty rank, yet, when it is the result of a special provision of the National Association of Stove Manufacturers for a preparation on the subject, some credence must be accorded to it. If that body will set up a cooking stove in the foundry of one of its members and arrange to connect it with the blower to the cupola, the wind will be sent through that stove faster than any chimney will make it go. If a good fire is built in this stove and care is taken to get a good solid body of live coals either from hard or soft coal, coke, corn cobs or wood and the blower started, "the plates will absorb the heat" so quickly as to blister your finger in a few seconds after the blower starts and will continue to absorb and blister the faster the blower blows until the contents of the fire chamber are all blown clear around under the oven, and won't cease to absorb and blister until the coals are blown clear out of the stove if the blast is strong enough, the current fast enough and lasts long enough. Such a trial would demonstrate my opinion to be wrong or the fallacy of the authority which produced and presented such a rule.

I believe no draft can be too strong which can be controlled and prevented from overheating. In an ordinary chimney often the draft is so strong that the bottom of the oven is so hot that bread will burn on the bottom and fail to bake properly. The housewife prevents this by closing the drafts in front and setting the bread upon an ordinary sad-iron stand so it does not come in direct contact with the excessively hot plates.

The damper in the pipe, as suggested, will help to prevent overheating, but will never help to heat.

This rule would tend to create an impression that some chimneys are too good rather than impress the fact that most chimneys are too bad, as the second circular suggests in stating, "There are more bad chimneys than good ones."

The second circular, which has the approval of the same authority, sets in a separate sentence, as an assertion, the following:

"A stove can no more operate without a chimney than a steam engine can operate without a boiler."

If the word "operate" with the stove meant do its best, and the word "good" was inserted before chimney it would be more nearly correct, but as it is, it is all wrong, and leaves this impression on the mind of those who have yet to accumulate an experience. The chimney, like all chimneys, is claimed by its owner to be good, consequently if the stove don't work the whole fault must be with the stove, especially if all the other suggestions of the two circulars have been complied with, which is, of course, all wrong. Letters from members of this very body have told us when a stove would not work at a chimney to take the stove out of doors and impress on the buyer that the stove would do spendid service when not hampered by a bad chimney. This shows that some makers do not believe a chimney is as essential to a stove as a boiler is to an engine, to which it is indispensable.

Stoves giving excellent results when standing out of doors with no other chimney than a piece or two of pipe refute the assertion positively and can be found in any community. Some of the other rules differ from my experience and practice, but as they are not likely to create wrong impressions that may cost the dealer dollars by leaving second-hand stoves in his stock, they do no harm. Aside from these criticisms the circulars are as capable of good as their intent.

If such a step had been taken years ago many a dollar would now be resting where it ought to be, instead of having been wasted through the unnecessary expense caused by the lack of this information.

ODD PLATES.

THE STOCKHOLDERS of the Dighton Furnace Company, North Dighton, Mass., held their annual meeting on February 15 and elected S. N. Staples, president; F. P. Leonard, agent and treasurer, and J. F. Dunlap, clerk. These officers, with A. W. Parker, Lewis Williams and H. M. Staples, constitute the board of directors. The salesmen of the company are A. J. Dunlap, Frank K. Frost and F. P. Leonard. We understand that the company have under construction some new patterns which will surpass anything that they have ever before attempted.

THE ART STOVE COMPANY of Detroit, Mich., have just completed the purchase of additional property on Milwaukee avenue, on which they propose erecting a new foundry building. The improvements contemplated cover a new foundry building 257 feet long by 128 feet wide, to be erected in the most substantial manner and to be equipped with all modern improvements. The plant of the company now fronts on Russell and Rivard streets, Milwaukee avenue and the Boulevard.

THE CORTLAND HOWE VENTILATING STOVE COMPANY of Cortland, N. Y., issue an announcement to the effect that, it having come to their knowledge that certain persons have visited different places in New York and other States, with the avowed object of locating a branch of the company named, or to organize a company for the manufacture of the Howe ventilating stoves, they desire to say that they are not contemplating a removal or the locating of a branch of their works in any other place. They also state that no one has been authorized to act for them in any business having such an object in view. They emphatically declare that they own and control, absolutely, all patents under which the Howe ventilating stoves are, or ever have been, made, and that they will not permit the manufacture of their stoves by any other company, the infringements of their patents, or the violation of any of their trade rights.

THE DIFFICULTY between the Clinton Foundry Company of Troy, N. Y., and their molders, in regard to prices on some new work, has been left to the officers of the International Executive Committee of the Molders' Union to adjust. It is understood that everything will be satisfactorily settled.

THE PORTSMOUTH STOVE & RANGE COMPANY of Portsmouth, Ohio, refer to their Model wrought-steel range as possessing many valuable features, and as meeting with a very gratifying reception at the hands of the trade. It is provided with patent oven door device and an improved fire box, which is so arranged that the ashes cannot back up and burn out the linings after being in use for a short time. The company are also producing a line of hard cold-steel ranges with duplex grate and tile linings, together with an assortment of goods having incased low-down reservoirs.

AT THE ANNUAL MEETING of the stockholders of the Fuller & Warren Warming and Ventilating Company of Troy, N. Y., Gordon G. Wolfe, Wiltsie F. Wolfe and William Henry Warren were elected directors for the ensuing year. Votes representing 1000 shares of stock were cast.

AT A RECENT MEETING of the stockholders of the Excelsior Mfg. Company of St. Louis, Mo., Giles F. Filley, Charles F. Filley, Frank Filley, Robert E. Filley, and George D. Dana were elected directors.

ACCORDING TO A RECENT ISSUE of the Taunton *Gazette*, White, Warner & Co. of Taunton, Mass., are making preparations to enlarge their works. We understand that 30 hands are now given employment, and that the increased capacity will provide room for double this number, and for the turning out of 50 stoves a day.

J. S. VAN BUREN, head designer and chief of the pattern department of Rathbone, Sard & Co., Albany, N. Y., was recently awarded several prizes on photographs exhibited at the show of the Albany Camera Club. He is one of the prominent members of the club.

THE BACKUS MFG. COMPANY of Williamsport, Pa., have leased one of the stores in the new Yates building at Syracuse, N. Y. They have filled it up with a handsome line of their heaters, of which there are said to be over 9000 now in use. Gas is the fuel used, and the construction of their grates and mantels is very artistic in design. Mr. Lottingham is the manager of the Syracuse branch.

THE PERRY STOVE COMPANY of Albany, N. Y., have resumed operations at their extensive plant on the island below that

city, having completed repairs and inventory. Superintendent Liddle says there is every indication of a good year's business. A healthful feeling seems to prevail among the trade generally, auguring a profitable year. The company have some new goods in preparation which they hope to be able to offer the trade in the near future. They started in this year with more men than they did last and are satisfied with the outlook.

GEO. H. BARBOUR, vice-president and general manager of the Michigan Stove Company, Detroit, accompanied by Mrs. Barbour, has gone to Florida to spend a month for the benefit of his health, which has been slightly impaired by a severe cold, contracted several weeks ago. During his stay in the South he will visit St. Augustine, Tampa Bay, New Orleans and other leading points of interest.

THE NATIONAL VAPOR STOVE & MFG. COMPANY of Cleveland, Ohio, are offering the New Idea vapor stove in an improved form for 1893. In referring to this construction, the manufacturers state that there is no smoke in lighting, no odor when running or extinguishing the burners, and that the latter can be readily lighted by any one. It can be easily taken apart, even to the burner, by the use of a screwdriver. The principle involved is the same as that embodied in last year's construction, but the operation is somewhat different. The manufacturers state that their regular line has also been improved, and that they have ready for the trade a high and low junior stove of new construction embodying many features of merit. They state that on account of the extreme cold weather they have been delayed in getting into their new works, and so will continue manufacturing in their old establishment until they can move without detriment to the trade.

ANOTHER PUZZLE has been issued by the indefatigable puzzle maker of the Michigan Stove Company. This time it is a diagram representing a prison containing 36 cells, connected with each other by doorways. The puzzle is how to get from a corner cell to the one diagonally opposite, entering each cell but once. The key is not published on the card, but is furnished on application to the Michigan Stove Company. The reverse of the card is devoted to a very pretty picture of childhood, lithographed in colors.

WE LEARN that E. J. Cridge, recently associated with the Michigan Stove Company, Detroit, Mich., has severed his connection with that concern.

THE PETITION of Judge John Gutmann, receiver of the property of the Albany Stove Company, Albany, N. Y., to sell the concern's effects has been granted by Supreme Court Justice Herrick. The receiver recites in his petition that by an order of the Supreme Court of November 29, 1892, the Albany Stove Company were dissolved and the petitioner appointed receiver. The company own real estate in Albany consisting of a foundry, mounting shop, engine room, storage room, pattern shop, office and manufactory. Claims against the company for $19,500 have been filed. There is a mortgage on the real estate held by James H. Carroll, ex-president of the company, and John W. McNamara, for the sum of $10,000, to secure them to that amount as indorsers of certain notes which are now part due, the amount being included in the $19,500 debts. The receiver stated in his petition that he considered it advisable to dispose of the property as far as possible as a whole and not piecemeal. The order to sell requires the receiver to give 14 days' notice of such sale. It seems to be the opinion that the excellent and practically new plant of the dissolved Albany Stove Company will be taken up by some enterprising men here and again put in operation. The concern have splendid facilities for making stoves.

A Unique Advertisement.

Among the enterprising stove concerns in the Northwest is the firm of Evenson Bros. of St. Peter, Minn. The members evidently believe in the use of printers' ink, and endeavor to put what they have to say before the public in a manner to attract their attention. In a recent issue of the St. Peter *Herald* is presented an advertisement decidedly unique in its way, and which we consider of sufficient interest to reproduce herewith. It may contain suggestions and convey hints of value to others engaged in the stove business.

They OWN THE Earth!

When In Doubt ..... Scribblers
USE A GARLAND STOVE.
Press the Button ..... Kodak
A GARLAND STOVE WILL DO THE REST
For that Tired Feeling ..... Hodd
GET A GARLAND STOVE.
Don't be a Clam ..... Siddall
BUT BUY A GARLAND STOVE.
Has Cured Others will Cure You ..... Ayer
OF CARE—A GARLAND STOVE.
Good Morning have You used ..... Pears
A GARLAND STOVE.
Greatest Speed Consistent with Safety.. Penn. R. R.
SECURED WITH A GARLAND STOVE
Grateful and Comforting to Housekeepers.... Epps
A GARLAND STOVE.
Best and goes Farthest ..... Van Houten
TRUE OF A GARLAND STOVE.
Yours for Health ..... Lydia P.
SAVED BY A GARLAND STOVE.
If you See it in the Sun ..... Chas. A.
TIS AN AD. OF GARLAND STOVES.
Keeping Everlasting at It ..... Ayer N. W.
IS UNNECESSARY WITH A GARLAND STOVE.

Test of an Open Gas Fire.

In a late issue of the *Gas World* was reprinted a record of a test of an open gas fire made by B. H. Thwaite, and concerning which he says:

The following is a record of a careful test to determine: 1. The efficiency of the gas fire in transmitting the heat produced. 2. In establishing an equable temperature. 3. To ascertain the cost in gas to heat a given volume of air. The date of the test was October 10, 1892—a sunless, autumn day. The gas was the ordinary 15 75 candle power quality, and was introduced to the gas fire at a pressure of $\frac{13}{16}$ inch of water. The rate of consumption was 22 cubic feet per hour. The test was conducted in a room, Fig. 1, of the following dimensions: Internal length, 18 feet 6 inches; internal breadth, 13 feet; and internal hight, 11 feet 5 inches; cubic capacity, 2765 75 cubic feet. Two sides and part of the third side of the room are outside glazed walls, exposed to the atmosphere—these walls being built up of timbering. In the room there were sundry benches and tables, and parts of gas lamps, a photometer and a small gas holder. The rate of flow of the gas was checked by an accurate standardized meter, equipped with a pressure gauge. Ordinary Fahrenheit graduated mercury thermometers were placed at various positions in the room, to determine the uniformity of heating of the system. The zone of combustion was 1 foot 6 inches above the floor, the gas fire being raised to this extent. The products of combustion were delivered outside the room by means of a 4 inch diameter tube. Thermometers were also placed externally. It was intended to determine the flow of air into the gas fire, but the anemometer indications were untrustworthy, owing to the imperfection of the instrument. Two persons were in the room during the test, the duration of which extended from 2.20 p. m. to 5.10 p. m.

Temperature Determinations.—To obtain an adequately accurate judgment of the heating effect, the temperature was registered at 16 points on four semicircles drawn around the gas fire, the front central face of which formed the center of the semicircle. Besides the positions named, temperatures were observed at varying heights of 2 feet, 4 feet and 5 feet, respectively, above the floor level. Determinations were also taken near the ceiling, and on the inside of the three walls at the hight of 8 feet from the floor level. There was not any firing back at any of the times when the gas was suddenly extinguished. The appearance of combustion and of the refractory lumps was almost ideally like an open blazing coal fire, and the temperature opposite the front face of the fire was even too hot to be comfortable. The efficiency of the gas fire, measured according to Carnot's law, varied between the two limits of 196° and 256° final temperature. Accepting 2000° as the temperature of combustion, the calculation of Carnot's law gives the efficiency of 80 per cent. in one instance, and 90.5 per cent. in the other. The results are shown graphically in Figs. 2, 3 and 4.

Actual Expenditure of Gas.—This equaled (2 66 hours by 22) = 58 52 cubic feet. If we take the thermic value to be 700 units per cubic foot, the expenditure runs up to 700 × 58 52 = 40,964 units.

We will now approximately determine the distribution of this heat. (No allowance is made for the human absorption of heat, because the general temperature never exceeded that of blood heat). If we take the average final temperature of the air to be 80° F., then the increase of heat from 59° initial temperature would be 80° − 59° = 21°.

Then 21 × 2765 75 = 58 080 75,

and taking 0.2375 as the specific heat factor of the air, the absorption equals 13,795.

$$\text{Then } \frac{13\,795 \times 100}{40,964} = 33.6 \text{ per cent.}$$

Proportion absorbed in waste gases—

$$\left(\frac{190 + 250}{2} = 220\right) - 59 = 161°, \text{ then}$$

$$161 \times (58.52 \times 5) \times \underset{\text{sp. ht.}}{0.2230} = 10,505.$$

The percentage loss

$$= \frac{10.505 \times 100}{40,964} = 25.6.$$

Recapitulating, we can now ascertain the exact proportion of heat absorbed in raising the temperature of air insensibly flowing through the room and in addition to that required for the combustion of the gas. This equals

$$(13,795 + 10,505) - 40,764 = 16,664$$

Now, as a proportion of this heat was wastefully absorbed by raising the temperature of the air above 80° or to 100°, there-

fore the net value of the heat utilized efficiently

$$= 13{,}795 + \frac{(13{,}975 \times (190° - 80°))}{190°} =$$

$$13{,}975 + 8715 = 23{,}442.$$

Then the total net efficiency

$$= \frac{24{,}838 \times 100}{40{,}964} = 57 \text{ per cent.}$$

The usual thermic efficiency is therefore satisfactory, allowing for the internal work necessary for combustion and the thermodynamic value absorbed in removing the air from the room. And were economic or cheap fuel gas supplied, there would not be much margin left for improvement

In your last issue your correspondent B. H. Thwaite, C.E., F.C.S., &c., has, I really believe, surpassed himself; for I have not the least idea where to look for such an example of egotistical abuse of science.

Among other things, he talks, as he has done before, about "Carnot's law," whereas, properly speaking, there is no such thing. There is a function known as Carnot's, of which he pointed out the existence, but failed to discover the form thereof, and it has nothing whatever to do with the question at issue.

Neither has the formula $\frac{T_1 - T_2}{T_1}$, which I imagine your correspondent is running

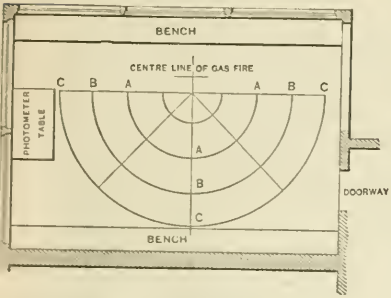


Fig. 1.—Plan of Testing Room.

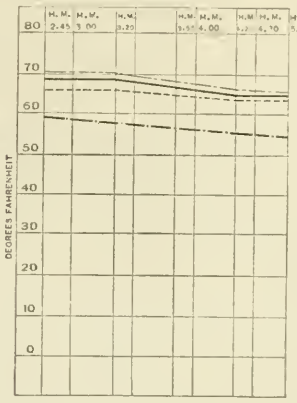


Fig. 2.—Diagram of Vertical Temperatures.

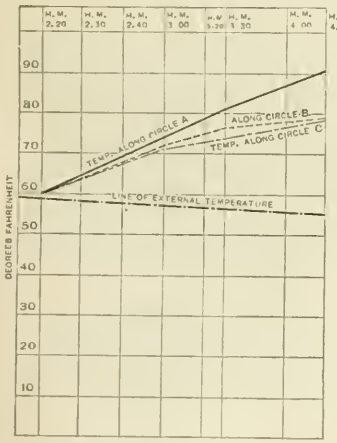


Fig. 3.—Diagram Showing Temperatures on the Semicircles A, B and C in Fig. 1.

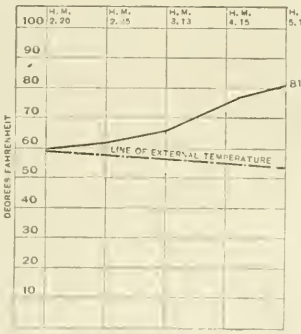


Fig. 4.—Diagram Showing Rise of Temperature Near Ceiling.

But it would take too much of your space to expose all the other evidences of absolute incapacity to deal with his subject on the part of B. H. Thwaite, though there are two which are exceedingly racy, and beat anything that I ever came across in my life, and which is saying a good deal.

Your correspondent tells us that the expenditure of gas was 22 cubic feet per hour for 2 66 hours, whereas there are 2¾ hours between 20 minutes past two and ten minutes past five This does not matter much, however, and I will assume, as correct, that there were 40,964 units of heat expended in so far as gas consumption is concerned.

Mr. Thwaite then says, "We will now approximately determine the distribution of this heat;" and he also notes that "No allowance is made for the human absorption of heat, because the general temperature never exceeded that of blood heat." I should think not indeed, considering that, according to M. Dumas, two average human beings give out, and not absorb, 382 units per hour, or for 2¾ hours 1082 units. Now comes the masterpiece. B. H Thwaite takes the volume of air at 2765.75 cubic feet, multiplies this by 21, the rise in temperature, and by 0.2375, the specific heat of air under constant pressure. The result, as he correctly remarks this time, is 13 785, which he considers as units of heat, totally ignoring the fact that 0.2375 is the decimal of a unit of heat that is required to raise a pound and not a cubic foot of air through 1° F. at constant pressure.

A pound of air at, say, 70° F. and ordinary atmospheric pressure occupies a volume of about 13.3 cubic feet, and, therefore, your correspondent's figure, 13,795, must be divided by 13 3 to give the number of units of heat required to raise the temperature of the 2765 75 cubic feet of air in this room by 21° F. This, in round numbers, is 1004 units, or actually less than that supplied by the respirations and bodies of the two men in the room; so away goes Mr. Thwaite's first efficiency of 33 6 per cent. Without the presence of the men it could only amount to 2 45 per cent.

He makes just the same blunder almost immediately afterward, besides assuming that the volume of the air supplied to the fire is only slightly more than four times that of the gas consumed. This is very absurd; for air to the extent of four times the volume of the gas, we well know, would not even be capable of completely burning it, and an enormous quantity in excess of that required for complete combustion always passes through and over an open fire. Twenty-four times would be much nearer the actual truth, as is evidenced by the low temperature of his products of combustion.

Assuming this, however, and it is all in favor of Mr. Thwaite's great efficiency, we have the fact that 58 52 × 25, or 1463 cubic feet per hour of, practically speaking, air is taken into the room at 59° and discharged into the chimney at a mean of 220°, representing for 2¾ hours 12,190 units of heat expended, while only that portion of it which is employed to heat up the incoming air to the temperature of the room—viz., 1590 units, or about 3.0 per cent. of the total heat of combustion of the gas—can be considered to be useful, and that mainly on the score of ventilation.

So much then for the efficiency of 57 per cent., which dwindles down to a possible 2 45 + 3 9, or 0 35 per cent if no one is in the room. Surely we are not so far gone in these days of science as to fondly imagine that the heating of a room depends upon the heating of the air that was primarily in it and of that which afterward passes through it.

If Mr. Thwaite understood anything at

TEST OF AN OPEN GAS FIRE.

on this kind of gas fire, which, while having the open-glow characteristics so dearly beloved by Englishmen, is essentially scientific and healthy. No part of the stove in contact with the air of the room can become sufficiently hot to cremate the organic suspended matter always present in the atmosphere, and whose contact with ordinary closed gas fires sets up the disagreeable odor of organic cremation.

MR. THWAITE CRITICISED.

In a following issue of our contemporary Anthony J. Bower publishes a letter severely critical of Mr. Thwaite's test, which we reprint below. The letter points out some errors, but is unfortunately personal to an inexcusable degree:

his head against. All that he requires is merely a little schoolboy's arithmetic, without any necessity existing for the consideration of absolute temperatures. The efficiencies of the gas or stove fire, still retaining Mr. Thwaite's erroneous method of putting the matter, would then be 0 932 and 0 875, not 0 8 and 0 905, as he says. But then B. H. Thwaite is far above schoolboy's arithmetic, since a little later on we are told that

$$(13{,}795 + 10{,}505) - 40{,}764 = 16{,}664.$$

I recommend this result as a convenient one for various fraudulent societies, as it might help them out of their difficulties when such have to be seriously encountered.

Again, we have 13,975 + 8715 = 23,442.

all about his subject he would know that nearly all the remaining available heat, or 40,964 — 12,190 = 28,774 units, is expended, firstly, in heating up the walls and windows, and afterward in maintaining a certain desired temperature within the room against the outflow of heat continually taking place through the walls and glass. This it is that constitutes the main useful work of the fire.

I recommend your correspondent to study a practical treatise on heat by Thomas Box before he again inflicts upon us his ideas about heating rooms with open gas fires. Either Mr. Thwaite's arithmetic or carelessness is abominable, and such an exhibition as this last is a disgrace, not only to science, but to Englishmen generally, for foreigners are not slow to take advantage of, and jeer at, such things.

There are many readers of the *Gas World*, and of other scientific papers, who think that some restraint should be placed on this gentleman's gaseous ebullitions, and, to use his own words, there may not have been "the disagreeable odor of organic cremation" round about this gas stove, but there certainly must have existed in the room the very offensive one of cremated common sense.

Strikes in New York State.

The annual report of Labor Commissioner Peck, recently issued, presents an interesting table, showing the number of strikes which occurred in various establishments and industries in the State of New York during the year 1892, with the number of persons involved in them. The information given is the result of a systematic investigation made by the Labor Bureau of the State of New York, and is summarized as follows, each strike representing a separate establishment:

Total number of strikes	1,768
Of these were	
Successful	1,138
Unsuccessful	596
Compromised	28
Pending	6

The total number of persons involved is given as 25,764, or an average of 14.57 individuals to each strike. Final returns are still to be rendered for about 250 minor strikes, in as many establishments, but these will not materially affect the results given as to the number engaged in them and the proportion of successful and unsuccessful.

We extract from the table and present below such information as directly affects the interests represented in *The Metal Worker:*

Trade or industry.	Number of establishments involved in strike.	Number successful.	Number unsuccessful.	Number of persons engaged.
Cement masons' laborers	71	54	17	1,108
Elevator constructors	25	22	3	577
Engineers (stationary)	5	1	4	6
Foundrymen	1	..	1	82
Galvanizers	1	..	1	20
Gas fitters	16	8	8	59
Iron workers (architectural)	8	6	2	285
Iron workers (molders)	1	..	1	35
Machinery constructors	1	1		20
Machinists	3	..	3	47
Pattern makers	1	..	1	8
Plumbers	3	2	1	21
Roofers (slate and metal)	11	9	2	74
Skylight and cornice makers	10	8	2	48
Steam fitters	42	34	8	171
Steam fitters' helpers	42	35	7	199
Tile layers	31	28	3	232
Tile layers' helpers	30	27	3	210
Tin and sheet iron workers	14	7	7	62
Tinware makers	1	1	..	250

Manufacturers' Perplexities.

The Western jobbers and Eastern manufacturers of standard hardware have encountered a difficult problem. The trouble has grown out of the rapid development of important jobbing centers along the upper Mississippi and Missouri rivers and even further West. As long as Chicago and St. Louis houses dominated the West, even serving as depots for the supply of small jobbing houses on the frontier of civilization, there were no conflicting interests to disturb the relations of manufacturers and jobbers. Chicago, of course, resented the ambition of St. Louis in sending traveling salesmen into Northern Illinois, Wisconsin and Minnesota, while St. Louis felt aggrieved when Chicago salesmen were encountered in Southwest Missouri, Arkansas and Texas. Certain territory seemed to belong naturally to the merchants of a particular city. Its invasion by the representatives of a rival city was, however, a matter which concerned only the jobbers and did not involve the manufacturers.

The upper Mississippi and Missouri river jobbers have now become of sufficient consequence to change the situation very materially. They refuse, and have refused for some time, to regard themselves as secondary to Chicago and St. Louis, demanding to be placed on an even footing with the merchants of those cities and claiming territorial rights over trade.

The consequence is that manufacturers have been obliged to concede to their demands and to make prices lower for delivery to these comparatively new jobbing centers than the Chicago or St. Louis price, with freight thence added. In some instances it is known that Omaha, St. Joseph, Kansas City and Sioux City jobbers have secured Chicago or St. Louis prices on their deliveries. They are thus able to sell in competition with Chicago and St. Louis not only further West, as heretofore, but also to the eastward in territory in which their influence had been felt but slightly. It is not surprising that a vigorous protest is uttered by the Chicago and St. Louis merchants against the manufacturers' action in building up still further their young but active competitors.

Manufacturers say that the matter cannot be adjusted in any other way. They are not animated by any spirit of hostility to the jobbing interests of Chicago and St. Louis, but are compelled to recognize the growth of the wholesale trade in what were once known as frontier cities, but are now centers of populous sections. They are obliged to meet new conditions which they have not created, but which they find springing up. On the other hand, they say, if they were to adhere to a rigid policy of billing goods on board factory, with buyers paying freight thence to their own cities, they could be justly charged with refusing to acknowledge the importance of any jobbing center whatever.

Another consideration probably exists for the policy which they have adopted. By making prices for goods delivered in the far West as low or nearly as low as if delivered in Chicago or St. Louis, a strong incentive for the establishment of competing factories is removed. Manufactures are pushing West with sufficient rapidity now and the stimulus of very high prices, if full freight rates from factory were borne by jobber or consumer, would accelerate the movement unpleasantly for those who now have their money invested in such factories. It cannot be disputed that a fixed price to all comers, "f.o.b. factory," would be an ideal arrangement if it could be maintained, as all sections and all jobbing centers would then be placed on an even footing in their own immediate territory. But to complete such an ideal arrangement, a much more ideal condition would be necessary, namely, that there should be no change in the character of manufactured goods, no development of new manufacturing enterprises and particularly no springing up of competing manufacturing enterprises in the West.

A STANDARD PRICE LIST, possessing novel features, has just been issued by Randolph & Clowes of Waterbury, Conn. It embraces their Seamless Drawn Brass and Copper Tubing, Sheet Copper Brass and German Silver, Brazed Tubing, Moldings, &c. To illustrate the general arrangement of the price list, we will take a page of Seamless Drawn Brass and Copper Tubing. This is arranged in seven columns, the first giving the outside diameters, the next three giving "extras over basis price per pound," the "approximate weight per foot No. 8 Stubs' gauge," and the "approximate weight per foot No. 6 B. & S. gauge" for Brass Tubing. The other three columns give the like figures for Copper Tubing. All are printed in black ink, except the two columns giving B. & S. gauges. Pasted in the book at the beginning of this list is the basis price of Brass and Copper, 16 and 19 cents respectively. The figures in the column headed "extras over basis price per pound" are to be added to the basis price. Thus to find the cost per pound of 1 inch Brass Tubing No. 8 Stubs', or No. 6 B. & S. gauge, we add 6 cents to the basis price of 16 cents, getting 22 cents as a result. The main advantage derived from this arrangement is that, should any fluctuation in the market make necessary a change in the basis price, a new basis slip could be sent to customers to take the place of the old one, all the rest of the price list remaining unchanged.

THE THOMPSON MFG. COMPANY, Cleveland, Ohio, issue a notice to the trade that they have opened a New York office at 136 Liberty street under charge of G. M. Maicas, who is the Eastern sales agent. Mr. Maicas has had lengthy experience in this line of business, and is prepared to answer all inquiries. He can furnish an illustrated catalogue of the Thompson Mfg. Company and give prices on corrugated iron and iron and steel roofing, siding, &c. The territory under the direct control of the New York concern includes Eastern New York, New Jersey and the New England States.

The California Legislature has passed a bill appropriating $100,000 for the maintenance of a nautical school at San Francisco. Graduates of the school, it is expected, will obtain positions as junior officers in the merchant marine on the Pacific Coast.

There is no direct trade between the United States and Paraguay, although American merchandise received by way of Montevideo and Buenos Ayres is preferred to European. The consul there says that a sample house should be established in that country where American goods can be displayed and ordered through one large shipping firm.

It is understood that the "City of New York" was recently fitted out with new propellers having three blades each, and great speed was expected as the result of this change. The new propeller's, however, instead of adding to her speed, retarded her almost 3 knots an hour. She arrived in New York last week 15 hours behind her rival, the "Majestic" of the White Star Line.

A statement compiled for the "London and General Freight Report" shows that at the beginning of this month there were laid up in British ports idle steamers to the number of 522, with an aggregate net register of 532,281 tons.

The Relations of Chemistry to Foundry Practice.—II.*

BY CLEMENS JONES, M.E., EASTON, PA.

From this view we have rapidly taken of the chemical elements with which this discussion treats, we are equipped to scan the horizon that now spreads out rather broadly before us, and recognize in approaching objects an intelligent significance of the signals they display, let us hope, in accordance with the codes laid down by the founder's tools and the machinist's lathe. We know pretty well about what objects to expect, and we will proceed in an endeavor to interpret not only the meaning of their appearance, but also to inquire what amounts of each, or all, fulfill the requirements of our search.

Pig Iron.—Pig iron is the raw material out of which the foundryman is required to make a finished casting. What is pig iron? Pig iron is impure cast iron. It is metallic iron combined with nearly all of the metals and metalloids that were contained in the raw ores, the flux, and the combustibles employed in its manufacture. As it comes from the furnace it is unfit for any but the simplest castings. Uncertain in quality and weak, it contains blow holes, is liable to chill and to excessive shrinkage, and is full of foreign fragments floated on its molten surface, as it rises to the top of the mold. This crude iron is in a condition to be cheaply purified and converted into articles most needed in the arts. In the early centuries, before cast iron became in vogue, pure iron was sought as a direct product. The direct process was used until the fifteenth century, and is still extant, notably in China, India and Africa. But these charcoal bloomeries required the finest selected materials, and involved tremendous labor and great expense. Besides, there is no use for chemically pure iron in the arts. On this account its manufacture is not attempted. But iron is combined with other elements, which we regard as impurities, until it has a required hardness, combined with a required strength. The elements employed to effect this change in the physical properties of iron are commonly carbon, silicon, phosphorus and manganese. As we have seen, there are other accidental impurities possible, which may comprise the whole list of elements we have discussed. Nature, provident in this, the greatest need of mankind, disposed of these needful elements in such relation to the deposits of iron ores that crude iron—the alloy with requisite properties—is readily produced, suited to the needs of the artisan. Indeed, so wide is the range in this respect that in earlier days quantity only, without respect to the quality, of the pig iron, was the sole object. Materials were tumbled into the blast furnace without rhyme or reason, and in utter disregard of those self controlling conditions of the process itself which alone were often responsible for a product that was fit for any purpose. Or, on the other hand, the founder's complaints to the furnaceman prevailed in such incessant changes of materials that by an accident of experiments the proper iron was at last made. Without doubt this state of affairs retarded any considerable progress in foundry practice. But blast-furnace practice has undergone a revolution. Chemical knowledge has brought it about. To day the foundryman is in a position to say to the pig-iron makers, "I want such a quality of iron;" and the furnace manager is in a position to light his fires and make it. The pig-iron industry is of such great importance that, independent of economical considerations, he will be obliged to make it. The report of the mineral products of the United States just distributed places the production of pig iron for the year 1891 at nearly 8,300,000 tons, having a value at this city of over $128,000,000. We may, therefore, look confidently to the present day as the dawn of light upon subjects long in darkness. Good workmanship in the foundry requires intelligent methods. These begin with the selection of appropriate materials—those having the right composition. It stands to reason that foundrymen are restricted when they undertake to handle material concerning which they do not possess any chemical knowledge.

While pig iron is usually weak and unreliable, there are instances on record of very strong irons. A good pig iron should stand a breaking strain of at least 15,000 pounds to the square inch. A well-known brand of Pennsylvania iron has an average tensile strength of 17,000 pounds to the square inch. The first remelting of this iron gives a strength of over 22,000 pounds. One test of this brand of iron gave in a gray forge iron the unusual strength of 52,000 pounds to the square inch.

We will not spend much time on the subject of the grades of pig iron. Grading at best is but a local designation. It has the advantage, however, of approximating to the end in view. The grades of pig iron with reference to fracture, may be classed in the following order: Silver gray, brittle, large bright crystals, open grained. 1x, tough open grain free to edges; torn fracture, jagged to the touch. 2x, similar to 1x, but having close-grained spots. 2; even close grained. 3, or gray forge, hard and finely grained. 4, or mottled and white irons. The composition of pig iron, taking the average of the Pennsylvania brand mentioned, for foundry use is about as follows:

	Per Cent.
Carbon, graphitic	3.75
Carbon, combined	0.20
Silicon	2.50
Phosphorus	0.75
Manganese	0.30
Sulphur	0.06
Total	7.29
Iron, &c.	92.71
Total	100

Iron of this composition will answer for general use, will be fluid and make a strong, soft casting. We find from the analysis the amount of each ingredient. Now, in actual practice, we will suppose that this given iron is entirely satisfactory when made into castings for a certain purpose. It melts easily, requiring a modicum of fuel, fills every crevice in the mold, comes out a perfect casting, and can be readily shaped on a lathe. This quality of iron, then, would naturally be sought for similar work. What is there in the appearance of pig iron to indicate its quality? Grading by fracture will not determine quality—that is, composition. Grade alone, judged by the fracture, is of no practical service whatever. Taken in connection with known composition it is of valuable assistance. There are claims held by reputable iron men that the fracture indicates carbon, silicon and every other constituent, presumably to the practiced eye. Still others hold that the face of the pig is an infallible guide for everything. Relied upon by itself there can be nothing more deceptive; the eye, no matter how finely educated, cannot see phosphorus, sulphur, silicon or anything else in an opaque, solid mass. If the blast furnace produced iron at each successive cast of perfectly uniform composition there might be a shadow of validity to such claims, since the free carbon as graphite under regular conditions, is a fairly good indicator. But it has been clearly shown by the best authorities that the two principal ingredients, carbon and silicon, are liable to be affected not only by the temperature of the iron, but the rate of cooling and other physical causes, other conditions being constant. As a matter of fact, not only do graphite and silicon vary in different casts, when using the same mixture of ores, &c., but there is even marked variation between the pigs in the different beds. It is asserted on good grounds that graphite is an index of silicon, for the reason that in certain amounts it changes the combined carbon to graphite—that is, precipitates it. But what visible means is there of determining exact amounts of silicon? There are many recorded cases of rich open grained irons that in reality contained hardly enough silicon to make the melted iron pour without clogging. Analysis from this array of facts is the only true guide. In these connections the relations of chemistry to foundry practice cannot be misapplied. Here a practical illustration may be of service. Pig iron is introduced into a cupola, fuel is added, flux is added to take up the excessive impurities, a current of air is blown in to increase the heat. The pig iron was smelted from its ores—chemical forces operated to produce it. The fuel, as we have seen, is a form of carbon—a chemical substance. Lime is the base of the flux employed; it unites with the acid impurities to form a liquid purifying bath—by chemical reactions. Oxygen, the tireless vital principle of the air, causes the combustion of the fuel with generation of intense heat—a type of chemical energy. The molten fluid metal, sparkling in the ladle, fills every crevice of the mold, and is at last uncovered from the steaming sand—a chemical product.

Cast iron is that kind of iron which neither tempers nor welds. This is rather a distinction than a definition. It compares with steel, which is that kind of iron capable of assuming temper, and with wrought iron, which may be welded, but will not take temper by chilling. There are, however, qualities of steel which may be welded, bent, and do not take temper. But to a certain extent these distinctions are caused by the behavior of carbon, and at the same time the absence of certain other elements. White iron becomes steel when its carbon is reduced to about 1.5 per cent., at which point it has slight weldability and great hardness. We may say that cast iron is a compound with varying quantities of carbon and silicon. Steel may contain silicon, but has less carbon than is needed to form cast iron. Wrought iron is nearly pure.

Let us now briefly examine the influence of the chemical elements with which we have become acquainted upon the quality of cast iron. When pig iron is melted in a cupola we look for a slight change of composition in the resulting cast iron, owing to oxidation caused by the blast of air. The tendency of this effect is to lessen the amounts of the more readily oxidizable elements, such as manganese and sulphur. Silicon and combined carbon afford combustible material to oxygen, and these elements are burned and also reduced in quantity. The practical effect, when a mixture contains the right proportion of carbon, silicon, phosphorus and manganese, is a uniform iron, in which, so to speak, the carbon as graphite is finely subdivided. This state of subdivision, in which all the carbon is still graphite, increases the tenacity between the particles of surrounding metal by placing them in closer contact and imparts a texture resulting in greater strength. By the same process, it is well known that up to a certain point subsequent remeltings give greater strength to cast iron, which from the first melting may be even doubled. We do not know accurately whether in addition to this the alloy may not be said to

* An address before the Foundrymen's Association of Philadelphia.

be intensified and a firmer grasp upon each other given to the combining elements. But the texture is improved by a rearrangement in molecular structure, and the actual composition may not have varied to any considerable extent. Illustrative of the effect of melting on pig iron, the following analysis, quoted by one of the greatest authorities on the subject of iron, will be instructive in several ways. The iron was graded as No. 1 pig. On remelting, it turned hard and white. The analysis of the original pig, and as remelted for castings, was as follows:

	Pig.	Castings.
Carbon	1.61	1.65
Silicon	0.98	0.61
Phosphorus	1.37	1.95
Sulphur	0.16	0.29
Manganese	0.12	0.47
Calcium	0.40	0.81
Magnesium	0.29	0.43
Total	4.93	5.51
Iron	95.15	94.42
Total	100.08	99.93

Observe that phosphorus and silicon sustained a loss, but the carbon remained practically the same, and sulphur and manganese increased, as well as the other two ingredients. Now, the phosphorus and silicon were oxidized, but the carbon was in all probability entirely graphitic. The gain in sulphur and manganese was undoubtedly due to bad fuel—a frequent source of trouble to the foundryman. Previous analysis of this particular pig iron would have avoided all difficulty. A critical study shows that it was deficient in carbon—should have contained twice as much. With the low silicon—of which the same holds good—this iron would have turned white, supposing that sulphur and phosphorus were not excessive. The abnormally high phosphorus and sulphur only increased the hardness of the metal. The gain in manganese is unusual, and had reached a point where, with the other constituents normal, chilling is so often sure to follow. Of calcium and magnesium, aside from the correctness of the analysis, the effects need not concern the result. But it is highly probable that had carbon and silicon been normally high, the increase in these elements, as well as sulphur and manganese, would have been prevented. Now, the analysis would have shown the deficiencies in this iron. With a knowledge of the chemical effects of these elements on cast iron, no foundryman would have attempted to melt this iron alone. It is important to understand clearly the fact that these chemical effects produce physical properties. The remedy is simple. The analysis points it out. A mixture of this iron with another iron containing more carbon and silicon and less phosphorus and sulphur, so as to result in a composition corresponding to that of the Pennsylvania iron, would have made soft, strong castings. Hence the practical application of chemical analysis to the materials used in the foundry is apparent.

The quantities of the chemical elements in cast iron giving the best physical and economic results have been fairly well established. They may be considered in their relation to cast iron as hardeners and softeners. Carbon is a hardener. In pig iron carbon rarely exists over 5 per cent. Metallic iron is capable of combining with even 7 per cent. as a maximum. Beyond this amount it separates outas graphite, of which "kish" is an example. But part of the carbon is replaced by the other elements, as already pointed out. As a consequence it rarely exceeds 4 per cent. In the condition of graphite the range in cast iron is from 3 5 to 4 per cent., in which amounts it imparts the greatest strength, for which purpose it is necessary. Carbon makes iron work hot and gives it fluidity. It makes it soft and easily cut by a tool. Silicon is the regulator of carbon in cast iron. Cast iron comparatively free from other elements and high in combined carbon is white, crystalline, hard, brittle and may be specular. Silicon appears to change the combined carbon to graphite and produces gray iron. It therefore adjusts carbon to make cast iron hard and strong or soft and tough. The range of silicon is wider than that of carbon. Over 3 per cent. of silicon gives hardness to cast iron and increases shrinkage. At 2.5 per cent it gives maximum fluidity to cast iron, which can be used for the thinnest castings. But if a large casting, to be subjected to tensile strength or to resist a great crushing weight, the amount of silicon should be less. Silicon thus plays the part of both hardener and softener. Cast iron is soft and easily worked, containing from 2 to 2.5 per cent. of silicon. For common castings, such as pipe, &c., even 1.75 gives good results. Phosphorus should always be well controlled. With proper adjustment of the other ingredients it makes iron hard and causes excessive shrinkage. Some authorities consider 0.50 per cent. all that is necessary, but more than this amount may be safely employed. The range, however, is more limited, and, except where very fluid iron is required, should not exceed 0.80 per cent. High phosphorus sometimes results in hard spots in castings. Manganese makes iron brittle and increases shrinkage, chilling and hardness. It weakens iron and reduces its ability to stand stress. On this account more than 0.40 per cent. is undesirable in ordinary cast iron It is a useful ingredient in making chilled castings, such as rolls, &c. Above 1 per cent. the hardening properties are lessened. Sulphur is one of the ingredients whose presence is not sought. It is a great hardener, and appears to increase combined carbon, which, as seen, is inimical to soft iron. It is always injurious to iron. In wrought iron sulphur causes brittleness at a red heat, and makes it "red short." This property is opposed to the influence of phosphorus, which makes it "cold short" at ordinary temperatures. But these terms do not properly apply to cast iron, although there is an old foundry saying, that a neutral iron may be made by combining red and cold short iron. Aluminum exists in such small proportions in cast iron that its influence is not often felt, but it appears to impart strength and elasticity. Introduced into melted iron, it is considered to act beneficially by collecting scum and slag, and produces sounder castings free from blowholes. Arsenic acts very much like sulphur on cast iron and is as greatly to be avoided, although but seldom encountered. There is no evidence to show that titanium injures cast iron, perhaps one reason being that it occurs in only small quantities. Copper is a hardener of iron, and in appreciable amounts weakens it. The other rarer elements, nickel, chromium, tungsten, &c., are so rarely to be found that their effects on cast iron are not accurately understood. They have been more used in connection with steel, the strength of which they appear rather to increase than diminish. But their occurrence in pig iron, and our knowledge of the fact, will pave the way to any future enlightenment concerning the effects they may produce. Cast iron, with the properties generally required, we may consider to be of a composition of from 3 to 4 per cent. carbon; 1 75 to 2.75 per cent. silicon; 0.25 to 0.85 per cent. phosphorus; 0.15 to 0.35 per cent. manganese, with as few other impurities as possible. The final point in our discussion is, as to whether it is better to depend on chemical analysis or upon practice in making iron castings. There will be no dissent from the opinion that they must and will go hand in hand. Since we can govern the amounts of the ingredients of cast iron, any desired property may be given to castings of which it is composed.

There is no law as yet resulting from the commerce between the laboratory and the foundry. Without doubt, there is too much to learn that prevents the formation of simple, definite rules applicable to modern foundry practice. But these will come in time as the relations of chemistry to foundry practice become better and more generally understood. There are a thousand minds at work on the problems of science—chemists thinking in every language of the civilized globe of the subjects we have here discussed. Science improves every industrial condition to which it is applied. It is not possible, with accumulating facts rising to activity, that even in so humble a factory as the iron foundry they may not find practical application from day to day.

Ocean steam navigation as concerns the United States is passing through a new stage of development. There is a louder call than ever for increased service, particularly in the coastwise trade on both sides of the continent, and railroad corporations are more than ever inclined to have a transatlantic service under their own control. Unfortunately, the new tonnage called for will be largely the product of foreign yards. First in prospect are the new ships of the Inman line, to be of American build. Then there are the new freight steamers for the Chesapeake & Ohio Railroad, to be built on the Clyde, at once. And besides a proposed line between Philadelphia and Jacksonville, Fla., for fruit transportation, the Trades League of that city are making an earnest effort to establish a first-class line to Havana, Mexico and other Southern points. From San Diego, Cal., word comes that a through line is just going into operation between that port and Mazatlan, in Mexico. Of deeper significance is the rivalry taking place to secure control of the California trade by water routes, as the clipper lines seem destined to contend with a stronger opposition growing out of the disruption of the old joint arrangement between the Panama Railroad and Pacific Mail Steamship companies. The latest scheme is to start a line of English built steamers from New York around Cape Horn to Chili and Peru. The pioneer steamer, "Coya," from Swansea, to sail in a few days, will be followed, it is stated, by vessels which have been contracted for in English yards at a cost one-third less than it could have been five or six years ago. As an experiment this long-voyage business, covering about 8000 miles, will be interesting.

A light, cheap and ornamental shelf, adapted to be attached to a stove pipe, forms the subject of a patent recently granted to Edward A. Loebs of Rochester, N. Y. The shelf is indented at its edges to meet the pipe, and has downturned tines and brace rods in combination with the frame to hold the shelf. The shelf may be readily detached from the frame or holder upon which it rests when desired. The construction is such that the frame or holder may be directly attached to the stove pipe.

The Pacific Mail Steamship Company decline to receive freight at San Francisco for New York via the Isthmus.

Never but once before since the white man settled the country was the Mississippi frozen from shore to shore and an ice gorge formed at Memphis.

At Springfield, Mass., the National Needle Company make and finish every year 30,000,000 machine needles.

TRADE REPORT.

The Iron Market.

There have been no features developed in the market of especial interest during the past week, and while no advance is noticed in values, prices of a week ago very generally represent the market. The feeling seems to be gaining ground that higher prices are not to be expected in the near future, and that outside of standard brands of Pig Iron at least, orders will continue to be for small quantities. The outlook for business is fairly satisfactory and a good demand is anticipated, though orders may cover immediate requirements rather than future deliveries. In the West the recurrence of severe winter weather the past week has caused another congested period in the operations of railroads, and merchants report more trouble than ever before with the prompt transmission or receipt of freight. This difficulty is becoming more serious, especially as the best-managed and best-equipped roads appear to be unable to improve the situation. There is a scarcity of both cars and motive power, which is becoming more pronounced every week.

In the New York market trade is quiet, generally speaking, with a somewhat easier market. The Thomas Iron Company are booking orders from their old customers for delivery during the balance of the year at last year's prices, although the figures for the current year have not been officially announced. New York quotations are as follows: Northern brands, $14.75 @ $15 25 for No. 1; $14 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 75 @ $15 for No. 1; $13 75 @ $14 for No. 2 and No. 1 Soft; $13.25 @ $13 50 for No. 2 Soft.

The situation of Pig Iron in the Philadelphia market could almost be defined in the single word "unchanged," but even that will bear some little qualification. Prices are certainly unchanged, but it is open to doubt whether the feeling is as steady as it was a week ago. With some sellers it may be a little firmer, with others there is more nervousness and perhaps more of a desire to get out at some price. The best brands are handled without the slightest necessity for shading, but with others the supply is so liberal that buyers require coaxing, and when a sale can be made at last week's figures holders are quick to accept. The local trade appear to have covered pretty freely within the past 30 days, and while there is no extraordinary pressure to realize there is also an absence of demand, except for the general run of trade, which is chiefly for small and medium sized lots of standard qualities. The feeling in regard to the future seems to be that prices are not likely to be higher, and as there is a possibility of somewhat cheaper ores consumers require special inducements before they will negotiate for large lots. Producers are not in a position to anticipate lower figures, any more than consumers are under the necessity of discounting their future requirements. For Philadelphia and near-by deliveries quotations are as follows:

American Scotch, No. 1X.....	$17.00 @ $17.25
American Scotch, No. 2X.....	16.00 @ 16.25

In the West an excellent business is reported for the past week in local Coke. The volume was, perhaps, not so large as that of the previous week, but was deemed quite satisfactory by the furnace companies. Negotiations are pending for additional quantities, so that the end of the season of activity is not yet visible. A retrospect of the trade of the past two months is rather encouraging to the makers. They started in January with a weak market, which looked as if there would be a very considerable decline in order to meet the views of buyers. The large transactions which have since taken place on a much better basis than feared have checked the tendency to very low prices, and it now looks as if there would be no further decline, unless very unfavorable conditions should arise.

At Chicago, sales of Southern Coke are reported of larger size than for some time. These sales were effected by concessions on the part of small Southern companies having an accumulation of Soft Iron which they were anxious to move. The transactions are believed by the sellers themselves to be exceptional, and not to fully represent the market. The prices made were but little above the level of those of last September. Lake Superior Charcoal has been considerably less active than Coke Iron, but consumers are known to be in early need of renewing old contracts, and considerable business is therefore expected in the near future. Makers of this class of Iron are feeling increased confidence in the prospects for this year, and some of the most discouraged among them are now making predictions of higher prices, which are rather sweeping in view of the general condition of trade. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal.....	$16.50 @ $17.00
Local Coke Foundry, No. 1.....	13 25 @ 13.75
Local Coke Foundry, No. 2.....	12 75 @ 13.25
Local Coke Foundry, No. 3.....	12.50 @ 12 75

In Southern markets there is nothing new to report of the Pig Iron market, there being a light volume of business, and the existing demand is fully supplied at quotations of a week ago. The current consumptive orders have been even smaller than the preceding week, and as there is no large buying for forward delivery the aspect is anything but encouraging, though prices seem to be down to rock bottom, and there appears to be no disposition on the part of the furnaces to stimulate trade by offering to make further concessions. Doubtless the new departure recently made by the Northern furnaces to meet all competition has turned much consumption into new channels, but there are evidences that consumption is large for nearly every purpose, and if the demand is comparatively light for forward delivery it must be made up by increased buying for current consumption before long. Quotations are unchanged, as follows:

Foundry.

Southern Coke, No. 1.....	$13 25 @ $13.50
Southern Coke, No. 2.....	12.00 @ 12.25
Southern Coke, No. 3.	11.50 @ 11.75
Ohio Soft Stone Coal, No. 1.....	16.00 @ 16.25
Ohio Soft Stone Coal, No. 2	15.00 @ 15.25
Mahoning and Shenango Valley...	15 25 @ 16.25
Hanging Rock Charcoal, No. 1....	18 00 @ 19.25
Hanging Rock Charcoal, No. 2....	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 1...	15.50 @ 15.75
Tennessee and Alabama Charcoal, No. 2.....	14.50 @ 14.75

Billets and Rods.—The market has been particularly quiet, both in foreign and in domestic material. We quote Steel Billets, tidewater, $24.50 @ $24 75; foreign, $29 @ $29.50; Wire Rods, $32.25 @ $32.75; foreign Wire Rods, $40 @ $40.50, and Swedish Rods, $54.50 @ $56.

Steel Rails.—The only transaction referred to by any Eastern mills is the sale of about 3000 tons to a Southern road at private terms. At the present time there is very little business in sight, and it is not likely that any marked activity will prevail. From the West come reports that considerably more business has been placed than is generally known, and that as a matter of fact the works have larger orders on hand now than they had at the corresponding period last year.

Metal Market.

Copper.—The market has remained quiet, and there is no sign of change in any particular. Small spot lots offered at prices as low as any that have been quoted thus far this month seem to virtually go a begging, and the presumption is that if consumers are as busy as they are represented to be, and using up large quantities of Ingot, they must either have a good stock of material on hand or be quietly supplied by some private arrangement with leading producers.

Pig Tin.—The situation is wholly unchanged. Values have fluctuated within

very narrow bounds, speculation has been confined almost wholly to a limited circle and the movement of Tin into the channels of consumption has proceeded in about regulation manner. Apparently the tendency is to keep an even keel until some word comes from Washington as to the probability of an extra session of Congress, and if one is called, receipt of information as to what may be done in the direction of repealing the duty prescribed in the McKinley Tariff act.

Pig Lead.—There has been only a moderate business and the status of the market is practically the same as it was a week ago, with buyers and sellers evidently inclined to follow a conservative policy for the time being.

Spelter.—No change for the better is visible in the market for Western brands.

Antimony.—The market has remained quiet and unchanged.

Tin Plate.—Fairly large sales have been made of 100 lb and lighter Bessemer, Coke finish Plates for May and more distant future shipment. The prices, it is understood, were very close to those quoted for spot stock. Otherwise business has continued quiet and hardly any change in values has taken place.

Coal.

The Coal trade is not disturbed by the sudden rupture and collapse of the Reading "combine" under the ambitious management of President McLeod. One of the Coal company presidents remarks that a natural effect will be to deaden trade for the moment, as consumers will be on the lookout for a drop in prices, especially as the spring season is approaching, when a drop is expected from natural causes. At present there is a plenty of Coal, the small Steam sizes being in better supply. The best grades of the latter may be quoted: Pea, $3, alongside; Buckwheat, $2.20, alongside. The common understanding of the situation is this: That the inevitable has happened to the "combine" launched one year ago with much trumpeting; only the dissolution now chronicled occurs sooner than was anticipated. The scheme to absorb all New England via the Poughkeepsie Bridge was impracticable. Thereupon, reaching out for one railroad after another, with credit already strained to the utmost, invited a catastrophe. But radical changes in the Coal business are not looked for, as Mr. Wilbur of the Lehigh, who is associated with Mr. McLeod in the receivership, also Mr. Paxton, are recognized as conservative, but operations will be conducted on a comparatively limited scale.

Shipments of Anthracite Coal for month of January, 1893, compared with the corresponding period last year:

Wyoming region	1,875,094	Inc. 354,166
Lehigh region	407,794	Inc. 11,402
Schuylkill region	786,690	Dec. 147,476
Total.	3,069,579	Inc. 218,092

The stock of Coal on hand at tidewater shipping points January 31, 1893, was 532,375 tons; on December 31, 1892, 657,868 tons; decrease, 125,493 tons.

The first shipment of Coal by the Lytle Coal Company from their new colliery at Primrose, near Minersville, has been made, and when fully in operation the colliery will be one of the largest producers of the region.

Bituminous Coal is unchanged. A contract has been made for the delivery at London, England, of 40,000 tons of Cannel Coal from the Jellico district, Southern Kentucky. It will be shipped via the Chesapeake & Ohio from Norfolk.

The Dominion Coal Company, Limited, who have secured control of the Cape Breton Coal mines for the next 100 years, have organized with the following officers: President, Henry M. Whitney, Boston; treasurer, John S. McLennon, Montreal; secretary, B. F. Pearson, Halifax, N. S.; chief engineer and general manager, F. S. Pearson, Boston; resident manager in Nova Scotia, David McKeen, Cape Breton.

Financial.

Outside of speculative circles the markets are undisturbed. Business is in good volume, and, irrespective of currency questions, general conditions are favorable to an active spring trade. In Wall street uneasiness is felt on account of the low stock of gold in the Government Treasury, and many express disappointment that Secretary Foster should hesitate to issue gold bonds as a measure of temporary relief. The Senate on Saturday evening passed an amendment to the Sundry Civil bill authorizing the Treasury to issue five-year 3 % bonds. Pending further action gold shipments are undiminished, and it does not yet appear that local bankers are disposed to co-operate on the line recently marked out in tiding over any temporary difficulty. It also remains to be seen whether the House will pass Mr. Sherman's amendment, or whether the authority intended to be conferred will be exercised either by the present Treasurer or his successor. Again, from what source are additional supplies of gold to be derived? And why should gold be borrowed for the purchase of silver rather than suspend the monthly purchases? Certain it is that, whatever the cause, the drain of gold continues and that the issues of paper therefor, virtually redeemable in gold, only aggravate the difficulty.

The subject next in importance bearing upon questions of finance is the supposed collapse of the Reading "combine," resulting in enormous sales of Reading stock, equal to something like one-half of the entire transactions on the Stock Exchange during the week. The trouble is supposed to have originated in the lease of the Lehigh Valley and New Jersey railroads a year ago, with the object of controlling the trade in coal. In consequence of this expansion the Reading management, as reported, was compelled to resort to a loan for the payment of its annual interest, hypothecating valuable assets for this purpose.

Banks, trust companies and other corporations loaned on real estate in New York and Brooklyn last year $68,000,000.

Chicago Report.

Scrap.—Prices are weak under large offerings. Rubber is an exception, being dearer. Dealers quote the following buying prices:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12.00	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	6.00	....
Horseshoes	13.00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	3 ¢

Anthracite.—Very active business is reported, with the continuance of severe winter weather, but quotations remain as follows on carload lots of 12 net tons:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

The production of cypress lumber in Louisiana and Arkansas is becoming important. In Delaware cypress logs are obtained by probing with a long pole in the swamps.

John Huntington of Cleveland has bequeathed $700,000 to be used in building an art and polytechnic school in that city, and a further sum of $800,000 as an endowment fund for it.

A treaty has been formulated for the annexation of Hawaii to the United States, and for the purposes of government extending to that country the laws now in force in Alaska. The royal family are to be pensioned and the indebtedness incurred by Hawaii in England shall be assumed by the United States, compensation therefor to be obtained by appropriating the revenues of the islands, said to be about $10,000,000 per annum.

Mr. Giffen, the English statistician, has given some recently compiled figures of the cost of strikes in Great Britain before the English labor commission. During the years 1890 and 1891 he estimates that a sum of nearly $13,000,000 was lost to wage earners in England by strikes, without bringing into the reckoning the loss caused by the consequent diversion of trade into different channels.

CONDITION OF THE

Hardware Trade.

THE PAST WEEK has made little change in the general situation, there being, however, something of an improvement in the volume of business. Travelers are busily engaged in their different fields, and the result of their activity is the obtaining of many orders, which are keeping jobbers and manufacturers fairly busy. Notwithstanding the fact that the market is devoid of special strength, and is characterized in a good many lines by more or less weakness, the trade are purchasing for their early requirements, the general impression being that prices on the whole are not likely to settle much lower. It is also recognized that some goods are abnormally low, with a possibility of recovery at any time. Business has to some extent been interfered with by prevalent storms and the backwardness of the season, but the tone of the trade is confident, and it is expected that the season's business will be large.

Advices from Chicago. — The Shelf Hardware trade is considerably better in this locality than up to the same time last year. Trade, however, has been light from Northern Michigan, Wisconsin, Minnesota and North Dakota, on account of the heavy snows, which have interfered with almost all traffic in that part of the country. This has checked the Hardware trade at Milwaukee and other points in the Northwest, from which complaints are heard of decided dullness. Other sections of the West are buying more plentifully, so that the average trade of Chicago jobbers is now ahead of last year, as stated. The movement consists principally of straight Hardware and seasonable goods, but a little better inquiry is reported for staple articles. The demand for the latter is not for immediate shipment, but generally for future delivery. Buyers think that it is now a good time to place their orders at prices probably as low, if not lower, than they will be next month. Heavy Hardware jobbers report matters rather quiet in their line, although some are in receipt of special business which keeps them fairly active. Their customers, such as wagon makers, carriage makers and other manufacturing establishments, anticipate a very heavy year, but are not buying just now, being inclined to wait until spring opens, and the crop question is a little better determined.

Notes on Prices.

Cut Nails.—It is difficult to report accurately the ruling prices for Cut Nails, in view of the uncertainty which for the past two weeks has characterized the market in regard to the basis for transactions. At a meeting held in Pittsburgh on the 15th inst. the Nail manufacturers, principally from the West, took action which was somewhat of a surprise to the trade at large, although those who were best informed in regard to the matter knew that it was under contemplation. At this meeting the Wire Nail card was adopted as the basis for Cut Nails, disposing at once of the National Price-List adopted two weeks before, and the regular Cut Nail card which has been in use for some time. In addition to the adoption of the Wire Nail card it was agreed that no sales or quotations should be made on any system of average. The mills pledged themselves to sell simply at a base price without regard to extras. This was regarded as an essential part of the action, as the manufacturers are very desirous of doing away with the system of averages, which in their judgment is detrimental to their interests as well as very inconvenient to the trade. The above action was unexpected by the Eastern manufacturers, and there has been some difference of opinion as to their course in view of it. A meeting was held in Philadelphia on Tuesday, in which the matter received careful consideration, and as a result the action of the meeting at Pittsburgh was ratified with some slight modifications in the card to adapt it more fully to Cut Nails. By this action substantially the same card is to serve for both Cut and Wire Nails. It was also decided by this meeting at Philadelphia that the base price for large lots should be $1.40, on dock, New York. It is as yet, however, too early to give a definite quotation on the new basis. During the past week there has been a good deal of confusion in basis for quotations, each manufacturer using his own judgment in the matter. On the whole, the tone of the market is not different from what it has been. It remains to be seen what effect the adoption of the Wire Nail card will give to prices.

Advices from Chicago.—The new Cut Nail card was adopted at once by the trade here, both by the manufacturers and merchants. General satisfaction is expressed at the action of the Cut Nail Association in adopting the Wire Nail card, as there will be now no necessity of comparing two cards and doing a great deal of figuring to determine which offers the most inducements. The Cut Nail and the Wire Nail will be compared from this time on precisely the same basis of cost. Manufacturers report many inquiries, but buyers are slow to place their orders. It will probably take a little time for the trade in general to adjust themselves to the new conditions. The price on factory lots made here is now $1.42½, Chicago, with no regard to average. The merchants have adopted the price of $1.50 from stock on the new card on any quantity.

Wire Nails.—The Wire Nail market continues in excellent condition, the lowest quotation being $1.40 for carloads, f.o.b. Pittsburgh, an advance of 2½ cents being made for Nails at Cleveland or Salem. Small lots from store in New York are held at $1.75, and carload lots at $1.65. The agreement among the manufacturers is promising well for the stability of prices.

Advices from Chicago.—Manufacturers of Wire Nails report orders coming in at the higher prices. These orders are frequently accompanied by specifications showing that the Nails are wanted immediately. The outlook is decidedly better, and every indication exists that the quoted price of $1.57½, Chicago, from factory, is being strictly maintained. Merchants quote $1.60 for carloads for mixed cars and $1.65 for small lots from stock. They observe remarkable fluctuations in the demand, according to the weather. Whenever a break of two or three days occurs in the rigorous weather the demand immediately springs up in considerable proportions, but the recurrence of winter weather causes it to shrink as rapidly.

Barb Wire.—The Barb Wire market is in good condition and competition is less active than some time ago. Trade is fair, though not specially heavy, but we are advised that stocks are not accumulating. Some of the manufacturers are making efforts to secure better prices, and the market, on the whole, is somewhat stronger. Quotations remain, however, without important change.

Advices from Chicago.—Manufacturers state that orders are now liberal, with an increasing volume of business from week to week. Reports from their salesmen indicate that as soon as spring weather makes its appearance the demand will be very heavy. They continue to quote on the basis of $2.20 and $2.60 for Painted and Galvanized, from factory, with 10 cents advance on less than carloads. The extremely low prices made by some of the Northwestern jobbers have been withdrawn, but there are still some who are quoting Galvanized on the basis of $2.60 to $2.65, for immediate shipment.

Tackle Blocks.—The Tackle Block market continues in an unsatisfactory condition. The termination of the agreement between the different manufacturers leaves them free to make such prices as they choose, and the result has been considerably lower quotations. A discount of 70 and 5 per cent. is thus made on ordinary lots, and a discount of 70 and. 10 per cent. on larger orders.

Standard Fiberware.—The Standard Fiberware Company, Mankato, Minn., have recently announced reduced prices on their line of Flax Fiberware. No. 1, or plain, is made assorted colors, maroon, brown and gray ; No. 5, or decorated, is made assorted, red, blue, black, brown, maroon, old gold and green, selected, with hand-painted decorations and with extra finish or striping as suits the article ; No. 5X, or white, is similar to No. 5 except color. The company's revised price-list is as follows :

	Price per dozen. No. 1	No. 5	No. 5X
Water Pails, 12-quart	$3.00	$4.00	$4.75
Dairy " (yellow), 14-quart No. 3, $4.00	....	4.50	....
Fire Pails, No. 1, $4 ; No. 2, 14-quart, $4.50.			
Sugar Pails (with cover)	5.50	6.00	....
Horse " (short, wide and heavy)	4.50	....	....
Buggy Pails (short and light)	3.50	....	....
Prison " (with cover)	7.50	....	....
Slop Jars (bal. trap), No. 5 and 5X, 14-quart	7.50	8.50	9.50
Chamber Pails, Slop Pails, Commode Pails, Nos. 5 and 5X, 14-quart	6.00	7.00	8.00
Commode Rings	1.50	1.75	2.00

Wash Basins, 10½-inch	1.80	2.00	2.50
" 12-inch	2.00	2.50	3.00
" 13½-inch	2.50	3.00	3.50
" 15 inch	3.00	3.50	4.00
Wash Bowls	....	3.75	4.25
Pitchers	....	5.25	5.75
Milk Pans (Old Gold, in No. 5)	....	2.25	2.75
Fruit Bowls	....	2.00	2.25
Keelers, 11½-inch	....	3.50	4.00
Waste Paper Baskets, 13 inches high	....	5.50	6.00
Mats, 8½-inch (for table use)	1.00	1.25	1.50
" 15 inch (for cuspidors, &c.)	3.00	3.50	4.00
" 17-inch (for slop jars, spittoons &c.)	3.50	4.00	4.50
" 2 -inch (for slop jars, spittoons, &c)	4.00	4.50	5.00
Cuspidors, 8½-inch by 7¼ inches high	....	7.50	8.50
Spittoons, " Daisy," 8-inch (pressed)	3.50	4.00	4.50
Spittoons, 10 and 11½-inch	5.50	6.00	6.50
Peck Measures	3.50	....	....
Half-Peck Measures	3.00	....	....

The Lee Filter Joint —The following is the price-list of the Lee Filter Joint, manufactured by Thomas Lee, 79 and 81 Race street, Cincinnati, Ohio. It is subject to a discount of 33⅓ per cent.:

	Per dozen.
3 inches, IX Tin	$18.00
4 inches IX Tin	20.00
5 inches, IX Tin	24.00
6 inches, IX Tin	28.00
2½ inches, Galvanized Sheet Steel	18.50
3 inches, Galvanized Sheet Steel	20.50
4 inches, Galvanized Sheet Steel	22.50
5 inches, Galvanized Sheet Steel	25 00
6 inches, Galvanized Sheet Steel	27.50

American Roofing Plates —James B. Scott & Co., 122 and 124 Second avenue, Pittsburgh, Pa., quote New York prices on their American Roofing Plates as follows:

Scott's Terne, all Stamped.

Scott's Extra Coated, resquared, IC, 14 x 20	$9.25
Scott's Extra Coated, resquared, IX, 14 x 20	10.75
Scott's Extra Coated, resquared, IC, 20 x 28	18.50
Scott's Extra Coated, resquared, IX, 20 x 28	21.50
Neville, IC, 14 x 20	6.00
Neville, IX, 14 x 20	7.25
Neville, IC, 20 x 28	12.00
Neville, IX, 20 x 28	14.50

Prices at Chicago are 25 cents advance on 14 x 20, and 50 cents advance on 20 x 28 sizes, over prices in New York.

W. P. Loughry, 81 John street, New York, representing the Glendale Tin Plate Company, quotes prices on their Terne Plates in New York as follows:

Optimus Best Redipped	IC, 14 x 20	$8.25
Optimus Best Redipped	IC, 20 x 28	16.50
Optimus Best Redipped	IX, 14 x 20	9.75
Optimus Best Repipped	IX, 20 x 28	19.50
N. F. Old Style Redipped	IC, 14 x 20	7.50
N. F. Old Style Redipped	IC, 20 x 28	15.00
N. F. Old Style Redipped	IX, 14 x 20	9.00
N. F. Old Style Redipped	IX, 20 x 28	18.00
Bonus Extra Coated Roofing	IC, 14 x 20	6.75
Bonus Extra Coated Roofing	IC, 20 x 28	13.50
Bonus Extra Coated Roofing	IX, 14 x 20	8.25
Bonus Extra Coated Roofing	IX, 20 x 28	16.50

H. R. De Milt & Co., 238 Water street, New York, quote the following prices on their American Roofing Plates at New York:

De Milt's First New York	IC, 14 x 20	$5 75
De Milt's First New York	IC, 20 x 28	11.50
De Milt's First New Jersey	IC, 14 x 20	5 75
De Milt's First New Jersey	IC, 20 x 28	11.50
De Milt's Manhattan	IC, 14 x 20	7 25
De Milt's Manhattan	IC, 20 x 28	14.50

Augers and Bits —The market for Augers and Bits, which has been fairly steady for some time, has recently shown signs of weakness and slightly lower prices are made by some of the manufacturers.

Rosin.—Another advance has taken place in the price of Rosin. The market is represented by the following quotations (₱ 280 lb), which are announced by F. W. Blossom, 124 Water street New York:

	In store.
A, black	$ .50
B, common	1.51
C, strained	1.52
D, good strained	1.54
E, No 2	1.55
F, good No. 2	1.65
G, low No. 1	1.75
H, No. 1	2.15
I, good No. 1	2.55
K, low pale	3.20
M, pale	3.85
N, extra pale	4.05
WG, window glass	4.30
WW, water white	4.60

Glass —The condition of the weather during the past week has necessitated a stop of all building operations, so there is no demand for immediate delivery of Glass. The new prices of the National Window-Glass Company have gone into operation, and early enough in the year for dealers to figure with certainty upon the cost of American Glass during the coming year. Those interested in the new company express themselves satisfied that the organization will prove a success, and that it will not conflict with any of the anti trust laws. It is understood that manufacturers are permitted to sell their product to jobbers who are members of the National Window Glass Company at any price agreed upon between the manufacturer and jobber, but that no Glass is to be sold to others than members of the company for less than schedule prices. This is certainly an inducement for jobbers to become members of the company, as it will pay them a good profit if they can buy Glass, say at 85 per cent. discount and sell it at 80 and 5 per cent. discount, besides putting them on an equal footing with others to obtain the best price they can in an open market. No official announcement has been made of the plans under consideration in forming the Imported Window Glass Association in this city, but it is reported that members will be under bonds not to transgress any rule made by a central committee, and that prices shall be on a sliding scale based upon quantities. The prices on imported Window Glass show no improvement up to the present time, sales being made from 80 per cent. discount to 80 and 5 per cent. discount. From reports it appears that the Plate Glass general agency plan has already stopped the ruinous cutting of prices, which was the object aimed at, without advancing them. Present quotations on Glass are as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; 100 boxes or over, 80 and 10 per cent. discount; less than 100 boxes, 80 and 5 per cent. discount. French Window Glass, 80 per cent. discount to 80 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ₱ lb.	....	@	$0.03½
Rubber Shoes, in ton lots ₱ lb.	....	@	.03
Large Hose, ₱ ton	....	@	9.00
Wringer Rolls, ₱ lb	....	@	.04½
Wringer Wire Rolls, ₱ lb	.01	@	.02
Syringes, ₱ lb	....	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	₱ lb	10¢
Light and Tinned Copper	₱ lb	9¢
Heavy Brass	₱ lb	7¢
Light Brass	₱ lb	6¢
Lead	₱ lb	3½¢
Tea Lead	₱ lb	3½¢
Zinc	₱ lb	2¾¢
No. 1 Pewter	₱ lb	14¢
No. 2 Pewter	₱ lb	7¢
Wrought Scrap Iron	₱ gross ton,	$17.00
Heavy Cast Scrap	₱ gross ton,	10.00
Stove Plate Scrap	₱ gross ton,	7.00
Burnt Iron	₱ gross ton,	5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No 1 White Rags	₱ lb			4	¢
No. 2 White Rags	₱ lb			3	¢
Mixed Rags	₱ lb	1½	@	1¾	¢
Blues and 3ds	₱ lb	1¾	@	2	¢
Hard Sized White Shavings	₱ lb	2¾	@	3	¢
No. 1 White Book Shavings	₱ lb	2½	@	2⅝	¢
No. 2 White Book Shavings	₱ lb	1½	@	1¾	¢
Light Book Shavings	₱ lb	⅞	@	1	¢
No. 1 Mixed Shavings	₱ lb			1½	¢
No. 2 Mixed Shavings	₱ lb	¾	@	⅞	¢
No. 1 Printed Books	₱ lb	1⅜	@	1½	¢
Ordinary Mixed Books	₱ lb	¾	@	⅞	¢
Newspapers	₱ lb			½	¢
No. 1 Manila Paper	₱ lb	1⅛	@	1¼	¢
No. 2 Manila Paper	₱ lb	¾	@	1	¢
Bogus Paper	₱ lb	⅝	@	¾	¢
Common Paper	₱ lb	⅝	@	⅞	¢
Straw Chips	₱ lb	½	@	⅝	¢
Binders' Clippings	₱ lb	½	@	⅝	¢
Jute Butts	₱ lb			1½	¢
No. 1 Jute Bagging	₱ lb	1¼	@	1⅜	¢
Mixed Bagging	₱ lb			1	¢
No. 2 Bagging	₱ lb			¾	¢
Hemp Twine	₱ lb			2½	¢
Manila Rope	₱ lb			2½	¢
Jute Rope	₱ lb	1⅞	@	2	¢
Mixed Rope	₱ lb	¾	@	⅞	¢

On What Basis Shall Cut Nails be Sold?

IN THE PRESENT confused condition of the Cut Nail market Nails are sold on three different systems. First the old Cut Nail card. Then at their meeting January 31, the Eastern Nail manufacturers adopted the National Price-List, which, however, has not come into general use. Again, at Pittsburgh February 15, at a meeting composed principally of the Western Nail manufacturers the Wire Nail card was adopted for the sale of Cut Nails, when the following resolution was passed:

Resolved. That the Wire Nail schedule of extras be adopted by the Cut Nail manufacturers and that such a card be issued immediately, and that each manufacturer of Cut Nails pledge himself and his company that he will not quote nor will he permit any quotations to be made for his account on any basis of average.

The fact that the Western makers have not regarded the National Price-List for Cut Nails with favor practically disposes of it for the present at least, and the action of the Eastern mills in following the Western mills in the adoption of the Wire Nail card, as is referred to under Notes on Prices, leaves the Wire Nail card, for the present, at least, as the basis for business in this line.

While there is a good deal of difference of opinion among the manufacturers of Cut Nails in regard to the proper basis for their sale, there is a general desire on the part of the trade to have some method adopted which will simplify matters, and if possible dispense with the troublesome though time-honored system of averages. The Cut Nail manufacturers are desirous, as far as possible, to meet the views of the trade in this regard, hoping that thereby the sale of Cut Nails will be promoted and the tendency toward the use of Wire Nails checked. At the same time they are naturally desirous of having some method by which they will be aided in obtaining a better price for Nails, it being conceded that for some time the sale of Nails has been attended with little, if any, profit, and in many cases with absolute loss.

In order to show the difference between the three methods of selling Cut Nails which are now before the trade, we give below the cost of an assorted carload, estimated in the three methods. The following is the cost of an assortment of 250 kegs on the old Cut Nail card at $1.40 basis, f.o.b. mill, with a 35 cent average :

3d	Fine,	10	kegs	$1.50 extra	$15.00
4d	Flat,	5	"	.60	3.00
4d	Common,	5	"	.60	3.00
5d	"	5	"	.60	3 00
6d	"	25	"	.40	10.00
8d	"	60	"	.25	15 00
10d	"	70	"	.20	14 00
12d	"	30	"	.15	4.50
20d	"	10	"	.15	1.50
40d	"	5	"	.05	.25
8d	Finishing,	10	"	1.60	16.00
10d	"	10	"	.85	8.50
60d	Common,	5	"		
		250	" at	1.40 basis	350.00
					$437.75

The following is the cost of the same assortment purchased at a discount of $1.25 from list, January 31, 1893, f.o.b. mill :

3d	Fine,	10	kegs	$4.00	$40.00
4d	Flat,	5	"	3.35	16.75
4d	Common,	5	"	3 35	16.75
5d	"	5	"	3.35	16.75
6d	"	25	"	3 20	80 00
8d	"	60	"	3.10	186.00
10d	"	70	"	3 00	210.00
12d	"	30	"	3.00	90.00
20d	"	10	"	3 00	30.00
40d	"	5	"	3 00	15.00
8d	Finishing,	10	"	3.20	32 00
10d	"	10	"	3.10	31.00
60d	Common,	5	"	3.00	15.00
		250			$772.25
250 kegs at $1.25 per keg					312.50
					$460.75

The following is the cost of the same assortment sold on the Wire Nail card at a base price of $1.25 :

3d	Fine,	10	Kegs	$1.60 extra	$16.00
4d	Flat,	5	"	.90	4.50
4d	Common,	5	"	.90	4.50
5d	"	5	"	.90	4.50
6d	"	25	"	.75	18.75
8d	"	60	"	.60	36.00
10d	"	70	"	.50	35.00
12d	"	30	"	.45	13.50
20d	"	10	"	.35	3.50
40d	"	5	"	.25	1.25
8d	Finishing,	10	"	.90	9.00
10d	"	10	"	.75	7.50
60d	Common	5	"	..	....
		250	"	at $1.25 basis,	$312.50
					$160.50

It will thus be seen that this lot of Nails costs approximately the same amount in the three different methods, the cost being as follows, in each case:

At the old Cut Nail card, $1.40 basis, 35 cent average	$437.75
At National Cut Nail Price-list at a discount of $1.25	460.75
At the Wire Nail card, $1.25 base	460.50

Trade Notes.

THE MONROE REFRIGERATOR COMPANY, Lockland, Ohio, make an announcement elsewhere relating to the Monroe Patent Stone-Ware Lined Refrigerator of their manufacture. The characteristics of this Refrigerator are noted in the text of the announcement.

KIRTLEY BROTHERS, 1213 Walnut street, Kansas City, Mo , in an announcement elsewhere show a sectional view illustrating Neff's Patent System of Elevating Water, and give a brief description of the system.

OATMAN'S ADJUSTABLE WROUGHT IRON EAVE TROUGH FASTENER is illustrated in an advertisement elsewhere, and a list of agents handling the device is printed in connection with the announcement.

THE UTICA, N. Y., PIPE FOUNDRY COMPANY have elected the following directors for the ensuing year: William M. White, Nicholas E. Kernan, J A. Williams, John L. Murray and Henry W. Millar. The board has organized by electing: Henry W. Millar, president; W. M. White, vice-president; John L Murray, secretary; N. E. Kernan, treasurer; inspectors of election, Charles I. Williams and John A. Kernan. The last year has been a prosperous one, according to the annual reports of the company. During the coming year the output will be increased between 40 and 50 tons daily, and 130 men will be employed during the entire year. Improved appliances are soon to be put in.

H. R. DE MILT & Co., 238 Water street, New York, announce to the trade that they have now in stock and ready for shipment the following brands of American Roofing Tin made in New York, namely: De Milt's First New York, De Milt's Manhattan, and De Milt's First New Jersey. These brands are stated to be a superior quality of Terne Plates. Messrs. De Milt & Co. are also sole agents for P. H. Laufman & Co.'s American Roofing Tin.

HUGH ARMSTRONG, Room 23 Laclede Building, St. Louis, Mo., has been appointed agent for St. Louis and vicinity for Gummey, Spering & Co., the proprietors of the Continental Tin Plate Works, Philadelphia, Pa. He will handle the various products of these works, which include the Eagle, Liberty, Phenix and Climax plates.

CINCINNATI MFG. COMPANY, Cincinnati, Ohio, issue a spring supplement, 1893 The supplement is devoted to Paint, Whitewash, Shoe, Scrub, Horse and Window Brushes, Cotton Mops, Whisk Brooms, Turkey Dusters, &c. Also, Nested Wood Bird Cages, Breeding Cages, Galvanized Poultry Netting, Screen Wire Cloth, Riddles, Sand Screens, Rat and Mouse Traps, Wire Moss Baskets, &c. A discount sheet accompanies the catalogue.

AMONG recently authorized corporations in Illinois are the following: Magney-Cate Mfg Company, at Freeport; capital stock, $50,000 for the manufacture of hardware specialties; incorporators, Rufus L Cate, Joseph P. Magney and Clarence E Calhoun. The Bradford Stove Company, at Chicago; capital stock, $100,000; for the manufacture of stoves and fittings; incorporators, Francis Jackson, Thomas E. Paxton and Arthur C. Conway. The Anderson Coke, Gas & Power Company, at Chicago; capital stock, $1,500 000; to purchase the patented inventions of James C. Anderson as far as they relate to coking coal and the recovery of the by-products therefrom ; incorporators, J. C. Anderson, J. F. Anderson and J. C. Cushman. The Excelsior Machinist Company, at Chicago; capital stock, $10,000; for the manufacture of machinery, tools and merchandise; incorporators, Reinold F. Paulson, Jens L. Christensen and Jesse Cox. The Ludowici Roofing Tile Company, at Chicago; capital stock, $40,000; for the manufacture of clay; incorporators, Henry B. Skeele, Harris Pomeroy and Charles W. Allen. The Gillespie Mfg. Company, at Chicago; capital stock, $50,000; for the manufacture of burglar alarms; incorporators, Henry R. Gulleepie, Thomas Robinson and Edward W. Gillespie. The Althouse Automatic Car Coupler Company of the United States and Canada, at Chicago; capital stock, $3 000,000; for the manufacture of cars, car couplers and railway supplies; incorporators, Henry Vincent, William Bannerman and John C. Amendt. Bracey Improved Spike Company, at Chicago; capital stock, $100,000; for the manufacture of railroad spikes and supplies and for general manufacturing; incorporators, M. J. Frost, B M. Taussig and W. N. Williams The Ruebs' Molding Sand Papering Machine Company, at Chicago; capital stock, $100,000; for the manufacture of sandpapering machines; incorporators, Lester A. Brown, Robert H. Wiles and Harry Bitner. The Lake Superior Fuel Gas Company, at Chicago; capital stock, $3,000,000; for the manufacture of fuel and illuminating gas, the erection of gas plants and the erection and operation of plants for the production of electricity for light, heat and power; incorporators, Faye Walker, Robert H. Harris and L. B. Langworthy. John A. Brown Novelty Company, at Decatur; capital stock, $18,000; for the manufacture of hardware specialties and stamped goods; incorporators, John A. Brown, Lewis S. Bonbrake and James L. Thayer.

ON FRIDAY of last week Robert L. Walker, president of the Youngstown Stamping Company, Youngstown, Ohio, and of the Girard Stove Works, at Girard, Ohio, made a personal assignment to H. K. Taylor of Youngstown, Ohio. As a result of the assignment of Mr. Walker, the Youngstown Stamping Company also made an assignment, and W. C. Hine, secretary of the concern, was appointed assignee. The Girard Stove Works also made an assignment, with assets stated at $30,000, and liabilities unknown. The Youngstown Stamping Company were established in that city on March 1, 1887, with a capital stock of $40,000, which was later increased to $50 000. When operations were first commenced only 25 persons were employed, but the business of the concern grew rapidly and at the time of the assignment about 150 persons were on the pay roll. The concern manufactured a general line of sheet metal goods and glass oil cans. It is thought an arrangement will be effected whereby the plant will continue in operation under the management of W. C. Hine, who has been secretary since the organization of the concern.

A CONVENIENT household article known as the hamper and toilet case combined is put on the market by the Folding Bath Tub Company of Marshall, Mich. The cabinets are made of ash with natural or antique finish, with the lower compartment for holding soiled clothes, pivoted at the bottom to fall forward. There is a ventilating flue at the top. It is designed to be placed in either bath or sleeping room, affording as it does a toilet case in connection with a hamper.

IT IS ANNOUNCED that the Stuart-Peterson Company, who recently sold their property on Noble street, Philadelphia, Pa., to Hoopes & Townsend, have purchased the large brick building of the National Bureau of Engraving Company, Burlington, N. J., and will remove their plant there in a few weeks. The building is now being put in readiness. The company, it is stated, will continue the

manufacture of Hollow Ware and Porcelain-Lined Goods, employing about 150 hands.

UNDER DATE FEBRUARY 15 the Iron Clad Mfg. Company, 22-24 Cliff street, New York, announce in a circular letter to the trade that they have commenced suit against the Haberman Mfg. Company for infringement of letters patent No. 296,206 of April 1, 1884, and No. 386,023 of July 10, 1888. The trial of this suit is to determine the questions of validity of the Iron Clad Mfg. Company's patents, and infringement by the Haberman Company.

THE STANDARD FIBER WARE COMPANY, Mankato, Minn., favor us with specimens of the wall calendars which they are distributing. These are composed of large cards, on the margins of which are printed numerous cuts of the company's specialties, making a very attractive border. The upper portion of the center of one of the cards presents a copy of Gerome's picture, "Last Prayer of the Martyrs." Another shows Herring's, "A Winter Farm Yard." Leaves for each month are attached to the lower part of the cards.

THE NUBIAN IRON ENAMEL COMPANY'S Works, at Cragin, Ill., were destroyed by fire on the 17th inst. The fire was discovered in the vat room at noon, and the Chicago fire department was immediately notified, but the icy condition of the streets and a blinding snow storm caused considerable delay in the arrival of the engines, and the works were completely destroyed. The loss on buildings and stock is stated to be fully covered by insurance. The manager, Charles E. Bonnell, is noted for his energy and enterprise, and it is not likely that he will suffer much time to elapse until manufacturing operations are resumed.

THE GOSHEN SWEEPER COMPANY of Grand Rapids, Mich., report having had a successful year in 1892, and are prepared to do a much larger business in 1893, having added materially to their machinery and other necessary fixtures. They, like some other manufacturers, are dissatisfied with the space allotted them at the World's Columbian Exhibition, claiming to have put in an application for 400 feet and being awarded but 48 feet of space. Other manufacturers of Carpet Sweepers have secured 80 feet, and the Goshen Company have concluded that unless they can have the same opportunity as their competitors they will save the money which will be required to make a creditable showing. They are still in hopes to have their space increased, as a number of applicants among their neighbors have concluded not to use the space awarded them. The number of improvements made in Carpet Sweepers by the Goshen Company within the past year have made them very popular with users, and they now receive a large quantity of orders by mail, whereas, when they first began manufacturing them at Grand Rapids, their business was entirely done by salesmen. They now have six representatives traveling from the home office, with selling agents in New York, Boston and Philadelphia, and expect to open an office and carry a stock in New York City at an early date.

A FIRM at Atlanta, Ga., engaged in the Tin Plate and Tinware business, as manufacturers and importers, write us under date of February 8th, respecting the business outlook in that section, as follows: "The South has had a spell of unusual depression, supposed by people generally to have been caused by the low price of cotton ruling for some time past. We are pleased to say, however, that the outlook is now much more encouraging. Reports from all sections of this and adjacent States where we seek trade indicate increase of business in the mercantile line, and good prospects for same in the future. Also good prospects in the way of building. Our own business for the month of January showed an increase of 60 per cent. over that of the corresponding month of last year."

JAMES A. COE & Co., Newark, N. J., well-known jobbers in Iron and Steel, have added a new department to their business and will hereafter handle and deal in Tin Plates. They have already arranged with one of the prominent manufacturers in the East for a Roofing Plate, which they are selling under the name of Staple. This is described as a high grade rolled Terne Plate, made by the palm-oil process and with a large percentage of Tin in the coating. Messrs. Coe & Co. intend to add immediately other brands of Ternes, as well as Brights, to meet the demands of roofers and sheet-metal trades for Tin Plates.

THE JOHN TORREY COMPANY of South Newmarket, N. H., send us circulars of what is known as Stovene Oil Stove Polish. It is said to be the great iron preservative and entirely different from any other stove polish offered to the trade. It is claimed that the oil in this polish does for the stove what clear oil does for paint. In the New Hampshire *Republican* of February 2 is a short article relating to the company, covering its location, officers, line of goods manufactured and prospects. In this article the superintendent of the factory, Daniel L. Langlands, is quoted as saying that the present output of the works is 12,000 boxes of Stovene daily.

NORTH BROTHERS MFG. COMPANY, Philadelphia, Pa., issue an oblong circular, bound in colored paper, which they entitled "Seasonable Hints for Household Use." The hints are in the line of recommendations respecting the Gem, Blizzard, American and other Ice Cream Freezers of their manufacture. They also show Ice Chippers, New Keystone Beater, Cake Pans and other articles. A price-list accompanies the illustrations.

H. R. IVES & Co. issue notice, under recent date, that, having resumed control of their business, they will be in a position to execute orders promptly for the coming season. The Longueuil works will be run mainly on staple hardware. Special lines, such as Mrs. Potts' Sad Iron, Iron and Brass Bedsteads, Iron Railings and Crestings, Hot-Water Heaters, Soil Pipe, &c., will receive particular attention.

AVERY STAMPING COMPANY, Cleveland, Ohio, issue a little pamphlet calling attention to a few of the articles of their manufacture in the line of Pressed and Stamped work. They add that they not only do all classes of Light and Heavy Blanking, Pressing and Stamping of Sheet Metal, but also build presses, dies and special tools for this class of work. The goods enumerated in the circular include Cylinders, Troughs, Tanks, Cones, Washers, Bottles, Hay Rakes and Harrow Seats. These goods are illustrated and price-lists given.

RAYMOND & CAMPBELL MFG. COMPANY, Middletown, Pa., make an interesting announcement elsewhere respecting the Sun Steam and Hot-Water Heaters (Lindemuth's patent) of their manufacture. The several advantages of the Heaters are referred to, and a variety of different views of the Heaters constitute the border of the announcement.

N. & G. TAYLOR COMPANY, Philadelphia, Pa., inform us that owing to their increasing business they have decided to open an office in New York City. They have secured facilities at 201 Water street, where in the future they will carry a full stock of their special brands of Bright Tin, Roofing Tin, Solder, Galvanized Iron and Tinners' Trimmings generally. The agency will be in charge of Benjamin B. Morrison, who is fully conversant with the trade in New York and vicinity, having been in their line for many years. Messrs. Taylor & Co. are also represented at Chicago, Omaha, Kansas City, Galveston and New Orleans, besides having numerous sub-agencies. They write us that their Tin-Plate works are in full operation and that the product they are turning out is giving full satisfaction.

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THE METAL WORKER.

NEW YORK AND CHICAGO.

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CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....219 Superior Street

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Production of American Tin Plates.

We print this week the report of Special Agent Ira Ayer of the Treasury Department on the production of tin and terne plates in the United States during the quarter ended December 31, 1892. The results of the industry, as set forth in this document, may be regarded as eminently satisfactory. The amount of American tin and terne plates proper produced during the three months covered by the report was 19,756,491 pounds, of which a little less than one-third consisted of bright tin plates, as against 10,952,725 pounds in the previous quarter, or an increase of nearly 100 per cent., while the total of the two quarters combined was considerably more than double the whole production for the twelve months ending June 30, 1892. Of the tin and terne plates produced during the past quarter, 8,043,449 pounds, or more than 40 per cent., were made from American rolled black sheets and this amount is likely to be augmented during the current quarter. Thirty-two concerns are reported as actively producing, while ten more are preparing to do so. Eighteen firms are either making or are about to make their own black sheets for tinning; and of the entire product of tin and terne plates during the past quarter 91 per cent. consisted of the lighter class of plates, weighing less than 63 pounds per 100 square feet. A steady and regular increase of production, together with continued erection of new and enlargement of old plants, are features of promise marked by the report of Colonel Ayer.

A Late Spring.

Some weeks ago we remarked upon the then probable severity of the winter of 1892-93, basing the opinion that an unusually severe winter was likely to be experienced upon the fact that large quantities of snow had then already fallen over wide areas of country, and that sound ice of considerable thickness had already formed in large quantities. We, therefore, had accumulated in early winter—almost at the very beginning—a large store of cold, so to speak, which, when the sun should begin to return northward, would, like ice in a refrigerator, neutralize the effect of increased solar heat. The winter has been conspicuous for the infrequency and short duration of thaws; and now, having passed the threshold of spring, large quantities of ice and heavy snow deposits cover nearly all the more elevated regions of the Middle States, while over the Northern and Northwestern portions of the United States, and over the continent northward, wintry conditions stubbornly oppose the advent of spring weather. It is apparent that we may anticipate a late spring.

A Curious Effect of Snow upon Climate.

A curious effect of snow upon climate has been brought to light by observations of the scientist, M. Chaix, at Geneva in Switzerland. He carefully took temperatures of the air at four different hights, of granular, powdery and compact snow, and the surface of bare ground. At a hight of 39 inches and at a hight of 78 inches above the surface of the snow the mean temperature of the air was found the same, and this temperature was nearly always found to be very little higher than that of the snow surface, except when active thawing was in progress. With snow covering land to a depth of 5 inches, the surface of the ground was, on an average, 8 1-10° F. higher than that of the upper surface of the snow. But when the temperature of the surface of bare ground was compared with that of the snow, it was found that it was only 6½° F. higher than the upper surface of snow 5 inches deep. It was found that the presence of humidity in the air decreased the difference of temperature existing between it and the snow immediately below it, while in elevated regions, where air is pure and dry, the radiation of heat from the snow is so rapid as to widen this difference to a marked degree. As the air at a hight of 6 feet above the snow approaches nearly the temperature of the latter, the presence of large bodies of snow over wide areas must exert a great influence upon the climate even of regions where snow is not present, but situated so as to receive the winds blown from the snow fields.

How It Will Affect Trade.

A late spring always benefits the coal trade, particularly if it has been preceded by a hard winter. Prudent householders who practice purchasing a year's supply in the early summer will this year, many of them, find that they did not buy enough to carry them through; this will help to swell the spring trade, while the winter trade has already had an unusual demand from those who purchase in small quantities as wanted, such customers being a numerous class in all large cities. Some other branches of trade will be injured. With a late spring, summer follows so suddenly that articles produced especially for spring use are not bought at all by many who would otherwise be purchasers. The result upon all such branches of trade is usually a surplus stock to be carried over, and frequently sold at a much lower price than otherwise might have been obtained. Articles necessary to agriculture or the mechanical trades are very little affected by seasons. They must be had, all the same, though the demand for them may be somewhat retarded. This spring is likely to be fruitful of damage to property lying along strong flowing streams now firmly locked by ice, as present conditions are favorable for numerous freshets. Unusual delays in the opening of streams for navigation are likely to be the rule, and activity in commerce will thus be more or less obstructed.

Trade Education.

So much has been said and written within recent years—in *The Metal Worker* and elsewhere—about the value and necessity of better technical education for the training of good and efficient workmen, that it seems as if the subject had been so thoroughly threshed out that to refer to it again would be superfluous. Yet, in the opinion of quite a number of our readers, from whom we have recently heard, the matter still requires to be steadily hammered at, for "things are going from bad to worse." This is not our own croak, but it is the reiterated statement of a number of plumbers, tinners and sheet-metal workers, who are employers of labor, in various sections of the United States, and especially in the West. "Why can we not get competent workmen?" "Cannot something be done to raise the standard of the plumber, or the tinner?" as the case may be. These are the pertinent queries we continually receive. The pressing need of a better method of training the younger workmen in these and kindred crafts is evidently keenly felt. The incompetent workingman is a real grievance, and one that demands serious consideration.

The Solution of the Difficulty.

That there is a solution to the problem the records of the New York Trade Schools and its graduates amply prove. Those young men who have received the diploma of efficiency from that institution and who have gone forth to work at the trades there taught them throughout the country, are the best advertisement such a system could desire. A few weeks since we received a letter from a firm doing business in Colorado, in which it was remarked: "Through reading your articles on the New York Trade Schools we were induced to send a younger brother there to learn the plumber's trade, a step we have never regretted, as it fitted him to take charge of our work. He is to-day a first-class plumber." Cannot others similarly situated go and do

likewise? Of course we know that it is only the few who could afford to avail themselves of the New York Schools in this manner. What is really wanted is that similar educational institutions should be brought to them, or to within a reasonable distance of them, so that all beginners may at least have the opportunity of obtaining a thorough training in their craft, instead of picking up their knowledge haphazard, as they too often do at present.

Domestic Ventilation.

Although proper ventilation is receiving more of its due meed of attention in our public buildings and in the large new structures now being put up for office and other purposes, the public still remain, in large measure, callous and apathetic in this connection, when it comes to a question of the houses in which they and their families dwell and pass the greater part of their time. Why this should be so it is hard to say; but it is nevertheless a fact that even men who are particular about the due supply of fresh air in the places where they work during the day, are content to go home and pass their sleeping hours under conditions which are most unsanitary. Houses go up by hundreds in the cities in which no provision whatever is made for the proper circulation of air and the purity of its supply. In the majority of rooms in city and suburban dwellings, during the winter at least, the only source of air supply of any kind is the register, and the air has to escape as it best can through an occasional open door or window, or through any cracks and crannies it may find. The only method of insuring ventilation is the primitive one of opening the windows, and that is not always comfortable or desirable during such severe weather as this winter has brought with it. Especially is this felt at night, where, in a small room, the choice has to be made between inhaling the atmosphere laden with impurities, or sleeping near an open window, with the chance of being snowed under or blown out of bed by a sudden change of weather. Now, it is perfectly feasible to so build a house as to insure this desirable feature of adequate ventilation. Every dwelling should be provided with a proper air shaft, with connections from each room, or flue to carry off the heated and vitiated air which accumulates there.

Unhealthy Sleeping Quarters.

A simple test, which we have seen carried out, should convince the most apathetic of the necessity for a better air supply. Take some of the condensed breath collected on the cool window panes of a room where a number of persons have been assembled, and burn it. It will smell like singed hair, showing that organic matter is present in it. But further, let the condensed breath remain on the windows for a few days and then examine it under the microscope, and it will be found to be alive with animalculæ. It is the inhalation of air containing just such putrescent matter that is being carried on in most of our sleeping rooms night after night in the cold weather. This is the secret of much of the lassitude and headaches felt in the morning, in place of the refreshment which sound sleep should bring. The agitation for fresh air is no "fad." It is an all-important question which needs to be impressed again and again upon the minds of this generation.

Liability of Employers for Accidents to Workmen.

The vast majority of manufacturers are sure to be confronted, sooner or later, with the question as to what they propose to do to recompense an employee who has been injured while in their service. While they may employ every guard and safety device known, and while they may repeatedly caution and conspicuously post printed directions, a more or less serious accident is bound to come.

Accidents occurring in the ordinary machine shop may be said to be due to one of the three following causes: Where it is of an unprecedented nature and could not, therefore, be foreseen and guarded against; when long familiarity with a machine has rendered the operator careless; and finally when, through innate wickedness and perfect laziness, an employee deliberately permits himself to be mutilated, trusting in the prospective suit for damages for his reward. With the second of these conditions we are all acquainted and have seen examples.

As illustrations of the first and third conditions, it is only necessary to mention two cases recently described to us by the proprietor of one of the most prominent machine tool manufacturing establishments in the country. A certain portion of the upper surface of a large casting was being planed. At the end of one of the cuts a piece was detached from the corner of the casting with such force as to permanently injure the eye of the operator, who chanced to be in range. This was one of those strange occurrences that could not be provided for. The firm promptly provided for the relief of their injured workman. The next case, in illustration of the third condition, was injury caused by a large traveling crane. An employee deliberately put his hand upon the track and permitted the wheels to run over it. There was no sudden alarm, of any description, that would offer a reasonable explanation for his seeking support and placing his hand upon the track. His employers conceived that his action was deliberate and the matter was taken to court.

That the employer of men in almost every industry understands perfectly that those working for him may be injured is conceded, as is also the fact that it is the exception when an employer is not willing to repair, as far as lies in his power, any injury to one of his men.

A phase of this subject, more particularly applied to miners, is discussed in a recent editorial in *Engineering*. Our contemporary reviews the German law covering assurance against accident, which has been established about seven years. Employers are compelled to provide an insurance fund from which to reimburse those of their employees who meet with accidents, however they may be caused. In England employers and employed carry on joint funds for insurance against accidents in mining industries. Commenting upon the German method, our contemporary says:

> The most striking feature of the German system of State insurance against accidents is the serious increase of cost that it has entailed from year to year upon the employers, who are compelled by law to provide the whole of the funds required. This is the essential difference between the German system and our own.
>
> In other words, one is compulsory and the other voluntary, as far as the employer is concerned.
>
> Generally speaking, in the absence of State compulsion, the two classes concerned are in Great Britain ready to share the burden, and in the mining industry a considerable part of the workman's earnings are regularly set aside to make this provision. The employer is generally ready to add to whatever fund is thus established, a moiety, at least, of the amount provided by the workmen, and the fund being jointly administered, it affords a desirable and a useful opportunity of bringing the two sides together and enabling them better to understand and appreciate one another. The funds provided in this way in the principal mining districts have been very considerable, but in some localities the recent course of the fund has not been satisfactory. . . .

Mr. Chamberlain would make employers wholly and solely responsible for the indemnification of those who suffer accidents in their employ, and he suggests that the tax so levied upon capital should be recouped by an increase of the price of the commodity produced, so that, in the long run, the expenditure incurred should be paid by the general public as consumers.

The question is a debatable one in almost all industries and in every country largely interested in manufacturing. The exact relationship of the employer to the employee—accidents to the latter only considered—and the proper grading of the nature of the accident, and the "contributary negligence" of the employee himself, are the most important factors of the problem. We do not think these points can be satisfactorily settled by any arbitrary arrangement such as is proposed by the German law.

Crinolines and the Iron Trade.

The rumored revival of the crinoline suggests the possibility of a new impetus being given to that branch of the iron trade which profited so largely from the adoption of this fashion some 30 years ago. Fortunes were made in the hoop-iron business when the metallic crinoline was last in vogue, and it is quite likely that manufacturers of this material may come in for a good thing again. Whether the distension of the female skirt would add, however, to the happiness and content of the race at large is questionable. When we recall the satisfaction with which the average "male creature" contemplated the passing of the crinoline fashion many years ago, we rather incline to the opinion that the resurrection of this article of apparel would not be regarded with the same equanimity by those whose recollection carries them back to the time when they suffered from its inroads on their comfort and convenience in the days of old. In public conveyances, churches, theaters and meetings of both sexes, social and otherwise, its existence was wont to be exceedingly palpable. And how would the fashion accord with the city crowds of to-day? How would a bevy of "be crinolined" fair get on, for example, amid the crush and push prevailing on the elevated railroads of this city, or the Brooklyn Bridge, every evening? It would be an interesting problem to calculate how the already congested condition of these and similar city outlets could be modified to admit of the accommodation of a few thousand iron-circled skirts a yard and a half in diameter. No, we cannot think that even the hidden autocrats, who rule the world of fashion, could be heartless enough to inflict such suffering upon humanity as would result from the wholesale adoption of the time-honored crinoline. However, if the fiat goes forth, and it *must* come, there will be some at any rate who may rejoice. The hoop iron trade will have cause to be exceedingly glad. But such is the innate selfishness of the majority of men, that it will not, we fear, be considered an unmixed blessing by those not directly interested in the manufacture of this product.

Governor McKinley is involved to the extent of about $100,000 by indorsing for Youngstown manufacturers, but friends come nobly to the rescue.

THE LETTER BOX.

Deafening for Floor.

From D. M. F., *Brook, Ind.*—I have put an iron ceiling below the floor separating a general store from a public hall. As a deafening of some kind is required, I propose putting a layer of 3 inches of mortar and sawdust on the iron, but the owner of the building is not satisfied with the plan. What method would be better?

Answer.—A layer composed of 3 inches of mortar and sawdust might answer as a deafening when laid directly on the iron, providing the iron was secured to the joists in such a manner as to resist the weight and there was no danger from the moisture contained in the mixture causing the iron to rust. This danger could be obviated by putting in a false floor between the joists upon which the mixture could be laid. A common method is to first lay a floor on the joists, then lay strips of wood ⅞ x 2 or 2 x 2 inches on the floor, above and parallel with the joist. The spaces between the strips are then nearly filled with a mixture composed of cinders and mortar, after which the floor is laid. There are a number of kinds of deafening felts that can be placed between the floors that are said to answer the purpose. Another material, and one that is highly recommended, is mineral wool. The spaces between ceiling and floor can be entirely filled, or a false floor can be laid between the joist, so there will be about 2 inches of mineral wool used.

A Problem in Algebra.

From H. M., *Paxton, Neb.*—Please solve the following algebraical problem in *The Metal Worker*. The problem is: Given the remainders of any unknown quantities, with divisors of 3, 5 and 7, to find the unknown quantity. In the case in mind, the remainder with divisor 3 is 2, with divisor 5 is 3 and with divisor 7 is 1. Expressed algebraically it would be:

$x - 3a = 2$, $x - 5b = 3$, $x - 7c = 1$.

Answer.—It is impossible to answer our correspondent's inquiry unless he lets us know the value of a, b or c. Take, for instance, where 3 is contained into x a times with a remainder of 2. If he lets us know how much a is, it is very easy to find what x is equal to. Assuming that a is equal to 2, therefore, and substituting in the first equation, we have:

$x - 3$ times $2 = 2$, or $x - 6 = 2$, or $x = 8$.

On the other hand, if we assume that N has any value, say 5, for instance, it will be easy to solve for the other letters, and we have in the three equations:

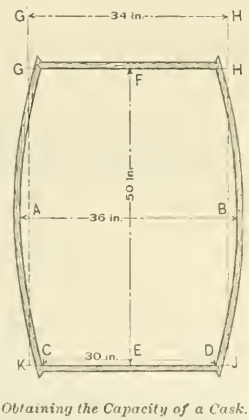
$$a = 1,\ b = \tfrac{1}{2},\ c = \tfrac{1}{4}.$$

To put the case very simply, the following arithmetical rule covers it: Multiply the divisor by the quotient; add the remainder, and the result is the given quantity. All these suggestions, however, do not cover the point. The fact is that we have three equations with four unknown quantities given by our correspondent, and in such a case the unknown quantities cannot be found. It is necessary to have as many equations as unknown quantities for an algebraical solution.

Obtaining the Capacity of a Cask.

From N. O., *Camden, N. J.*—I would like to have a method published in *The Metal Worker* for obtaining the capacity of a barrel or cask in cubic feet, cubic inches and gallons. The curve or bulge of the cask is what bothers me.

Answer.—One method for obtaining the capacity of a barrel or cask is to determine the size of a cylinder having the same capacity as the barrel or cask, and then obtain the contents of the cylinder.



Obtaining the Capacity of a Cask.

Take for example the cask shown in the accompanying diagram, in which A B represents the bung diameter, C D, the head diameter, and E F the length. A cylinder having (nearly) the same capacity as cask is indicated by G H J K. The diameter of this cylinder, G H or G H, represents the mean diameter of cask. The mean diameter of a cask is found by adding to the head diameter two-thirds of the difference between the bung and head diameters, or if the staves are not much curved, by adding six-tenths. This reduces the cask to a cylinder.

In the diagram, the bung diameter of cask is 36 inches and the head diameter 30 inches. The difference between the two is 6, and two-thirds of $6 = 4$. This number is to be added to the head diameter of cask. Then $30 + 4 = 34$ inches, the mean diameter of cask. Then to find the contents of cask shown in diagram we have simply to find the contents of the cylinder G H J K, which is (nearly) the same capacity as the cask. In performing the operation, if the dimensions are given in inches, the result will be in cubic inches. If the dimensions are given in feet and fractions, then the result will be in cubic feet. As there are 231 cubic inches in a gallon, the former method may be found the most convenient.

To find the contents of a cylinder, multiply the area of the base by the hight. To find the area of the circular base, multiply the circumference by one-half the radius. To find the circumference of a circle, multiply the diameter by 3.1416. By the above rule it is necessary to find the circumferenceof the circle in order to obtain the area. This is obviated by another rule, which is as follows: To obtain the area of a circle (base of a cylinder) multiply the square of the diameter by the decimal 0.7854. The square of a number is obtained by multiplying the number by itself. Then to find the contents of a cask in gallons, we multiply the square of the mean diameter by 0.7854, and the product by the length. This gives the contents in cubic inches. Then, by dividing by 231, we obtain the contents in gallons. A more convenient way of performing the operation is as follows: Multiply the length by the square of the mean diameter (in inches), then multiply this product by the decimal 0.0034. The product will be the contents in gallons and decimals of a gallon.

Flux for Soldering Roof.

From W. C., *Jacksonville, Fla.*—I see by the Letter Box article on soldering a roof, contributed by "B. E. H.," Philadelphia, in *The Metal Worker* of February 11, that he has been somewhat troubled with a tin roof rusting out every three years. If he has to put on the roof again, as I think he will probably have to do, I would advise him to cover the roof first with some kind of building paper, then put on the tin, and he will not be troubled so soon with it wearing out. The paper will prevent the dampness condensing on the under side of the tin and rusting it. I have used it a long time here and find it better than painting the under side of the tin. But do not use tar paper. I have used sperm candle as a flux occasionally, and have always found it to work well.

Removing Water from Cellar.

From J. E., *Confluence, Pa.*—I have a wet cellar that has at present from 4 to 8 inches of water in it. We cannot drain it on account of the cellar being lower than the high-water mark. The water comes in from the lowest point of cellar and at a point to which the floor drains. No water comes in through the side walls. Do you know of any arrangement for lifting the water and throwing it out that does not depend upon city water pressure, or can you suggest any remedy for the difficulty?

Note.—Our correspondent's reference to high water is evidently the high water of some neighboring river. If it was tide water it would be a simple matter to put in a drain with a back-water valve, so that the cellar would drain at low water, and nothing would enter at high water

However, that suggestion is impracticable, and likewise it does not appear that the cellar drainers on the market would be of use, from the fact that they depend upon water or steam pressure for operation. To remove the water, we fear our correspondent will have to use a pump or bucket, and as to the prevention of the evil, perhaps a coat of Portland cement on the cellar floor would prevent the inflow of water. We submit this question to our readers and trust that those who can will assist with their experience.

Roofing Cement.

From O. B., *Cincinnati.*—There are a great many tin roofs so old that they cannot be patched with solder, in which case I use cement. I find, however, it is pretty expensive to buy it all mixed and would like to know some receipt for making a roofing cement of good quality. I would like to mix it in quantities of 50 and 100 pounds.

Will Somebody Tell Him?

From O. I. C., *Clearwater, Ill.*—As your paper is quite interesting reading, many an old, experienced hand will probably see this, and can, if he will, give for the benefit of the craft at large the proper size for a hot-air pipe leading from the furnace to heat a room 15 feet square with a 10-foot ceiling. I don't want the cut and dried observation of the pen and ink expert that the question is vague, and it depends on conditions, &c. The question is asked just as a young workman asks his boss, and the boss has to answer it by taking in all the possible conditions and telling him how to provide for every one of them, bay window and all. I want just that kind of instruction in the hammer and shears style from the know-how of those who have done the work and felt the consequences. I have been waiting some time for things to get a little quiet in the shops all through the country, so my question would receive attention and the old hard workers would have time to write the size they would use under different conditions, with the conditions and the why of them. They have some advanced laws on heating in Massachusetts, and I hope some Yankee will give us a line and that your paper will be pushed a little for space to give us all a little education.

Preserving Tin Roofs.

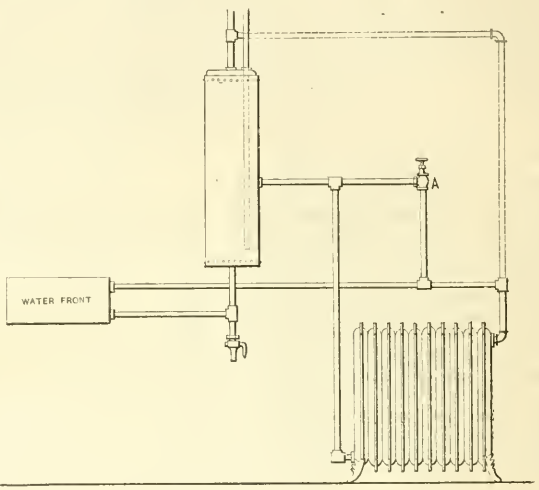
From E. F. B., *Greenville, Pa.*—In answer to the question of "C. L. F.," who asked what good the sand will do on the last coat of paint on a tin roof, would say that if the painting and sanding are properly done, the sand will form a solid body on the surface which will protect the roof. Were your correspondent here I could show him a roof made in this manner 22 years ago, which has never been painted since and is still in good condition.

Leaking Cans.

From J. W., *Wappinger's Falls, N. Y.*—In *The Metal Worker* of April 20, 1889, you will find a letter from me describing the same trouble that "G. A. K.," of Akron, Pa., whose communication was published in *The Metal Worker* February 18, 1893, complains of. I wrote for help to my fellow-craftsmen, but received none. I asked a manufacturer of acids, who is also an expert lead burner, what to do, and he advised me to wax the joints. Later I had another 14-ounce copper tank, 3 x 4 feet, double seamed and locked, with corners heavily soldered inside and fitted tightly in a wooden box made of 2-inch boards. This tank sprang a leak on me and I discovered that the solder was all gone from some of the seams. Instead of trying to resolder them I simply warmed the seams with a gas jet and waxed them smoothly with common beeswax, and I have had no trouble since. The water used in the tank was well water pumped in through iron pipes. Your correspondent at Akron will find that wax will resist any acid and is available for cold water tanks.

Radiator and Water Front.

From J. G., *Philadelphia, Pa.*—I would advise "F. P.," East Fairfield, Vt., whose inquiry appeared in *The Metal Worker* of February 11, to arrange his radiator and circulating boiler as shown in the inclosed sketch. He should use not less than 1-inch circulating pipe and locate at the highest point of the top circulating pipe to radiator, a vapor pipe of about ⅜-inch internal diameter, and carry it to a point above the supply tank of the boiler or into the hot-water pipe, as shown in dotted lines. In running the pipes care should be taken to grade them, so that no steam or air can be lodged in them. This arrangement will give all the circulation he desires at the radiator and also at the boiler, if the water front is a good one. The angle valve marked "A" may be opened for summer use when the radiator is not required. If both the radiator connections are at the bottom of the radiator, then he must run an air pipe from the top of radiator and connect it with the air pipe shown in the sketch.



Radiator and Water Front.

A Word to Apprentices.

From E. B. H., *Carmel, Maine.*—I wish to say a few words to the young men who are now serving apprenticeship at the tin business, and who do not have the advantages of the trade schools which are located in several of our large cities. It was my lot to learn the trade in a country shop of a man who was a very good workman, but who did not know or care much about the art and science of pattern cutting. He had been in business some 15 years, and did not have a treatise on pattern cutting of any kind, nor did he take a trade paper. Consequently, what I learned about pattern drawing I had to pick up myself. I learned many problems in this way: I purchased a book on pattern cutting, and after my day's work was done would take a sheet of paper and square and compasses and sit down at the bench and would draw a small design from some one of the problems. I continued in this way until I had mastered all the problems in the book. By following this plan the young apprentice will be surprised at the short time it will take him to become acquainted with the principles of pattern cutting and the vast amount of valuable knowledge he can acquire. It also has this great advantage—it sets him to thinking how to lay out work for an odd job that may come in; and also when he has a job that requires drafting it teaches him to rely on himself. It is a good thing to have help in the study of pattern cutting; but remember that if you take no interest in such work it makes no difference how much help you have, it will do you no good, while if you go at it alone every problem you master will be impressed on the mind and will always be ready when wanted.

Size of Coil Radiators.

From T. F., *New Prague, Minn.*—I wish to know the rule by which I can find how many lineal feet of 1-inch pipe of a hot-water system will be required for a given size of room. I would also like to know how many lineal feet of 1-inch pipe I should use for a given sized room in a heater exclusively made of 1-inch pipe with return bends and branch tees for circulation.

Note.—Our correspondent has not given sufficient particulars for us to answer intelligently. The size of a room is not a safe basis for calculating the amount of heating surface required. The location of a house, the material of the walls, and more especially the exposed glass surface of a room, have a great deal to do with the question of heating it. A certain size of room, for instance, in a house with walls packed like an icehouse would require very little heating surface, while a conservatory of the same capacity would require a great deal of heating surface. As a rough guide, we would say it has been recommended to use 1 square foot of hot-water radiating surface for from 30 to 50 cubic feet of space in dwellings. Figuring on 4 lineal feet of 1-inch pipe to a square foot of radiating surface, our correspondent can make the necessary deductions. As to the size of boiler surface for a given quantity of radiating surface the authorities differ, one well-known rule being 1 foot of boiler surface to every 40 square feet of hot-water radiating surface.

Roofing Contracts.

From H. C., *Pittsburgh.*—"J. J. B.'s" inquiry in *The Metal Worker* of February 28 about roofing contracts started me a-thinking, and I will give you my experience with a verbal agreement.

A party whose name and business I knew and with whom I was on speaking terms (an acquaintance only, no friendship, no knowledge of his standing) came to me stating that he was building two houses out of town and was recommended to call on me in reference to putting in the heating and cooking apparatus and doing the necessary roofing, &c. Who sent you? was my first question. He gave me the name of one of my best customers, one who has given me many a pointer when I needed them in my earlier years, and who is a leading dealer of this city. He also gave him as reference. I went to see the buildings. They were just started. He showed me the plans, but they were worthless. No one could make head or tail of them, neither the owner nor the carpenters. I asked for the size of the buildings and he gave me them. The total square feet over all, allowing for all projections of cornices, &c., was 1500 square feet, with 28 feet of leader. They were to be 5-room houses.

I gave him price on heating same; specified the ranges and also set price: and he said: "That is satisfactory; we will send you word in a few days, for the roof is ready, so that you can be prepared." I then said, "I will send you specifications and estimate what I intend to furnish, and what I will do for that money, and you send me acceptance." That, he said, was not necessary; he was not afraid but I would do what was right. "Well," I said, "now if your houses are any larger than the sizes you gave me I will charge you so much per foot extra. That is what I am figuring on; and the leaders must not exceed 28 feet; and if they are smaller I will allow you the same. There must not be over five runs of pipe from each heater, or I will charge you so much per foot extra; or, if less, I will credit you with the difference." I went over the estimate item by item, and he was perfectly satisfied with my terms—payments to be made as work progressed, and 20 per cent. to remain until houses were finished, as a guarantee of good workmanship, &c.

I started. After a few days' work my foreman sent me word that there was not enough tin. Strange, I thought. I went out and saw the brother of my customer, who was part owner and the paymaster of the firm. "Oh, that will be all-right," was his response. I finished the roofing, 3368 square feet, and 108 feet of leader. I measured the job, handed the measurements to the brother, and called his attention to the difference. He said, "We thought while we were about it we would give ourselves plenty of room, and altered the plans." No money yet! The partition studding was put up, and call made for pipes for heating. Out I went, ten rooms instead of five. I called the boss carpenter's attention to it. He was the father of the owners. He called in the paymaster, who said, "I suppose it is all right; the house will have to be heated, and if it is extra, of course that is all right." In went the pipes. No money yet!

I then stopped, requested some cash and got 50 per cent., and the promise that as soon as heaters were in I should be given the other 30 per cent. A heater intended for five rooms won't heat ten. Without asking any questions, I put in one large enough. Instead of six registers in each house I put in 11 and refused to put in ranges on account of so many changes, and not seeing more cash. I got done and presented the bill to the one I made the contract with.

Bill disputed! Would not pay. His excuse was, I had no authority to do any more than I had agreed to do. His brother or father had no authority to order it and he would not pay one cent over or above the contract.

I employed an attorney, started suit, filed lien, &c. Found out that there was $6000 of judgments ahead of me. They made their defense, filed affidavit, &c. I was not satisfied with my attorney's opinion and got another opinion. Both opinions were that he would beat me. I should have made a new contract, or have stopped. They offered 60 per cent. in settlement, and under advice of my attorney I accepted it and was glad to get it. I thus got a larger percentage of my bill than a few others. After the smoke cleared away I figured the second time. Result: net loss, $134.50. My first figuring showed a profit of $60. I have no comment to make.

Exhaust Blowers in Planing Mills.

From M. F., *Cincinnati, Ohio.*—Please tell me how to construct the blow pipes used in planing mills and other woodworking machine shops for taking up the shavings and dust. What size is necessary for the different machines and what size of blower in speed of fan is required?

Answer.—The piping used for removing chips, shavings and sawdust from woodworking machinery, although sometimes made of wood (and, therefore, rectangular in section) is almost universally constructed of galvanized iron of sufficiently heavy gauge to withstand the wear of the material passing throught it. The size of the pipe should be proportioned to the amount of material passing through it. In ordinary practice the following sizes of pipes will be found to be most satisfactory for the respective machines:

Surfacers or matchers, upper hoods, 7-inch.
Surfacers or matchers, lower hoods, 7-inch.
Surfacers or matchers, side hoods, 5-inch.
Double surfacers or matchers, upper hoods, 8-inch.
Double surfacers or matchers, lower hoods, 8-inch.
Double surfacers or matchers, side hoods, 5-inch.
Tenoners, 6-inch.
Pony planers, 6-inch.
Rip saws and resaws, 6-inch.

These sizes, which are for medium-size machines, may be varied somewhat in accordance with the size of the machine, but a pipe less than 5 inches should be avoided. Sweep up pipes should not be less than 6 inches.

Great care should be taken in the construction of the hoods, bearing in mind the principles that they must be as closely fitted as possible around the cutters and that their cross sectional area must not be increased so much as to decrease the velocity of the air which passes through them and thereby cause the shavings to drop rather than pass up the pipe.

The pipes from the hoods if carried up to a main pipe above, should enter on the side, not on the top, and all pipes should have easy bends, the internal radius of all elbows being equal to the diameter of the pipe. To select the proper size fan, add together the areas of all the branch pipes to the hoods and then choose from the manufacturer's tables a fan whose inlet has an area equal to this combined area.

This method will secure satisfactory results, notwithstanding the fact that some manufacturers or agents recommend that the fan be about 2 inches less than the diameter thus found, while others recommend that it be about 20 per cent. larger.

The truth of the matter is that the larger the pipe that will satisfactorily convey the material, the less the power required, provided the same volume of air is moved under the differing circumstances. Power will be saved by placing blast gates in the hood pipes, so that they may be closed when not in use.

Fans are usually speeded at from 4 to 6 ounces pressure, according to character of the shavings, the heavier shavings calling for the higher speed.

The practice should always be followed of placing the fan as near the work as possible and letting the greatest length of pipe come on the delivery end between the fan and the point where shavings are deposited.

As slight errors in design of piping system, selection of fan and speed at which it runs may seriously affect the amount of power consumed—which is never small—it is usually best to avail one's self of the experience of the manufacturers of planing mill exhausters, who are generally perfectly willing to give all needed advice to a customer.

Practical and Theoretical Furnacemen.

From J. P. C., *Roxbury, Mass.*—I saw a statement some time ago that it wasn't necessary for a man to be a pounder of tin to be a furnaceman. It may not be necessary to be a pounder of tin, but I claim that a furnaceman should have considerable knowledge of the business, and also be a practical mechanic. I have seen so much of those men who are not so that I wouldn't have them round for a moment if I could get a practical furnaceman. If they would sell a furnace, and stop at that, it would be all right. But after awhile they will go and set a furnace in a cellar, and call a tinman and tell him what to do. There's where the mistake comes in. The tinman knows more about the furnace in an hour than the salesman would know in ten years, and it is discouraging to him to receive instructions from such men. There is always more or less trouble with the work, and the employer is put to unnecessary expense. I don't think much of mere book-read mechanics; and the reason such men get into the furnace business is because the employers are usually not mechanics themselves. The young men taking their fathers' places as employers are still less so. Because they have been educated at college and think they know enough, they won't trouble to acquaint themselves with the tin shop and other business. They employ the class of men I speak of, between the workmen and themselves, to the disadvantage of both parties. At any rate, that is the state of affairs in Boston, I am sorry to say, as all tinmen will testify. It seems to me that the less a man knows about the furnace business the better he is off if he wants to make a living at it. These theoretical men seem to know as much about a furnace in fifteen minutes as a practical man would take five years to learn. I have seen carpenters fill the position—or try to do so—also brickmasons, at various times. So it seems to me if a man wants to be a furnaceman, he had better learn some other trade outside the tin business."

Says a correspondent of a foreign hardware journal: "A friend of mine bought some waste tin plates from a manufacturer, and after examination wrote to the maker saying they were simply scraps of tin plate packed in boxes and fit for nothing but to cover bungholes with, and asking what the maker was prepared to do to fulfill his contract properly. To this the diplomatic maker replied that he was obliged for the letter, and would advise his friend to use the plates for covering bungholes, as they seemed so suitable for that purpose. The joke was too good to annoy even the buyer."

WORLD'S FAIR NOTES.

Labor Troubles.

The first labor organization to attempt a hold-up at the World's Fair, with the necessity of being ready by May 1 as the club, was the Electrical Wiremen's Union. The attempt was a flat failure. Director of Works Burnham anticipated the announced strike last week by having all the electrical wiremen in the employ of the exposition to assemble at the Transportation Building. There he made a short address. He told the men he would not be forced to pay equal wages to all; that some earned more than others and were entitled to more pay. When Mr. Burnham had concluded he asked all who wanted to leave to go to one side of the aisle and those who wished to remain to go to the other. The men separated, sixty nine desiring to go and fifty-five to remain. The sixty-nine were paid off and at once left the grounds. At the same time 140 employees of the insulating company, which has the subcontract for stringing the wires for the Westinghouse Company, quit work.

The demand of the union upon both the insulating company and the exposition was the same, being for uniform wages of 37½ cents an hour, time and a half for overtime, and double time for Sunday work.

The pay roll of the Exposition shows that of 69 strikers 43 received 31½ cents an hour, 11 30 cents, 12 35 cents, 1 50 cents, and 2 25 cents. The force had been working nine hours, with time and a half for the last hour, making the daily wages $2.99 for 43 of them.

The strike contagion did not manifest itself anywhere else on the fair grounds, and officials are hopeful of quarantining against it. The bad weather has delayed in some degree a good deal of work on the grounds, and this loss must be made up in short order as soon as the snow and frost disappear. The most important point just now is Machinery Hall, where a force of 325 men is engaged in preparing the foundations for the heavy machinery. Any delay in this work would be critical, as all the time remaining is needed to get the machinery into place.

The work of constructing the exhibit pavilions in the Manufactures Building is being rushed forward as though May 1 were two weeks instead of two months in the future. In fact this particular branch of construction work is being hurried along in every department, but so great is the main building that particular attention is paid to that.

Passes and Admission Tickets.

Sixty thousand passes will be issued by the exposition management to the fair next summer. Every person of prominence who might be expected to have a free admission will secure it. The bulk of the passes will, however, go to the 45,000 exhibitors and their employees.

Each one of these passes will bear the picture of its holder. Within a few weeks a circular will be issued to those entitled to these free admissions and requests for their photographs be made. These will be taken to Jackson Park, rephotographed to vignette size, and then placed on the cover of the pass book. These pass-books will contain one coupon for every day of the exposition and one must be torn off for every admission. In case the holder leaves the grounds within the day he will be given a return check.

Monthly peauss will be issued to employees of exhibitors. They will be renewed every 30 days, in case the bearer retains his connection with the exposition.

Aside from the passes there will be two sets of admission tickets. The first will be handsomely engraved and suitable for souvenirs. They will be issued in four series, one bearing the head of Columbus, the second that of an American Indian, the third that of Washington, and the fourth the picture of Lincoln. These will be placed on sale by April 30. It is thought that they will be largely purchased and retained as souvenirs, and to complete the series the investor must expend $2. These tickets will not be sold at the gates, but at designated downtown places.

The gate tickets will be less artistic affairs and probably be good for one day only. The others are to be good for any day.

The Steam Boiler Fight.

The Stirling Boiler Company have reason to feel elated over the latest development in the famous boiler controversy. Last week Judge Grosscup of the United States Court, to which the case had been transferred, refused to grant the injunction asked for by the Babcock & Wilcox Company against the World's Columbian Exposition Company and others, restraining the fair officials from allowing the Stirling Boiler Company to place an exhibit of boilers alongside the Babcock & Wilcox Company exhibit in Machinery Hall. The reason given was that the complainants were to have the remaining space if the fair needed additional boilers. An agreement with Mr. Sargent, representing the Chief of Construction, was the basis of the complaint. In his decision, Judge Grosscup held that there had been no agreement and that the court could not interfere with the discretion of the Director General. Again, the supposed privilege had not been submitted to and approved by the Council of Administration. Sargent had no right, the court held, to grant such a privilege. After stating that the Babcock & Wilson boiler plant was acknowledged to be an exhibit, Judge Grosscup says:

"Nothing is clearer than that the installation of the exhibits is exclusively within the control of the commission. In this respect the local corporation and its agents have no authority."

The Ferris Wheel.

On the Midway Plaisance there will be an exhibit which is intended to rival in novelty the Eiffel Tower. This will be the Ferris wheel. Its diameter will be 250 feet. The wheel is intended to convey passengers around a circle in cars, from which visitors will have a full view of the exposition grounds and buildings The wheel will be 264 feet in hight. Around it, suspended between the two crowns by steel trunnion pins, will be 36 passenger cars with a seating capacity of 60 persons each. The entire structure is of steel and somewhat resembles a huge bicycle wheel revolving between two towers. The principle of coostruction is somewhat similar to an old style English breast water wheel in that it consists of a stiff outer crown, which is suspended from the center axle by a system of tension rods. The wheel practically consists of two wheels placed on the same axle, spaced a distance of 28½ feet apart and held together by struts and ties. The great axle is the largest piece of steel ever forged in this country, being 33 inches in diameter, 45⅛ feet long, and weighing 56 tons.

The axle is supported by means of steel towers 137 feet high. These are each supported by four legs, two vertical and two inclined, connected at the base by eight huge portal struts, thus forming an almost solid arch of steel. The foundations of masonry beneath the tower taper from an immense base to a hight of 18 feet and under this are piles and concrete. Passengers, while indulging in their novel trip, will be just as safe as while riding out to the grounds on a railroad train. Arranged in groups on the rode around the crown of the wheel are 3000 incandescent lights of various colors. These will be alternately extinguished and relighted at night as the wheel revolves. The engines which are to revolve this structure are in themselves an object of interest. They consist of two link-motion reversible eogines of 30 inch bore, 4 foot stroke and 2000 horsepower.

The Ferris wheel is to be located in the middle driveway of the Midway Plaisance, about 100 feet from one of the entrance gates. The driveway divides at the wheel, and passing on both sides converges after the wheel has been passed. It is the personal invention of G. W. G. Ferris, a bridge engineer of Pittsburgh and head of the firm of G. W. G. Ferris & Co. Robert W. Hunt of the Robert W. Hunt & Co. Inspection Bureau is president of the Ferris Wheel Company.

For Bicycle Enthusiasts.

Nearly 60,000 enthusiastic bicyclists make their homes in Chicago and vicinity, and it is in recognition of these and the wheelmen of the entire country that the exposition authorities will establish two bicycle courts at Jackson Park. In making this arrangement, too, it is estimated that the passenger transportation problem will be made easier of solving. Days of special importance will see 10,000 wheelmen at the park, who would, only for the bicycle courts, be compelled to depend upon the already overcrowded cars and steamboats. These courts will be of sufficient size to accommodate 8000 wheels. They will be each 200 x 40 feet in dimensions, covered with glass, and built on rather unpretentious lines.

Attendants will be maintained in each court, who will receive the wheels, check them and then place them in racks, where they will be kept until the return of the owners.

No person without a bicycle will be permitted to enter the wheel courts. The charge for the service will be very light.

Transportation Facilities.

W. H. Holcomb, General Manager of transportation, has just completed a final estimate of the carrying capacity of the lines that will control the Jackson Park traffic. He has found that not more than 100,000 persons can be handled in one hour, but even that will make any serious blockade or inconvenience impossible. This estimate may be increased a little during good weather, when an extra force of excursion boats may be brought into service on the lake. The following is the estimate sent by Mr. Holcomb to the Council of Administration:

World's Fair Steamship Company—Three vessels, with a carrying capacity of 5000 each.
Illinois Central—Five tracks, each with a capacity of 6000 per hour.
Baltimore & Ohio—Capacity of 5000 per hour.
Chicago & South Side Rapid Transit (Alley L)—Capacity of 20,000 per hour.
Wabash Avenue Cable Line—Capacity of 15,000 per hour.
State Street Cable Line—Capacity of 15,000 per hour.

This gives a total of 100,000 per hour carrying capacity. Mr. Holcomb believes this to be sufficient to meet all demands unless some accident should occur; and, to prevent trouble, he is now giving his time to a plan for perfecting all terminal facilities. There are now being constructed within Jackson Park thirty-five terminal tracks, all of which will be constantly in use after May 1. The trains made up at the park will be the heaviest ever drawn, averaging fourteen cars each.

Old Locomotives Received.

There rolled into Jackson Park last week a quaint little locomotive 57 years old and with a history possessed by no

other engine in the country. This little old locomotive was the first one used on a railroad west of Chicago and was the first one to come into Chicago. Forty-four years ago it was shipped there by lake. At that time there was no railroad in Chicago running East. The Lake Shore, which was the first to reach the city, had not at that time completed its line. The locomotive was purchased for the Galena & Chicago Union Railway, which was constructing a line to Galena, and its first service was to haul rails and ties for the extension of the new line. It weighs, all told, but 8072 pounds and has only six wheels. There are but two drivers and these are connected directly with the piston rod. Its fittings are extremely simple. The locomotive is owned by the Chicago & Northwestern Railroad. It was built in Philadelphia by M. W. Baldwin in 1836. It was originally constructed for the Utica & Schenectady Railroad and subsequently sold to the Galena. It has no brakes of any sort and its whistle is of a diminutive character. It is the first locomotive to be installed in the Transportation Building. Two old locomotives have also been received from France. The names of the locomotives are the Samson, built in 1837, and the Albion, built in 1838. A passenger coach of great antiquity accompanied them. It is upholstered in white satin and is in a splendid state of preservation. The engines are queer pieces of mechanism, having perpendicular cylinders and connecting rods with the old hook action. They were built in England.

Wisconsin's Display of Minerals.

Among the State exhibits in the Mines and Mining Building Wisconsin promises to make a showing that will stand in the very front rank and attract universal admiration. Special effort is being put forth by the Badger Commonwealth in arranging its display of mineral and geological products, many of the most valuable specimens of which will enter into the construction of a magnificent pagoda 25 feet high, and occupying a floor space on one of the best blocks in the Mines Building 49 feet long by 45 feet wide.

This pagoda will consist of four monoliths resting on elaborately carved bases furnished by the Prentice Brown Stone Company. There will be two entrances of terra cotta surmounted by the coat of arms of the State. The railing extending around the four sides will be made of green jasper and fancy granites with wrought brass panels of clever design. The plans show that the pavilion in the center rests on four blocks of different colored granite, and the capitals of the columns which hold them will be liberally studded with amethysts and other brilliant stones. The fountains in the center of the pagoda will also be of amethyst, the whole scheme forming what promises to be one of the most attractive features in Chief Skiff's department of the great show. It is estimated that the entire display, as it stands when ready for public inspection, will represent an outlay in preparation of $20,000.

The pagoda will be filled with handsome showcases containing the best specimens of ores and minerals of all kinds that Wisconsin can produce. For instance, there will be one case holding $250,000 worth of pearls. It was designed by the Beatty Mfg. Company. The display will rest on a platform made of white and black marble tiling, the whole being surmounted by a beautifully-gilded dome, richly ornamented, thus giving the display a showy effect both from the galleries and distant sections of the building.

Fraser & Chalmers' Exhibit.

Fraser & Chalmers of Chicago are preparing a fine exhibit for the Mines Building. Having been located under the main gallery, the firm found it impossible to secure sufficient hight to put in a vertical engine that would have added largely to the attractiveness of the exhibit. This also prevented the introduction of a ten-stamp combination silver and gold mill, which, in operation, would have attracted probably as much attention as almost anything at the Fair. However, these drawbacks will not interfere with the company's arranging a very fine display of modern mining machinery.

In the array of what may be classed as most interesting devices shown will be water jacket smelting furnaces for smelting copper, silver, lead and tin, a concentrating machine, light and heavy crushing machines for grinding ore, sundry smelting devices, lead and silver smelting furnaces, copper furnaces, copper converters for Bessemerizing purposes, and all the apparatus that enters into the metallurgy of gold, silver, copper, tin and lead.

Besides these devices there will be a 20 x 40 Corliss engine adapted to the Riedler air compressor, a twin compound engine adapted to the Riedler pump, and a standard hoisting engine. The triple expansive vertical condensing winding engine, which is 23 feet high, cannot be set up in the center of the exhibit. This engine is a reproduction of four others made for the De Beers diamond mines of Kimberley, South Africa. It will probably be set up in Machinery Hall. Fraser & Chalmers will also have an engine of 1000 horse power in the power plant of that department.

Spain at the Exposition.

Advices have been received from Spain that January 28 the first consignment of exhibits was sent to Chicago, consisting of 500 cases of various objects. One of the most interesting exhibits will be that of the War Department, which intends to send to Chicago a rare collection of ancient artillery of the kind used in the days of Columbus. There will be lombards and falconets, cannons and mortars, shells and projectiles of every description, all of Spanish manufacture; and in addition there will be an exhibit of modern war materials, together with books and pictures of all the gun factories and war materials of Spain. In the city of Tarrasa great activity has already been displayed, and a large exhibit of manufactures of that town is being collected for the exposition.

The Fair Will be Closed on Sundays.

Exposition officials were not wholly surprised, but were greatly disappointed by the action of Congressman Durborow's committee in declining to report the Houk bill. A majority of the directors feel convinced that the Sunday opening movement is dead, and little effort will be made to do anything more with Congress in that matter. F. W. Peck, chairman of the Finance Committee, is hopeful that there will be a special session of Congress and that there may be a fighting chance then to secure favorable legislation. But in his hope he is not generally supported by his fellow directors.

Director General Davis declines to discuss the question. He said he was a national officer and bound to obey the dictates of Congress. He would say nothing further than if the law were not repealed the fair would be closed on Sundays so tight that nobody could get into it. It is not believed that the directory will take any steps toward undoing the act of the last session of Congress.

A Deserved Promotion.

Frederick Sargent, mechanical and electrical engineer of the exposition, was promoted to a position in which he will have several assistants to perform under him the work of the department. The work was divided into two divisions. The mechanical engineering section will be in charge of Robert Pierce. Mr. Sargent will remain at the head of the two divisions and direct the work of both.

J. A. Fay & Egan Company.

The consolidation of the firms of J. A. Fay & Co. and the Egan Company, both of Cincinnati, Ohio, has been announced, and the officers of the new J. A. Fay & Egan Company will take charge about March 1. The successful bringing together of these two rival concerns may be regarded as an important move, since it makes the new company the largest manufacturers of wood-working machinery in the country. The two plants occupy squares on the opposite sides of the street, and are therefore especially well fitted for being united under one management.

The directors of the new company will be Thomas P. Egan, Frederick Danner, W. H. Doane, D. L. Lyon, David Jones, W. P. Anderson, Joseph Rawson, S. P. Egan and Edwin Ruthven. Thomas P. Egan will be president, Frederick Danner vice-president, S. P. Egan superintendent and Edwin Ruthven secretary. These four officers are of the Egan Company.

The Egan Company date from 1873, when Thomas Egan, with two partners, started in a small way. A stock company was formed in 1880, and the business proved so successful under able management that additional factories were built, until now the plant covers an entire block, and employs 800 men.

The original J. A. Fay & Co. were established in Keene, N. H., about 1835. In 1850 a branch was established in Cincinnati to meet the demands of the Western trade and to save the expense of transportation. In 1860 not more than 15 men were employed in the works, while now there are over 500. This plant also covers a square block of ground.

The consolidation will not affect the working of the two establishments in the least, and the amount of product and the number of men employed will not be reduced. They will be in position to fit out a wood working establishment entire with machinery of their own manufacture.

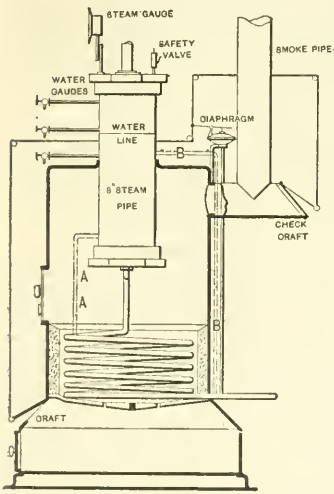
The new building which is to accommodate the Department of Mechanical Engineering of the Pennsylvania State College, in Centre County, Pa., was formally dedicated on February 22. The building, which has been erected by the Commonwealth of Pennsylvania for the purposes of industrial education, at a cost of about $100,000, is stated by the *Williamsport Times* to be a very handsome structure, of good design and well adapted for the purpose to which it will be devoted. It is of ample proportions, covering an area 206 x 208 feet square, is three stories high, and contains in all 57 rooms, with all the most improved facilities for heating, lighting and ventilation, as well as a complete equipment of tools and apparatus for the instruction and practice of the students. The educational departments include mechanical and sanitary engineering, hydraulics, machine work of all kinds, smiths' work in a shop with 20 forges and anvils, wood working, pattern making, pipe cutting, steam fitting, &c. A museum of mechanical devices, model rooms, laboratories, libraries, drawing rooms, and a number of classrooms, together with offices for the professors attached to the department, are provided in the building. Three hundred students can be accommodated in the different undergraduate and post graduate engineering courses, and free scholarships have been provided by the trustees, which will place the facilities of the new college department within reach of all.

STEAM AND HOT-WATER.

A Home-Made Heating Boiler.

From C. W., *East Pepperell, Mass.*—I want to build a small steam heating apparatus to heat about 150 feet of radiation. Do you think that the boiler shown in the inclosed sketch will be satisfactory? The coil is 1¼ inch pipe and the boiler is 8-foot steam pipe.

Answer.—We reproduce our correspondent's sketch. To carry 150 square feet of surface it will be necessary to have a boiler capable of developing about 2 horse-power, or at any rate not less than 1½ horse-power. The surface exposed to the direct action of the fire should be about 10 square feet, the usual proportion of fire and flue-heating surfaces being 1 of heating surface to every 5 to 8 square feet of surface in radiators. The coil as shown connected to the 8 inch diameter drum will not work as satisfactorily as if provision were made for circulation between



A Home-Made Heating Boiler.

coil and drum in some such manner as shown by dotted lines A A, B B. Such a change will tend to make the water line more steady than when arranged as shown by our correspondent.

Heating Room to 175° F.

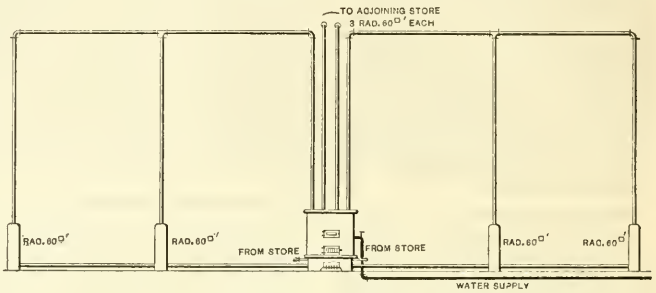
From W. J. Y., *Winston, N. C.*—Will you inform me how much 1-inch pipe it will require to heat a room 22 x 15 x 11 feet to 175° F.?

Answer.—We wrote to this correspondent for additional particulars, but those furnished by him in reply are yet too meager to enable us to answer the query definitely without making some assumptions. The room, he states, is located in the northeast corner of the fourth story of a tobacco warehouse and has four windows, 7 x 3½ feet in dimensions. The steam for heating is to be carried through a pipe 125 feet long. We infer, also, that the room is to be used as a dry room, and, doubtless, some ventilation will be required. But, this point being left indeterminate, it cannot be considered in our answer. On the assumptions that the inclosure will be made in all its parts as resistant to the passage of heat as a brick wall 1 foot thick, lined with tin and having a dead-air space between the tin lining and the wall, would be, that the windows will be double, and not taking into account any air admitted for ventilation, also assuming the lowest exterior temperature to be for all sides of the room an average of 30° F., 1237 feet run of 1-inch pipe will be required, with steam carried at 60 pounds pressure, to meet the extreme conditions. The bulk of this pipe should be arranged in coils of vertical pipes along the middle of the room, leaving space to pass by them at the ends, and the main supply pipe ought not to be less than 2-inch. The arrangement could probably be designed to secure a gravity return of the condensed water to the boiler; but if this be not practicable a return trap or a condensed-water tank and a small feed pump may be used. The supply pipe should be covered with good insulating material, so as to bring the steam to the coils as dry as possible. If ventilation is required more pipe will be needed in the coils. Such a job as this ought to be erected under the advice of a competent engineer if the best results are to be obtained.

THE TRADE will regret to learn that W. C. Mowry, the well-known boiler manufacturer of Norwich, Conn., is confined to the house by illness. It is hoped, however, that the genial colonel will be about soon in his accustomed good health.

A Novel Musical Instrument.

From EDWIN C. MASON, *Madison, Wis*—I have in my store a system of hot-water heating of which the diagram sent herewith will give you an idea. Wishing to show this heater to my customers, I put it on the main floor in my show room and piped it in the way indicated in the diagram. The radiators are on a level with the return pipes, and, in order to secure circulation, I adopted the syphon system of running flow pipes nearly to the ceiling.



A Novel Musical Instrument.

In addition to heating my store, I heat an adjoining store of nearly the same size by running pipes through the wall.

The peculiar feature of the system is this: Under certain conditions of the fire, and when the water is just about at the boiling point, a series of musical sounds are produced, varying in pitch with the intensity of the fire, and also changing tone when the water in the system is increased or diminished in greater or less degree. I also find that I can change the note by opening the feed door, the check drafts or the slide draft on the ash-pit door. By a little practice I can produce something very much like the musical scale. The notes at times are very deep and sonorous and excite the admiration of all who listen to them. I have not yet succeeded in playing a tune, but shall endeavor, when I have a little leisure, to do the calliope act for the benefit of my friends and customers. The cause of all this is probably in the unusual tension in which the whole system is placed, there being no passages of pipes through the wall of any account, and the pipes not being supported in any place excepting at the heater and at the radiators.

It is something quite unusual, I think, to find a heating apparatus which also serves the purpose of an orchestra, and I thought perhaps it might interest your readers to know of this very peculiar affair.

E. C. MASON, Madison, Wis., representing the Sunray hot-water and combination hot-water and warm air heaters, also the Star heater for hot water and warm air, manufactured by the J. L. Mott Iron Works, New York and Chicago, has placed quite a number of these heaters in the residences of prominent parties in Madison and vicinity. Mr. Mason's re-

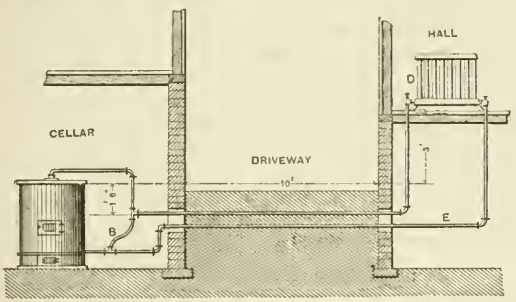
ports regarding these heaters are very flat tering. One of his customers wrote him during the late cold weather, "Cold, cold everywhere, but where the Mott Star combination heater holds sway there summer reigns."

Dropping a Flow Pipe.

From W. M., *Gloucester, Mass.*—Please inform me how a hot-water flow pipe can be dropped between heater and radiator with an open-tank system and give satisfaction. I have a hall to heat 10 feet from the house in which the heater is located and must cross a driveway 18 inches lower than the top of the heater. I cannot lower the heater and there is no way of running over the head of the driveway. The radiator in the hall will be 3 feet above the top of the heater. If I drip ell at the point B will it start the circulation?

Answer.—In answering our correspondent's interesting query we have reproduced his sketch, Fig. 1, and added two sketches, Figs. 2 and 3, in order to be as explicit as possible in our reply. We assume that the boiler to which it is desired to connect radiator in hall is also used for heating the house in which it is located. In Fig. 1 the circulating pipe is too near the boiler and might tend to raise the temperature of pipe A, and pipe to return will be removed.

Fig. 3 illustrates the indirect method of circulation. The water from the boiler in this case passes to the tank first and thence down to flow pipe to radiator, during which passage it loses a certain amount of its heat. The circulating pipe B in this case will be found very useful. In either case, Figs. 2 or 3, the circulating pipe B may be the same size as the flow and return pipes to radiator. As shown in Fig. 3 by F and G, separate connections are also taken from boiler to each radiator.



Dropping a Flow Pipe.—Fig. 1.—Plan Proposed by Correspondent.

the return too quickly, thus impeding the natural circulation to D and E. Fig. 2 shows the manner of connecting pipes which may be adopted with some boilers, and

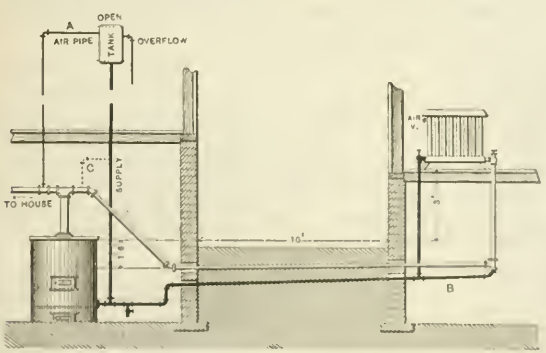


Fig. 2.—Showing Direct Circulation Between Boiler and Radiator.

by which direct circulation is attained. The circulating pipe B may be omitted if desired. If only the one radiator is connected to boilers the air pipe, C dotted lines, Fig. 2, can be used in place of air

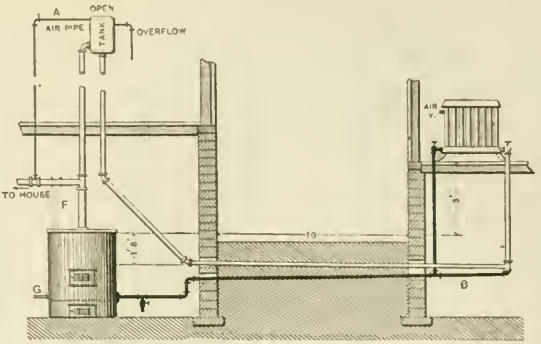


Fig. 3.—Showing Indirect Circulation Between Boiler and Radiator.

For the convenience of the trade the American Boiler Company of Chicago have decided to change the name of some of the boilers made by them. The Perfect sectional steam boiler will hereafter be known as the American. Their new circular sectional boiler will be designated as the Modern, while the small stove hot water heater, designed for use in baptisteries, laundries, baths, &c., will be known as the Little Giant. The name Perfect will apply only to their sectional hot-water heater.

National Association of Master Fitters.

At the monthly banquet of the Chicago Local Association of Master Steam and Hot Water Fitters held February 8, President P. S. Hudson of the National Association delivered an address setting forth the advantages of the central organization and the dependence upon it of the local associations and isolated members.

In the early part of his address he referred to the invitation he had received as president of the National Association to point out the necessity of such an organization. In introducing the subject he quotes from the second annual report of the national secretary in 1890 showing the increased power of the organization when united action can be taken by all its members in all parts of the country. Mr. Hudson continued:

"I have already said enough to show why there should be a National Association. There are many good arguments I shall be unable to call to mind. However, I am unwilling to pass by the social feature, the acquaintanceship that has been made between men of different cities, the general development and growth of the business vouchsafed at each of our conventions. All this is worth the expense of a national membership. There is new light and instruction given at every such meeting, which, even though a man is not present, is reflected to him through his comrades who do attend, as was attested at our last convention by one of our members in a talk on the floor in illustrating the benefit the National Association was to him through his improvement by mingling with the craft at such times, claiming that the new ideas he carried home with him were of much greater value than the cost of his annual dues. The time has passed when each individual firm is trying to draw the veil over the discoveries which experience has proven beneficial; they are passing their new achievements out to one another now, and this, too, is worth the cost of the National Association to each of its members.

"Again, at our last convention, a new clause was ingrafted in our constitution

which will be found there (numbered 18) requiring members who go from one city to another seeking contracts to notify resident local or national members of their intentions. This one clause is well worth the cost of the National Association, as there have already been several illustrations of its usefulness.

"Again, the uniform manner in which we are fighting the Osborne patent cases is worth the price of the association to us, as they are apparently halting in consternation at our combined strength.

"Then, again, we should have a National Association as a guard against the unknown or unexpected with which we are likely to be overtaken at any moment in the face of the present progress and contention in business affairs; this, that we may be prepared to arise and assert our rights at the shortest possible notice and fight in a united manner against any unreasonable and inconsistent obstacles that may be thrown in our way, or any attacks that are unprincipled and damaging in their effects."

Following this is a long quotation from the *Master Steam Fitter*, together with a letter prepared by Secretary Reynolds. We print below the close of President Hudson's address:

"While upon this subject I will add one word with reference to men who have not, and do not join our National Association, and say to you that their remaining out partakes of the spirit of our colonial farmers at the time of the Revolutionary War, when they hauled and delivered their products to the British army at the very moment that Washington and his soldiers were freezing and starving at Valley Forge. They were so enamored of the penny in sight that they were willing to feed the element that was striving to hold them as subjects and ignore those who were suffering with cold and hunger and offering their lives to gain for them an independence.

"I claim that the men who remain out of our National Association are in a like manner fighting those who are struggling for their interests.

"The attitude I have take in this emergency is such as those whom I represent have a clear right to expect from any and all who have accepted an office at their hands. The interest with which I have in my feeble way endeavored to touch this question is deep seated, and did it not come from the heart I would feel it my duty to withdraw and make room for some one who would contribute more soul to the work, but you will permit me to add that what I have said would receive from me just as strong an indorsement were I not an officer in the association, for surely if I were to feel less or do less I would not be truly serving my own best business interests.

"In summing our interests up I will say to you that I hope to live to see the day when objectors, scoffers and defamers of our National Association will be of the past utterly, and I ask you now if pride alone in the simple fact of the national headquarters being located in this city for the last year, where we are soon to entertain our craft from all over the United States, should not cause a unanimous vote in shelving any proposition that is disposed to strike out the clause in our constitution and by-laws requiring members of our local to become members of our National Association, and I ask you as men doubly interested in the success of the business in which we are engaged to cast your votes, each and every one of you, that the clause shall stand as it now reads."

The question of changing the by laws having been put to the meeting, the amendment referred to in the last paragraph of President Hudson's address was lost by a unanimous vote.

Some Heating Queries.

From J. M. G., *Peoria, Ill.*—Please answer the following questions through *The Metal Worker:* How many square feet of radiating surface will a 1-inch pipe supply, the steam being at 40, 60 and 80 pounds pressure? How many feet of outside wall (frame building, hollow walls) are equal to 1 square foot of glass, and how much does glass require in radiators? How much more surface does a frame building require than a brick building? Is the piping correct in the sketch of building sent herewith? The main supply is carried to the front of the building before entering the coils. A friend of mine says it should have been the other way—that is, the steam should enter first and the water be returned from the far end, his reason being less cost. Which is the more economical and better? Would it have any effect on a gravity apparatus?

Answer.—In reply to our correspondent's first query as to the quantity of radiating surface a 1-inch pipe will supply at 40 pounds, 60 pounds and 80 pounds pressure, we will base our answer on a formula published by F. Schumann. It is as follows: Radiating surface in square feet equals a constant 184 divided by the square root of the length of the supply pipe, multiplied by the square of the diameter of the pipe, and this product multiplied by the square root of the pressure multiplied by the diameter of the pipe, divided by the weight of a cubic foot of steam at the given pressure, taking in each case the length of supply pipe at 100 feet.

First example, 40 pounds pressure:

$$\frac{184}{\sqrt{100 \text{ feet}}} = 18.4 \times 1 \text{ dia. of pipe squared}$$

$$= 18.4.$$

$$\sqrt{\frac{40 \text{ pounds} \times 1 \text{ dia. of pipe}}{0.13046 \text{ (weight of steam at 40 pounds)}}} =$$

17.49.

$18.4 \times 17.49 = 321$ square feet of surface in radiators, which a 1-inch pipe will supply at 40 pounds pressure.

Second example, 60 pounds pressure:

$$\frac{184}{\sqrt{100 \text{ feet}}} = 18.4 \times 1 \text{ dia. of pipe squared}$$

$$= 18.4.$$

$$\sqrt{\frac{60 \text{ pounds} \times 1 \text{ dia. of pipe}}{0.17493 \text{ (weight of steam at 60 pounds)}}} =$$

18.49.

$18.4 \times 18.49 = 340$ square feet of surface in radiators, which a 1-inch pipe will supply at 60 pounds pressure.

Third example, 80 pounds pressure:

$$\frac{184}{\sqrt{100 \text{ feet}}} = 18.4 \text{ 1 diam. of pipe squared}$$

$$= 18.4.$$

$$\sqrt{\frac{80 \text{ pounds} \times 1 \text{ dia. of pipe}}{0.21874 \text{ (weight of steam at 80 pounds)}}} =$$

19.1.

$18.4 \times 19.1 = 351$ square feet of surface in radiators, which 1-inch pipe will supply at 80 pounds pressure.

From 5 to 10 square feet of outside wall of frame building may be taken as equal to 1 square foot of glass.

One square foot of glass is estimated to lose 1.57 units of heat per hour for a difference of 1° between the external and internal temperature. The loss of heat from 1 square foot of surface in radiator in room is, approximately, about 2 units of heat per hour for each degree of difference of temperature between the surrounding air and that of the surface of the radiator, which is usually taken as the same temperature as that of the steam within the radiator. The temperature of steam at 40 pounds pressure is 286°, from which deduct 70°, temperature of room, and the remainder equals 216°, which, multiplied by 2 units of heat, the loss per degree of difference, equals 432 units of heat given off per square foot of surface in radiator. Taking the outside temperature at zero, 70 multiplied by 1.57 equals 109.9 units of heat lost per hour through 1 square foot of glass. Then $\frac{432}{109.9} = 3.9$, the square feet of glass which absorb or lose the same quantity of heat as given off by 1 square foot of surface in radiators.

We did not consider it necessary to reproduce our correspondent's sketch, as the letter sufficiently explains the arrangement about which advice is desired. It is better to carry the main supply pipe to the front of the building. This arrangement is to be preferred, with either a mechanical means of returning the water of condensation to the boiler or when it is returned by gravity. The extra cost is the difference between the cost of the supply pipe and the return pipes in position.

When windows, doors, &c., are equally well fitted, frame buildings will approximately take from 10 to 15 per cent. more radiating surface. Some well-built frame buildings are as easily heated as brick buildings.

Stopping Leaks in Steam Pipes.

From E. E. P., *Woburn, Mass.*—I would like to ask "G. H. A." of Jersey City, N. J., who, in *The Metal Worker* of February 4, recommends a mixture of equal parts of sulphur and sal-ammoniac as a preventive of leaky steam or water pipes, what is the best way to use the mixture?

HEATING NOTES.

At a meeting of the Executive Committee of the Master Steam and Hot Water Fitters' Association of the United States, held on the 28th ult., it was decided that the next Annual Convention of the association should be held in Chicago, beginning Tuesday, June 6, at 10 o'clock a.m. The duration of the convention will depend upon the wishes of the members attending.

The Illinois Heating Company have lately been organized in Chicago, with a capital stock of $10,000. The officers and incorporators of the new company are: Frank Wheeler, president; C. B. Thompson, secretary; C. C. Finkler, treasurer. Mr. Wheeler has been the Chicago manager during the past four years of the Pierce, Butler & Pierce Mfg. Company. Mr. Thompson during the same period has managed the Chicago office of the National Hot Water Heater Company, and Mr. Finkler has been Chicago manager of the Detroit Heating & Lighting Company of Detroit. These gentlemen have

THE MANUFACTURES BUILDING OF THE WORLD'S FAIR.

been closely identified with some of the best work in Chicago, both in steam and water heating, and will make a specialty of fine residence work, giving it their personal supervision. They are prepared to figure on any reputable boiler in the market. The new company have secured commodious quarters at 88 Lake street, which are being fitted up for office, salesroom and shop.

M. L. Foote, formerly in the employ of the Pierce, Butler & Pierce Mfg. Com pany, has associated himself with the American Boiler Company of Chicago, and will be located permanently in St. Louis, where he will devote his attention to the sale of the various boilers made by that company.

The Kewanee Boiler Company, Kewanee, Ill., manufacturers of Haxtun magazine boilers for steam and hot water, also tubular and portable house-heating boilers, have removed their Chicago office from 36 Dearborn street to 96 Lake street.

Wm. H. Peterson, who for a number of years was connected with the steam fitting concern of John S. Trachsall & Son, Arch street, Philadelphia, has entered the employ of the American Boiler Company, Chicago, and will be the resident representative of that concern for Philadelphia and vicinity.

The Gurney Hot-Water Heater Company, Boston, Mass., inform us that they recently received another gold medal diploma "in confirmation of the gold medal awarded them by the Massachusetts Charitable Mechanics' Association at Boston in the year 1887." We understand that the company now possess the following medals and diplomas: From the American Institute, New York, 1887, "Medal of Excellence," in 1888 a "Special Medal," and in 1889 a "Medal of Superiority." From the Massachusetts Charitable Mechanics' Association a gold medal in 1887, special gold medal diploma, November, 1890, and special gold medal diploma, November, 1892. These diplomas are in confirmation of the gold medal awarded in 1887. The silver medal awarded in 1892 was on their new 300 Series and Double Crown hot water heaters.

Frank Shay, formerly manager of the New York branch of the Detroit Heating & Lighting Company, will represent the Capitol Heater Company in New York, Eastern Pennsylvania, New Jersey, &c.

F. X. Brunell, Worcester Mass., is the patentee of a steam generator or heater, the furnace of which is composed of a series of helically coiled tubes, the ends extending backward and connected with an upright trunk or standpipe outside the circles of the coils.

The Capitol Heater Company, Detroit, Mich., favor us with another of their postal travelers, which are cards containing advertising matter relating to their manufactures. The last one received carries on the front a picture of a salesman opening a satchel and with it the statement that he has a new heater in his grip this winter. Later on it makes reference to the Bolton boiler and its points of advantage. On the back of the card are letters from several sources referring to the excellent results given by the Bolton water heater.

We learn from Foskett & Bishop, New Haven, Conn., that they have established wholesale agencies at Chicago and Cleveland for supplying the Western trade with their improved G. & J. R. Bolton heaters. We understand that the number of inquiries reaching them from the West made this step necessary. We further learn from this concern that J. W. Runner, who for the last three years has travelled for the Detroit Heating & Lighting Company in Central and Western New York State, is now traveling that district for Foskett & Bishop. The interests of this firm in Michigan will be looked after in Detroit by George Bolton.

Foskett & Bishop, New Haven, Conn., with New York office at 114 Liberty street, issue an illustrated catalogue and price-list of the G. & J. R. Bolton hot-water heater of their manufacture. The pamphlet, of oblong shape, contains various illustrations of this apparatus, showing broken views as well as general views and illustrations of the heater with the casings removed. All the features of the apparatus are referred to in the description and the advantages are pointed out. A table gives complete dimensions and other particulars, together with prices. The catalogue also notices Foskett & Bishop's improved steam traps. At the end of the circular are a number of testimonial letters and references.

The Sheet-Metal Gauge Bill.

We have received from Oberlin Smith of Bridgeton, N. J., the following letter:

It is earnestly to be hoped that Congress will not pass the Sheet-Metal Gauge bill, as described in your issue of February 11, without at least making in it important modifications, as the absurdities apparent upon the face of it, when glancing at the table you quote, are sufficient to condemn it in the eyes of any systematic engineer. Among these are the ciphers (in one case extending up to seven) at the beginning of the series of size numbers, instead of beginning with unity. Also the following of the old system of putting small numbers for the larger thicknesses, and *vice versa*. Also the actual sizes of the gauge dimensions themselves, which run in very curious fractions that are not measurable by ordinary tools. The only good and systematic thing about this proposed system is that the respective gradations agree with certain definite numbers of ounces per square foot of iron or steel, these two happening to be of about the same specific gravity. This very fact, however, makes the gauge unfit for measuring, by the same system, tinned or galvanized sheet iron, brass, copper, zinc, aluminum, silver, gold and other metals, as well as paper, leather, &c.; and it also makes it unsuitable for a wire gauge for all kinds of material, including iron. Exactly how the interesting groups of seven, and six, and five ciphers above mentioned are to be pronounced in speaking, we have not been informed.

Just why we should have saddled upon us a law of this kind, after which we shall have to use various other gauges for wire, screws, rivets and nearly all the sheet metals, passeth ordinary comprehension. It is certainly to be hoped that the bill in its present shape will be defeated, and that some forthcoming action by the American Society of Mechanical Engineers, and perhaps by other scientific societies, will be productive of good in leading the way toward a sensible gauge of some kind. Such, for instance, might be one founded upon the actual fractions of an inch involved, these preferably being expressed in thousandths. This perfectly simple and natural method was proposed by me at the Erie meeting of the American Society of Mechanical Engineers, and has more than once been promulgated in your columns since that time. All there is to do is to make gauges to suit different trades with such notches in them as may respectively suit each case in question. These notches have only to be numbered by the number of thousandths of an inch that measure them, and everything will agree—even though some gauges may have entirely different sequences of numbers from others.

The Manufactures Building.

(*With Supplement.*)

An illustration is herewith given of the great Manufactures Building of the World's Fair as it now appears. The view has been taken at the southwest corner. The sheet of water shown is a portion of the lagoon, which communicates with Lake Michigan at the right and extends to the left past the Manufactures Building and thence through the grounds under a succession of ornamental bridges. This is the body of water which will be navigated during the exposition by steam and electric launches, gondolas, &c. The Manufactures Building was completed some time since, and a large force of workmen are now engaged in the erection of booths and pavilions for the numerous exhibitors. Exaggerated accounts have recently been published of damage to the roof of this building by accumulations of snow during the extraordinary winter, which has been especially severe in the Northwest. The frame work of the roof has not been injured in the least, as it is so strong that nothing short of an earthquake could affect it. Wet snow sliding from the sides of the great central span fell on the skylights at its base and crushed a few of them in, entailing some work in replacing or repairing them, which will not cost more than a few thousand dollars, and proving more of an annoyance than an expense. The illustration will enable this explanation to be intelligently grasped. This building is the mammoth structure of the exposition, measuring 1687 x 787 feet, and covering nearly 31 acres is the largest exposition building ever constructed.

Within the building a gallery 50 feet wide extends around all four sides, and projecting from this are 86 smaller galleries, 12 feet wide, from which visitors may survey the vast array of exhibits and the busy scene below. The galleries are approached upon the main floor by 30 great staircases, the flights of which are 12 feet wide each. Columbia avenue, 50 feet wide, extends through the mammoth building longitudinally, and an avenue of like width crosses it at right angles at the center. The main roof is of iron and glass and arches an area 385 x 1400 feet, and has its ridge 150 feet from the ground. The building, including its galleries, has about 40 acres of floor space.

The Manufactures and Liberal Arts Building is in the Corinthian style of architecture, and in point of being severely classic excels nearly all of the other edifices. The long array of columns and arches which its façades present is relieved from monotony by very elaborate ornamentation. In this ornamentation female figures, symbolical of the various arts and sciences, play a conspicuous and very attractive part.

The exterior of the building is covered with "staff," which is treated to represent marble. The huge fluted columns and the immense arches are apparently of this beautiful material.

There are four great entrances, one in the center of each façade. These are designed in the manner of triumphal arches, the central archway of each being 40 feet wide and 80 feet high. Surmounting these portals is the great attic story ornamented with sculptured eagles 18 feet high, and on each side above the side arches are great panels with inscriptions, and the spandrils are filled with sculptured figures in bas-relief. At each corner of the main building are pavilions forming great arched entrances, which are designed in harmony with the great portals.

TIN PLATES.

American Tin-Plate Production.

Ira Ayer, special agent of the Treasury Department for the collection of statistics of the production of tin and terné plates in the United States, has issued the following report for the quarter ending December 31, 1892:

I have the honor to report that during the quarter ended December 31, 1892, 32 firms produced 19,756,491 pounds of tin and terne plates proper. The same number of firms produced during the previous quarter 10,952,725 pounds. Of the production of the past quarter 6,138,739 pounds, or a little less than one-third of the whole, were bright tin plates, of which 5,274,434 pounds, or about 86 per cent., consisted of the class of plates weighing lighter than 63 pounds per 100 square feet; 13,617,752 pounds were terne plates, of which 12,684,646 pounds, or more than 93 per cent., belonged to the lighter class; of the entire product nearly 91 per cent. consisted of the lighter class of plates.

The amount of American sheet iron and steel made into articles and wares tinned or terne during the quarter, as shown by the sworn statements of manufacturers received to date, was 2,245,506 pounds, and for the previous quarter 898,233 pounds. This makes the total production for the last quarter, within the meaning of the law, 22,001,997 pounds, against 11,850,958 pounds produced during the quarter ended September 30, 1892, and shows a total production for the six months ended December 31, 1892, including the products from American sheet iron and steel tinned of 33,852,955 pounds.

The production of tin and terne plates proper during the first six months of the present fiscal year was 30,709,216 pounds, against 2,236,743 pounds produced during the corresponding period of the previous year, the ratio of increase having been nearly as 1 to 14. The production of the last fiscal year was 13,646,719 pounds, which is considerably less than one-half the production during the first six months of the present year.

American Black Plates.

Of the production of 19,756,491 pounds of tin and terne plates proper during the past quarter, 8,043,449 pounds, or more than 40 per cent., were made from American black plates, against 5,920,082 pounds used during the previous quarter. The consumption of American plates in the production of tin and terne plates proper during the first six months of the present fiscal year was 13,963,531 pounds, or 316,812 pounds more than the total product of tin and terne plates proper during the first year that the law became operative. The consumption of American plates for the same purpose during the first six months of the fiscal year ending June 30, 1892, was 1,986,208 pounds, the ratio of increase for the corresponding period of the present fiscal year having been as 1 to 7. The total consumption of American plates, including articles made from sheet iron or steel and tinned, during the first six months of the last fiscal year was 4,474,755 pounds, and for the first six months of the present fiscal year 17,107,270 pounds.

Of the 32 firms who submitted their sworn returns for the quarter nine made and used their own black plates exclusively, four others used only American plates, nine used both American and foreign plates and ten used only foreign plates. The American plates are generally preferred by manufacturers to the foreign.

The foregoing figures are taken from the sworn statements of manufacturers, the details of which have been tabulated in Exhibit 1, appended hereto. A summary of production for the four quarters of the last fiscal year and for the first two quarters of the present year is also appended (Exhibit 2). To these exhibits attention is respectfully invited.

Imports and Exports.

Full returns from the importing and exporting ports of the country show that the imports of tin and terne plates, and the exports of the same in the form of manufactured articles, with benefit of drawback, were as follows:

	Lighter than 63 pounds per 100 square feet.	63 pounds per 100 square feet and heavier.
IMPORTS.	Pounds.	Pounds.
Tin plates	332,328,123	14,519,549
Terne plates	42,368,883	1,334,147
Totals	374,697,006	15,853,696
EXPORTS.		
Tin plates	136,740,638	480,847
Terne plates	32,552	155
Totals	136,773,190	481,002

From the foregoing it is seen that of the class of plates weighing lighter than 63 pounds per 100 square feet there were imported

	Pounds.
During the fiscal year ended June 30, 1892	374,697,006
And of the same class of plates there were exported	136,773,190
Making the net importations for the year	237,923,816
One-third of which is	79,307,939

Under existing provisions of law American manufacturers must produce, during one of the six fiscal years ending June 30, 1897, one-third of the net importations of one of the said years. If it be assumed that the net importations will not be less during any one of the remaining years specified, the amount of the lighter class of plates which must be produced by American manufacturers during one of the six years in question may be positively stated at 79,307,939 pounds.

As shown in former reports, it is probable that this amount will be equaled during the present fiscal year.

Present State of the Industry.

It has been seen that during each of the first two quarters of the present fiscal year 32 firms were engaged in the production of tin and terne plates proper, and made their sworn returns to the Government. Three firms were added to the list of producers during the last quarter, viz, the Blairsville Rolling Mill & Tin Plate Company of Blairsville, Pa.; the Morewood Tin Plate Mfg. Company of Elizabethport, N. J., and the Phillips Tin Plate Company of Philadelphia, Pa.

Two firms which made returns for the quarter ended September 30, 1892, were not producing during the past quarter, owing to temporary causes. The works of the Anderson Tin Plate Company of Anderson, Ind., were destroyed by fire and will probably not be rebuilt.

The Baltimore Steel, Iron & Tin Plate Company of Baltimore, Md., commenced working three tin sets about January 1, 1893, and state that they will soon have two additional sets in operation.

The Britton Rolling Mill Company of Cleveland, Ohio, inform me that they have most of the machinery on hand for their tin-plate department, but add that it is doubtful if they will proceed further until something definite is known relative to the action of Congress as affecting these interests.

The Canonsburg Iron & Steel Company of Canonsburg, Pa., have added two tin mills to their plant during the past year, and claim that they have a present capacity for stamping and black plates of about 6000 tons per year. Probably not more than one-fourth of this, they state, will be used as ordinary black commercial plates for tinning. A portion of the remainder is used in the manufacture of stamped ware, much of which is tinned. Some is used for polished work and for a variety of purposes, and does not require to be tinned, although the finish is said to be the same as for tin plates.

The Corning Steel Company of Chicago, Ill., write that the demand is so great for common black sheets that they have not attempted to make any regular black plates, preferring to keep their mill, for the present at least, on the common material. This firm have therefore been dropped from the list of manufacturers.

The Cumberland Steel & Tin Plate Company of Cumberland, Md., report that they started their works January 10, 1893, and have at present an output of 6 tons of black plate daily, the principal gauges being 28 and 30. Their expectation is that before July 1 next the capacity will be increased to 20 tons daily. The present output, they state, is sold to tinning houses in Pittsburgh and Philadelphia, and add that the entire product will be used for tin and terne plates.

The Morewood Company, located at Gas City, Ind., state that they have already completed four large iron buildings and have other buildings in course of construction, all of which are intended for tin plate manufactures.

The Falcon Iron & Nail Company of Niles, Ohio, state that they have met with unlooked for delays in securing the structural iron for their buildings, which should have been erected as early as December 1, 1892. The machinery is all on the ground, and the most of it set in place. They now expect to have two tin mills in operation by April 1, and estimate their output at 400 tons of tin plate per month. They will roll the sheets for tinning from the steel billet. Their machinery is built for four mills. They represent that they will at first sell their black plate product to parties who are engaged in tinning, but will commence work in the spring on their tinning department. The company propose to build a first-class plant throughout.

The firm of Hughes & Patterson, owners of the Delaware Rolling Mill of Philadelphia, Pa., have begun the erection of substantial buildings for the production of tin plates, but state that it will be some months before they will be in a condition to begin the actual manufacture.

The Indiana Tin Plate Mfg. Company of Atlanta, Ind., state that the hard winter

has considerably checked the progress of their buildings. They now hope to be in operation by March 1. They add that their present obligations are to erect a plant of two rolling mills, with the necessary finishing department, at a cost of from $80,000 to $100,000.

As neither the International Tin Plate & Refining Company of Chicago, Ill., nor the Joliet Tin Plate Company of Joliet, Ill., report any progress, their names have been stricken from the list of manufacturers.

The New Castle Steel & Tin Plate Company of New Castle, Pa., which is building a large and substantial plant, together with the continued erection of buildings and plants, as herein shown, serve to confirm the view expressed in a former report relative to the permanent establishment of this industry. In this connection the substantial increase in the production of American black plates is particularly noticeable.

In Exhibit 3, which gives a revised list of manufacturing firms December 31, 1892, I have adhered to estimates of production heretofore made. The estimated investment in buildings and plants, close of fiscal year ending June 30, 1893, as shown in my report of October 24, 1892, has been reduced.

Exhibit 1.—Abstract of Tin Plates and Terne Plates Produced in the United States during the Quarter ended December 31, 1892.

[The detailed entries in this abstract are taken from the sworn returns of manufacturers.]

Tin plates.				Terne plates.				Amount made from		
Lighter than 50 pounds per 100 square feet.	50 pounds per 100 square feet.	62½ pounds per 100 square feet.	63 pounds per 100 square feet and heavier.	Lighter than 50 pounds per 100 square feet.	50 pounds per 100 square feet.	62½ pounds per 100 square feet.	63 pounds per 100 square feet and heavier.	American black plates.	Foreign black plates.	Total.
Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net	Lbs. net.	Lbs. net.
.....	563,770	.....	.....	137,081	.....	.....	.....	700,851	.....	700,851
.....	.....	.....	.....	.....	245,280	.....	40,500	.....	285,780	285,780
.....	.....	.....	.....	512,609	.....	134,088	.....	134,088	512,609	646,697
.....	40,096	.....	50,260	.....	.....	67,976	63,650	221,982	.....	221,982
.....	.....	.....	.....	.....	171,075	.....	.....	171,075	.....	171,075
.....	78,300	6,615	320	.....	12,852	.....	.....	.....	98,087	98,087
535,801	977	.....	4,815	.....	.....	.....	.....	541,593	.....	541,593
.....	.....	.....	.....	.....	107,406	.....	.....	51,581	55,825	107,406
.....	.....	.....	.....	.....	627,424	.....	.....	.....	627,424	627,424
.....	.....	.....	.....	.....	180,365	121,581	.....	249,295	53,251	302,546
.....	132,731	58,825	18,487	.....	360,198	2,200	38,738	560,260	.....	560,260
586	10,476	180,414	77,407	.....	.....	.....	.....	430	268,453	268,883
48,000	132,000	.....	28,000	.....	.....	.....	.....	100,000	108,000	208,000
.....	36,217	.....	290,945	.....	1,332,504	.....	206,905	.....	1,875,551	1,875,551
.....	.....	.....	.....	1,364,688	.....	.....	.....	.....	1,364,688	1,364,688
1,201,389	146,983	12,025	84,565	792,509	824,883	16,122	208,603	.....	2,287,080	2,287,080
74,646	94,443	7,200	.....	.....	.....	.....	.....	48,965	127,024	175,989
10,800	.....	.....	.....	2,200,932	.....	244,328	.....	.....	2,446,060	2,446,060
.....	18,468	4,350	.....	.....	84,240	.....	.....	1,030	106,028	107,058
.....	.....	.....	.....	.....	23,307	.....	197,259	220,566	.....	220,566
.....	.....	.....	.....	.....	337,260	.....	.....	337,260	.....	337,260
.....	27,152	.....	16,800	.....	284,148	.....	112,340	185,520	254,920	440,440
.....	.....	66,411	77,920	.....	.....	.....	.....	144,331	.....	144,331
.....	.....	.....	.....	.....	178,696	20,446	65,111	179,058	84,585	263,643
.....	634,186	225,221	66,087	.....	713,047	168,084	.....	1,839,625	.....	1,839,625
.....	289,872	.....	.....	.....	.....	.....	.....	289,872	.....	289,872
.....	150,380	101,994	56,363	.....	516,106	51,036	.....	875,879	.....	875,879
280,664	216,801	305,074	38,700	.....	249,320	1,620	.....	1,092,179	.....	1,092,179
.....	.....	.....	.....	.....	.....	434,800	.....	.....	434,800	434,800
376,383	.....	205,483	11,656	.....	.....	.....	.....	593,522	.....	593,522
.....	.....	.....	.....	.....	129,355	.....	.....	.....	129,355	129,355
.....	.....	.....	.....	.....	98,000	.....	.....	98,000	.....	98,000
1,527,970	2,572,852	1,173,612	864,305	5,007,819	6,424,456	1,212,571	933,106	8,043,449	11,713,042	19,756,491

Exhibit 2.—Summary of Production.

Period from		Tin plates.				Terne plates			Tin and terne plates	Amount made from		
		Lighter than 63 pounds per 100 square feet.	63 pounds per 100 square feet and heavier.	Total.	Lighter than 63 pounds per 100 square feet.	63 pounds per 100 square feet and heavier.	Total.	Aggregate production.	American black plates.	Foreign black plates.	Total.
		Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.	Lbs. net.
July 1, 1891, to Sept. 30, 1891.	First fiscal year after law became operative.	134,869	17,920	152,489	442,552	231,881	674,433	826,922	785,547	41,375	826,922
Sept. 30, 1891, to Dec. 31, 1891		181,501	34,410	215,911	1,046,879	147,031	1,193,910	1,409,821	1,209,661	200,160	1,409,821
Jan. 1, 1892, to Mar. 31, 1892		1,018,038	80,958	1,098,996	1,907,909	201,700	2,109,609	3,208,605	2,142,982	1,057,113	3,200,095
April 1, 1892, to June 30, 1892		2,796,941	274,593	3,071,534	4,795,280	383,981	5,179,247	8,250,781	5,798,263	3,052,488	8,850,751
Total...		4,132,049	407,881	4,539,930	8,192,620	914,593	9,107,129	13,646,719	9,286,593	4,350,106	13,646,719
July 1, 1892, to Sept. 30, 1892		3,347,046	274,331	3,611,397	6,875,958	465,400	7,341,358	10,952,725	5,920,082	5,032,643	10,952,725
Oct. 1 1892, to Dec 31, 1892		5,274,424	864,305	6,138,729	12,684,646	959,106	13,643,752	19,756,491	9,756,491	8,043,449	11,713,042 19,756,491
Total		8,611,470	1,135,636	9,750,106	19,560,604	1,398,506	20,959,110	30,709,216	15,676,573	13,043,531	16,745,685 30,709,216

Exhibit 3.—Revised list of firms or companies engaged in tin and terne plate manufactures, December 31, 1892.

[*a*, Producing; *b*, building; *e*, enlarging; ***, making or preparing to make black plates.]

Note.—From the following list are omitted the names of all firms or companies who had not begun actual building operations December 31, 1892.

A. A. Thomson & Co., *a*, New York, N. Y.
Alliquippa Tin Plate Company, † *a*, Alliquippa, Pa.
American Stamping Company, *a*, Brooklyn, N. Y.
American Tin Plate Company. * *a*, Elwood, Ind.
American Tin Plate Machine & Mfg. Company, † *a e*, Philadelphia, Pa.
American Tin & Terne Plate Company, *a*, Philadelphia, Pa.
Apollo Iron & Steel Company, * *a*, Apollo, Pa.
Baltimore Steel, Iron & Tin Plate Company, *b*, Baltimore, Md.
Britton Rolling Mill Company, * *b*, Cleveland, Ohio.
Blairsville Rolling Mill & Tin Plate Company, * *a*, Blairsville, Pa.
Cincinnati Corrugating Company, *a*, Piqua, Ohio.
Cleveland Tin Plate Company, *a*, Cleveland, Ohio.
Coates & Co., * *a*, Baltimore, Md.
Columbia Tin Plate Company, *a*, Piqua, Ohio.
Cumberland Rolling Mill & Tin Plate Company, * *a e ‡*, Cumberland, Md.
E. Morewood & Co., * *b*, Gas City, Ind.
Falcon Iron & Nail Company, * *b*, Niles, Ohio.
Griffiths & Cadwallader, *a*, Pittsburgh, Pa.
Gummey, Spering & Co., *a*, Philadelphia, Pa.
Hughes & Patterson, * *b*, Philadelphia, Pa.
Indiana Tin Plate Mfg. Company, * *b*, Atlanta, Ind.
John Hamilton, *a*, Pittsburgh, Pa.
Kahn Bros., *a*, New York, N. Y.
Marshall Bros. & Co., * *a*, Philadelphia, Pa.
Matthai Ingram & Co., *a e*, Baltimore, Md.
McKinley Tin Plate Company, *a*, Wilkinsburg, Pa.
Merchant & Co., *a*, Philadelphia, Pa.
Morewood Tin Plate Mfg. Company, *a*, Elizabethport, N. J.
N. & G. Taylor Company, *a e*, Philadelphia, Pa.
Norton Bros., * *a e*, Chicago, Ill.
New Castle Tin Plate Company, * *b*, New Castle, Pa.
Norristown Tin Plate Company, *a*, Norristown, Pa.
Phillips Tin Plate Company, *a*, Philadelphia, Pa.
P. H. Laufman & Co., Limited, * *a*, Apollo, Pa.
Pittsburgh Electro-Plating Company, *a*, Apollo, Pa.
Pittsburgh Tin Plate Works, *a*, New Kensington, Pa.
Record Mfg. Company, *a*, Conneaut, Ohio.
Scott & Co., Jas. B., *a*, Pittsburgh, Pa.
St. Louis Stamping Company, * *a e*, St. Louis, Mo.
Somerton Tin Plate Works, * *a*, Brooklyn, N. Y.
United States Iron & Tin Plate Mfg. Company, * *a*, Dennnier, Pa.
Wallace, Banfield & Co., Limited, * *a*, Irondale, Ohio

report that it will be June or July before they get into operation.

The sworn statements of manufacturers show a steady and regular increase of production from quarter to quarter, and taken

I also append (Exhibit 4) a list of stamping and manufacturing companies, who use American sheet iron and steel in the production of articles and wares tinned or terne coated.

Total number of companies, December 31, 1892	42
Number of companies manufacturing December 31, 1892	32
Number of companies building December 31, 1892	7
Number of companies enlarging works December 31, 1892	6
Number of companies making or preparing to make black plates December 31, 1892	18
Production tin and terne plates proper, fiscal year ended June 30, 1892, pounds	13,646,719
Production tin and terne plates proper, six months ended December 31, 1892, pounds	30,709,216
Estimated production tin and terne plates, fiscal year ending June 30, 1893, pounds	100,000,000
Estimated annual rate of production, close of fiscal year ending June 30, 1893	200,000,000
Estimated investment, buildings and plant, close of fiscal year ending June 30, 1893	$3,500,000

† Made no returns quarter ended December 31, 1892.

‡ Making black plates only.

Exhibit 4.—List of stamping or other manufacturing companies who use American sheet iron or steel in the production of articles and wares tinned or terne-coated.

Note.—The following list embraces only such firms or companies as made sworn returns of production to the Government for the quarter ended December 31, 1892:

Acme Shear Company, Bridgeport, Conn.
Avery Stamping Company, Cleveland, Ohio.
American Stamping Company, Brooklyn, N. Y.
Buhl Stamping Company, Detroit, Mich.
Chicago Stamping Company, Chicago, Ill.
Central Stamping Company, New York, N. Y.
Dover Stamping Company, Cambridgeport, Mass.
Eberhard Mfg. Company, Cleveland, Ohio.
Iron Clad Mfg. Company, Brooklyn, N. Y.
Knapp & Pratt Mfg. Company, Geneva, Ohio.
Lalance & Grosjean Mfg. Company, New York, N. Y.
Mix, G. I., & Co., Yalesville, Conn.
Parker Company, Charles, Meriden, Conn.
Sidney Shepard & Co., Buffalo, N. Y.
Wallace Mfg. Company, R. L. & Sons, Wallingford, Conn.

Is This So?

A correspondent in Indiana writes to us to the following effect:

There is one subject I wish you would preach a little about, and that is, some of the old importers of tin plate (claiming now to be manufacturers) are re-branding inferior brands of Welsh tin plates with American names, and putting "American" in large letters on the boxes. They don't even use diligence in getting the old brands off. I have been caught twice by different houses in this way. Another point: I bought plates from one house branded and priced differently, that were exactly the same plate. Now, our American manufacturers will use us up as badly as the Welshman if we don't kick, and I am one of the kickers.

A possible explanation of the first circumstance complained of by our correspondent may be that the plates he procured were some which had been made of imported black sheets, dipped in this country, and repacked in the boxes in which the black sheets were received. As plates so treated would come within the meaning of the law, as "American tin plates," according to the decision of the Secretary of the Treasury, it would be perfectly legitimate to brand and mark them as such. If, however, Welsh tin plates are being palmed off as *bona fide* American productions—which we are loth to believe—it is a very reprehensible practice, and one which would tend to the detriment of the American tin-plate trade in general. As to the second statement, if our correspondent finds for a certainty that he is being supplied with the same plates at different prices, we can only advise him to buy elsewhere. It must, however, be borne in mind that to distinguish between similar plates is difficult, and even experts might not agree in two plates being exactly the same article.

SCRAP.

The American Tin Plate Machine Company have leased the premises at Linfield, Pa., which were for many years occupied by the March Brownback Stove Company. Work is progressing rapidly and it is expected that the buildings will be ready for occupancy in course of a month or six weeks.

A press dispatch from Frostburg, Md., states that a tin-plate plant is about to be established in that city. W. R. Perry and others are interested in the enterprise, and John J. Jones, it is stated, will manage the plant.

Bruce & Cook, importers and dealers in tin plates and metals, 186–188 Water street, New York, have now on sale American terne roofing plates, samples of which, in appearance and quality, appear to be a very desirable article. To the trade the brands are known as P. T. L. and Snowdrop. This house inform us the goods are giving excellent satisfaction to all who have used them, adding that they compare favorably with high-grade imported brands, and can be sold at a price permitting successful competition.

Prize Competitions

$25.00.

FOR MORE THAN six months Weekly Prize Competitions ($10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of $12.50, a second prize of $7.50 and a third prize of $5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Prize Competition No. 14.

SUBJECT:

Suggestions Regarding the Sale of Spring and Summer Goods.

This competition is for the purpose of drawing out practical suggestions as to desirable methods in regard to the sale of spring and summer goods. Some merchants are negligent in regard to the matter, not giving it the attention it deserves, thereby losing trade, or defer attention to it until too late to do a good business in this line.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

Those discussing the subject are of course free to treat it as they think best, but the following points are suggested as deserving attention:

Putting carried-over stock in salable condition.
When should new stock be purchased?
Preparing room for season goods.
When should season goods be exhibited in the store?
Arrangement and display.
Methods for increasing last year's sales.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

Replies are to be received not later than March 25, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Prize Competition No. 14.

Our Prize Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 5. Closing March 4.
A Method of Securing a Reliable and Prompt Delivery of Goods.

No. 12. Closing March 11.
Arrangement of Pocket Cutlery.

No. 13. Closing March 18.
The Best Method of Changing a Credit into a Cash Business.

No. 14. Closing March 25.
Suggestions Regarding the Sale of Spring and Summer Goods.

Another subject will be announced in our next issue.

A hot-air register, claimed to be simple and inexpensive in construction, and which can be quickly and easily put together, forms the basis of a patent recently granted to Frederick Burmeister, Cleveland, Ohio.

ROOFING AND CORNICE.

Roof Coverings from an English Standpoint.

The consideration of a roof depends in some measure upon the standpoint from which it is viewed. The roofing materials used in this country are somewhat peculiar to it, and the same is to be said of any other country. Accordingly, when an English engineer or mechanic visits this country he is very apt to see much that is curious to him in our roofing methods. Again, when one of our roofers goes abroad he encounters many things which are worthy of note and which he is eager to describe to his fellows upon his return. The discussion of roofing theoretically, also the esthetical consideration of the topic, may proceed from as many different standpoints as the consideration of different materials used. In a recent issue of the London *Building News* we find the following article on roofs and roof coverings, written entirely from a London standpoint. It contains much that will interest our readers, notwithstanding that it does not deal to any great extent with those materials with which they are most familiar:

In actual execution the roof, of course, precedes the roof covering; but in working out a design it is frequently the covering which decides the shape of the roof. When once settled, it fixes at least the lower limit for the pitch, and it may even have an influence on the question of hips or gables. In olden times this influence was marked. In many districts hip tiles were scarcely to be had; lead hips were too costly for common use, and hips made up with slates and mortar were both unsightly and insecure. This difficulty has long since vanished. Facilities for transit are, from one point of view, even too great. Materials can be so readily taken from place to place that local peculiarities in building are tending to die out. The country—and one might almost say the world—is getting too much alike all over it, and, among other things, we now find tile hips and ridges everywhere. They have, however, usefulness at least to recommend them. They supply a practical want; but this is more than can be said of all the materials which are nowadays becoming fashionable in localities to which they do not belong. Traveling has become easy, but when all places become pretty much alike what will there be to travel for? It is time that all architects set themselves, as some have long done, to fight against this impending uniformity, and it is worth noting how many roofing materials, and how many ways of using those materials, may still be found within the boundaries of England alone.

One roof covering which is dear to painters, though hardly dignified enough for their architectural brethren, is thatch. The recent destruction by fire of a thatched village in the South of England will not help to commend it, even for cottage roofs, to the practical man. Yet, apart from its pleasant associations and its homelike look, it has merits of its own. Sir Epicure Mammon, in the *Alchemist*, when he is scheming to strip the lead from the churches and turn it into gold, proposes to put thatch instead, and remarks, truly enough, that thatch will lie light upon the rafters. And it is not only remarkable for lightness, but for warmth. In the hands of a clever workman all kinds of forms can be produced in it—gables, hips, valleys, and almost everything but gutters. In the Eastern counties it was brought to great perfection, because reeds were abundant, and were used instead of straw. We need not, indeed, expect to see a general revival of thatching, even in the remotest districts; but it would be a great pity to let the art die out, and the only serious objection, the inflammability of the straw, could in all probability be much lessened by simple means.

OAK SHINGLES.

The use of oak shingles is almost confined to spires and *flèches*, and there they may be made extremely effective. If well seasoned and selected, they are durable; where there is a proper lightning conductor they run little risk of taking fire; and in a certain class of work, usually unpretending, though refined, their color and texture are invaluable. A shingled spire in a freestone county looks, perhaps, a little out of place, though one old example at least, and by no means a bad one, may be found in Lincolnshire. On a wooden turret, however, shingles form an ideal covering. They enable the feature to be completed in the same material in which it is begun, and there is a charm in unity, although fortunate accidents may make even patchiness attractive. Shingles, too, from their smallness, are invaluable in giving "scale." The chief objection to them is their cost. This, when the modern contractor is asked to give an estimate for them, turns out to be surprising. Perhaps the reason is that they are so seldom called for. If a country carpenter here and there, in districts where oak is cheap, would make a specialty of these roofs, he might advance his own interests, and they might be less expensive and less exceptional than they now are.

GRAY SLATE.

The nearest approach in effect to oak shingles is produced by excessively small and rather thick gray slates, such as still remain on a few old houses at Penzance. The architect who has not seen these houses or something like them can hardly imagine how much beauty is to be got out of slating. Here it is used close to the sea for wall coverings as well as for roof coverings; and so it is also in South Devonshire—as, for instance, at Totnes. The Totnes people were more ambitious in their slating than their Cornish neighbors. They built their walls of a slaty stone, which was liable to let the driving rain through its laminated beds. To prevent this evil they then covered the walls with slate hanging, and they experimented on this in all sorts of ways. There are slated quoins and slated pilasters, and many other classic or semi-classic details, slated ever. They look as if a scaly eruption had broken out on the naturally smooth surface of an Italian building, and by degrees had covered it. The result is not always agreeable; but the simpler cottages at Penzance, with their slate hanging, are in this respect quite models for imitation. The artistic objections to slating are its even, mechanical surface and its want of tone and texture. In Westmoreland green slating these objections are more or less removed. The slates are thick, to begin with. Then they vary in size, diminishing in courses as they rise from the eaves to the ridge. The color is a pleasant one, and the surface is broken up by the well marked and somewhat rough edges of the slates. The misfortune is that Westmoreland slates are too expensive for ordinary use. But the old cottages of Devon and Cornwall show us how we may get all the artistic qualities of Westmoreland slating, except its color, out of some of the commonest and cheapest slates that are anywhere to be had. They are worth looking at a little more closely.

SIZE OF SLATE.

First of all, the size of the slate in general was very small indeed. Next, it often varied in different courses, somewhat as it does in Westmoreland slating. The olden slater took his slates as they came, and they did not come to him all sorted to one size, as they come to his successor of to-day. Neither did he try to reduce them all to the same gauge. He was a man, with such rudiments of artistic talent in him as most men have, or used to have, by nature. He was not a machine, like the typical modern workman, trying to do, by the imperfect aid of hands and arms, things which could be done much better and more regularly by the unerring assistance of wheels and pinions. Hence he put his mind into his slating; he fitted here, and contrived there and considered how this part would look and how that part would keep out the weather. Along with his small slates, a few larger ones reached him—as big as "Countess" or even "Duchess" sizes. He did not cut them up to match the others, because he had a use for them elsewhere. If his roof had hips, he worked them in there, one big slate ranging, sometimes with two, sometimes with three, or four, or even five of the smaller courses. If his roof had gables, he worked them into the verges just in the same way, and so he was able to make the verges overhang more, and protect the walls from the weather. Again, where his roof abutted against a wall or a chimney, he first tilted it up well, to throw the water off, away from the rubble or the masonry. Then he covered the junction with a carefully executed filleting of lime and hair, or mastic, in lieu of lead, and over this he found a place for some of his strongest and most durable slates of medium size. The use of these was to prevent the water, which was sure to run down the masonry in stormy weather, from finding its way into the house through crevices at the back of the plaster filleting. To accomplish this he built them in like steps, each 10 inches or 12 inches long, and 3 inches or 4 inches in projection, a little way above the raking line which the roof forms against the wall. As the water ran down the face of the work, it reached these stepped slates, and could not pass them. Consequently it either ran over their edges and on to the roof at a safe distance beyond the filleting, or it just

dropped from one projecting slate to the next, until it got down to the eaves. This was the old-fashioned substitute in cottages, and sometimes even in parts of churches, for lead flushings, step flushings and soakers. It cost less and lasted longer. Compared with the modern slated roofs, which, with other things of their kind, so sicken the townsman of to-day that he has to run away as long and as often as he can, to forget them, these old West-country roofs were full of interest, of art and of beauty. But we could not get them, or anything like them, by writing a clause in a specification. It takes a man to make them, and a man whose heart is in his work.

THE USE OF TILES.

The intense ugliness, flatness and monotony of most modern slating have driven our architects to the use of tiles. Now tiles do have some texture, some solidity, some play of light and shade over them, however mechanically they may be laid. With plain tiles the courses cannot be much more than 4 inches wide, and so the "scale" of a building does not suffer by them as it does by slates of the sizes now customary. Plain tiles, too, are not absolutely flat, and their slight curvature gives variety of tone and softness of effect. In Hampshire one sometimes sees tiled roofs, perhaps to mere sheds and outhouses, which seem to have the softness and richness of velvet, even when new. Broseley tiles and others of that class look hard when first laid, and turn black, rather than greenish or browniah, by time. Tiles of a different make or of a different tint mixed at random among them help to prevent the deadness which comes over such surfaces. But the difficulty is to get them mixed at random. The modern slater would rather make them into patterns, or into bands, or into something else that is loud and staring. He cannot appreciate the beauty of a quietly and delicately diversified surface, and if he is not allowed to do worse, he is likely at the least to put into one mass all the tiles which you are introducing to get a little play of color, so that he can go on with his even, mechanical task, and rejoice at having got rid of them. There are places, of course, where patterns may be welcomed. Here, in England, we seldom find them in such places; though we see them often where they would be far better away. But some of the French churches show what can be done, when that sort of doing is desirable, with both unglazed and glazed tiles of the richest colors.

PATENT TILE.

Ornamental ridge tiles are dear to the speculative builder. Like tile patterns, there is a right place for them; but that place is not where he puts them. Fortunately, they make admirable marks for stone throwing, and it is a merit in the street boy, which ought to hide a multitude of his sins, that he does his best to relieve us of these excrescences. Some 25 years ago quite a crop of patent tiles sprang up. They were on the pantile system, or on various modifications of it, and some of them were clever; but the weak point in all of these was that the roof-covering was only one tile thick, so that if there was a crack or a flaw in any tile the water came through at once. For the same reason, roofs covered with them were very liable to injury by workmen, and the result is not only that they are little used in new buildings, but that they have even been removed from older ones. Roman tiles, which have a separate covering piece over the vertical joints, are stronger, and less liable to injury; but English architects have found it difficult to get them properly made. And all these specimens of the pantile type have such a marked and distinctive character of their own that they either jar with or overpower most architectural details.

We have no room to speak of lead as a roof covering. It has a beauty of its own, though in London the smoke and soot seldom let us see it. But the gray roofs of Lincoln are something to remember, and so is a quaint, old, lead-covered spire like that at Braunton, near Ilfracombe. Bleached in places almost silver white, covered with rolls and fragments of rolls, patched up with patterns and ends of patterns, old and new, it looks like a history of North Devonshire plumbers for many generations. But their patching was surely not without expense; and in the quantity of it which has been needed we may see the reason why lead-covered spires are as infrequent as they are.

Perkins Shutters and Doors.

The Borden-Swearingen Shutter & Iron Works, Kansas City, Mo., and St. Joseph, Mo., since taking control of the well-known Perkins patent double-plate air space fireproof shutters and doors have made wonderful strides, which speaks well for the management, as also for the value of this fire-proof shutter. There are, it is claimed, over 100,000 of these shutters in use in the United States, Canada and Mexico, and their sales amounted to more during the year just closed than any two previous years. The Perkins patent swing shutter is constructed on the same principle as the rolling shutter, except in closing it projects into the opening. It cannot be warped by fire, as both plates are rendered stiff by corrugations and cross braces before being put together, the corrugation not only stiffening, but also providing for expansion and contraction, thereby preventing twisting out of position. The two plates are firmly riveted together along the sides, top and bottom, through heavy bands of iron, each plate setting as a brace to the other, so that a degree of heat sufficient to ignite the wood work of doors and windows cannot pass through it.

The 2-inch air space between the plates admits of a rapid circulation of cool air in case of fire, the air passing in at the bottom and out through small slots near the top. The inside plate is thus kept comparatively cool, while the outside plate may be subjected to intense heat. This is a combination claimed to be found only in the Perkins shutter. The top, with the exception of the slots mentioned, is tightly closed, preventing rain and snow from entering between the plates, and the inside surfaces are well painted before putting together.

They are operated either from the inside or outside of the building without the necessity of opening and closing frost-bound windows hard to reach. By attaching one to the other, all the shutters from top to basement on the same side of a building are opened and closed simultaneously at a single point, thus accomplishing in a minute's work that which often takes an hour or more to do with swing shutters, and insures increased protection from the quickness in operating them. They can be used in very narrow spaces where it would be impossible to open and close swing shutters. The tracks on which the shutters roll are set at an inclined angle, so that the shutters as soon as released from their fastenings, which hold them open, quickly roll down and close themselves. The advantage of this feature will be readily appreciated by hotels and others requiring the shutters to be opened constantly, and, in case of fire, readily closed. It is claimed that wind, snow, and ice cannot affect them; that there is no danger of broken windows and hinges torn from the wall by slamming shutters; that snow cannot clog their working, as the wheels or rollers are inclosed between the plates of the shutters.

The Borden-Swearingen Shutter and Iron Works also handle metal roofing and siding, prepared asbestos roofing, prepared felt roofing, incandescent lamps, mineral wool, asbestos and building papers.

FLASHINGS.

THE NATIONAL CORNICE WORKS, of which Schneider & Scheurer are proprietors, Hastings, Neb., have just issued an illustrated catalogue for 1893. The 20 pages of which the little pamphlet is composed give attention to galvanized iron cornices, dormer windows, pediments, finials, window caps, etc. The illustrations show designs for sheet metal work and indicate in a measure the variety of work which the concern now are in position to supply. An important feature of the pamphlet is found in the dimensions presented and the list of prices.

A VERY UNIQUE CARD, intended for the spring trade, is that just issued by Auld & Conger of 100 Euclid avenue, Cleveland, Ohio. Upon one side is a design worked out in slate of different patterns, the inscription reading:

"Auld,
1893,
Conger."

The main body of the design is in light green slate, while the letters and figures are in a deeper shade. The card is intended to show the manner in which lettering and dates can be worked out with slate of different colors, and can be used as a copy, which may readily be followed by the workmen, as the pattern on the card is made to a scale. On the other side of the card is a table, copyrighted by Auld & Conger, giving the number of slate of any size in a square from 1 up to 60. This is very convenient for the workmen in getting out an order or for the truckman, as they can tell at a glance how many slates of any size are required to do a certain piece of work. We understand that Auld & Conger will supply a copy of this card to any one who may be sufficiently interested to apply.

J. H. ELLER & Co. of Canton, Ohio, have issued what is known as their Seventh Annual Catalogue and Price-List. Within its colored paper covers the merits of the goods turned out are set forth and the statement made that the aim in the past has not been to "sell the cheapest, but to furnish a good article at a reasonable price," which high standard, it is said, will be maintained. Attention is given to steel roofing, corrugated iron, roofing and siding, conductor pipes, eave troughs, gutters and Eller's steel roofing. Remarks are presented on the construction of steel roofs, with illustrations of how the specialties of the company are applied. The engravings are numerous and represent goods of a character to prove interesting to those engaged in the roofing business. Price-lists are also given, together with testimonials and diagrams for the convenience of those ordering roofing or siding.

MERCHANT & Co. of Philadelphia are about to put upon the market a metal tile made on the same principle as their Spanish tile, but designed expressly for use on towers. The metal tiles at present on the market can only be adapted to towers by cutting or otherwise altering them to suit the tapering grades, which entails a good deal of waste, as it necessitates the use of as many tiles for the upper or taper courses as for the lower. With the special tiles now to appear, there is practically no waste, as they are made in a variety of sizes, and will run to any taper with little perceptible difference in each course. It is claimed that a great saving in labor is effected by the use of these tiles, as they are as easily applied for upper as for lower courses, the filling being made on an ordinary former. The method of fastening and nailing is the same as that used for the Spanish tile.

"The Metal Worker" Competition in Skylight Pattern Cutting.

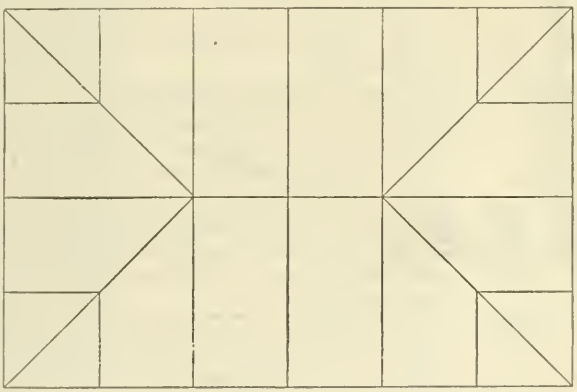
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

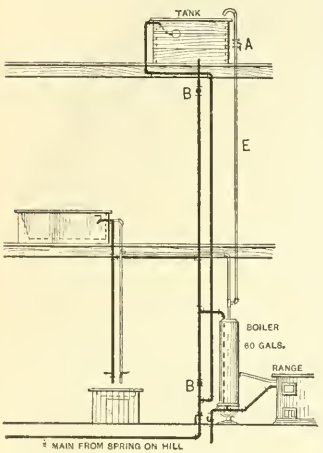
1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

PLUMBING AND GAS FITTING.

A Plumbing Problem.

From N. H.—I inclose sketches of two jobs done in neighboring summer houses. The point involved is this: the plumber who did the work claims that it is all right, while another claims that it is not and that it is dangerous in its present condition. The work has been in use three years and the boilers hammer and kick when there are hot fires in the ranges. It is almost impossible to keep packing in the hot faucets over the sinks. The boil-



A Plumbing Problem.—Fig. 1.—Range Boiler with Tank.

ers are copper. You will notice check valves on the supplies at B and there are no relief pipes to the boilers. *The Metal Worker* has advised other readers under similar circumstances and I would like an opinion as to the safety of the work in question.

Answer.—Accepting the work as shown by the cuts, the principle shown in Fig. 1 is much the better and with some modification it can be made satisfactory. Our correspondent remarks that there are no relief pipes to the boilers. According to Fig. 2, there is no place for a relief pipe. In lieu of the relief pipe, a safety valve might be placed upon the boiler and the drip pipe from it arranged to discharge over the kitchen sink. In any case the check valve B should be omitted; the boiler would then, if occasion required, relieve itself by forcing the water back into the spring supply. Continuing our remarks on Fig. 1, it is evident that pipe E was intended for the relief pipe. We advise the removal of the stop cock A, as there is no probable service it can perform, and allowing it to remain is courting the chances of having it closed when an open way through the pipe is most desirable. Pipe E should be as large as the hot service from which it is taken and no means of closing it at any point should be provided.

With reference to the check valves B B, Fig. 1, they probably perform the service that was intended while the work is in its present condition; that is, the lower one prevents any return of hot water through the spring supply and the upper one prevents hot water from rising into the tank when the boiler is overheated. However, as the spring supply to the tank and the cold service pipe to the boiler and fixtures are already practically two lines of pipe, it would be better to remove both check valves and make the spring supply one continuous line to the tank without any intermediate connection. Then, with the relief pipe E in proper condition, there would be no danger of hot water rising into the tank through the cold service pipe.

In Fig. 2 we notice that the spring supply is much larger than in the case of Fig 1, and we presume other fixtures not shown in the sketch are supplied by it. If on this account it is urged that a check valve is necessary to prevent the possibility of syphoning the boiler by drawing on the supply between it and the spring, the check may be allowed to remain provided a safety valve of some kind is used as before mentioned.

The heating surface of the water backs is very likely excessive in both of the jobs in question. If so, every point that will aid in securing a free circulation between the water backs and the boilers should be taken advantage of. If any of the connections are smaller than the openings proper in the boilers and water backs, they should be enlarged to full size. Notwithstanding that the pipe may be of the proper size, incrustation will sometimes reduce its bore until the result is practically the same as though the pipe itself was smaller. Therefore, in case the hammering continues after the alterations suggested have been carried out, our correspondent had better examine the range connections.

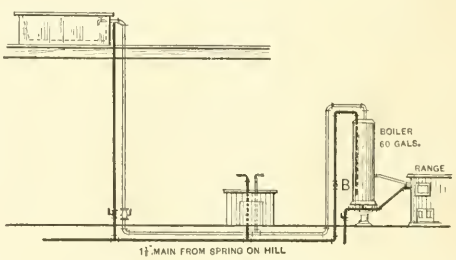


Fig. 2.—Range Boiler without Tank.

Registration of Plumbers in England.

The bill to provide for a uniform system of registration for plumbers throughout the United Kingdom, which was brought before the British House of Commons last year and referred to a select Committee of the House, has been again introduced, with the object of passing it into law. It is expected that the bill will be carried through Parliament at an early date, in which case it will take effect from January 1, 1894.

OBJECTS OF BILL.

According to the preamble of the bill, the chief object is "to afford additional safeguards to the public health, by enabling persons employing plumbers to select, when they desire to do so, persons who have given evidence of their qualification for plumber's work."

"There has been for several years a system of registration of plumbers established in the chief centers of Great Britain and Ireland, and by the bill it is proposed to place this system upon a broader and more permanent basis. The arrangements as to the examinations for registration will be placed under the jurisdiction of a General Council, representing the master and operative plumbers, the Plumbers' Company (one of the great London guilds), and the chief educational and sanitary bodies of the United Kingdom, with branch councils in Scotland, Ireland and Wales. It is proposed also to give the Council power to promote technical education among plumbers, and to exercise discipline among those whose names are enrolled upon the register. The bill does not contemplate any monopoly, and it does not interfere in any way with the rights of non-registered plumbers. It prohibits, however, such plumbers from representing themselves to be registered."

Such is the main drift of the present bill. The Plumbers' Company are, we understand, fathering the measure, as a means of consolidating and systematizing plans which have been already initiated under their auspices for furthering the better regulation of plumbing work in various centers of Great Britain. As will be seen, the bill does not interfere with unregistered men, but merely provides for plumbers who are qualified to pass the

necessary tests of knowledge a status which shall stamp them as efficient workmen.

POWERS OF GENERAL COUNCIL.

The General Council of Plumbers' "Education and Registration" is to consist of the following members: For England six master plumbers, six operative plumbers and six persons who must be members of a local board of health, medical officers of health, or sanitary inspectors. Branch councils in Scotland, Ireland and Wales will consist of two members of each class above detailed, or six in all. These will be elected by the district councils established throughout the country; but not more than two persons residing in the same city or district can be elected to sit on the general or branch councils at the same time. The members will be elected for a term of three years and will be eligible for re-election.

The General Council is to be intrusted with the work of making by-laws for their own procedure; and they will be given a large jurisdiction in regard to the district councils. These will be directed and regulated in great measure by the General Council, who will also make provision for and direct the examinations for registration, and outline the courses of study and practice calculated to promote the advance of sanitary plumbing. In fact, to the General Council is relegated the carrying out of the entire system of examination and registration, as well as the management and fixture of registration fees and general expenses connected with the work.

PROMOTION OF TECHNICAL EDUCATION.

A portion of the income arising from fees is proposed to be devoted toward the support of laboratories, museums, libraries, or lectureships, or for other purposes tending to the promotion of learning and education in connection with the art of sanitary plumbing. A clause of the act makes special provision for rental or purchase of halls, workshops or other buildings, for the purpose of establishing trade schools for the teaching and practice of plumbing.

PLUMBER'S REGISTER.

"The Plumber's Register," containing the names and addresses of all persons qualified under the act, is to be published annually; and with the General Council will lie authority for removing persons from this register for various specified causes, as misdemeanor, incapacity, &c.

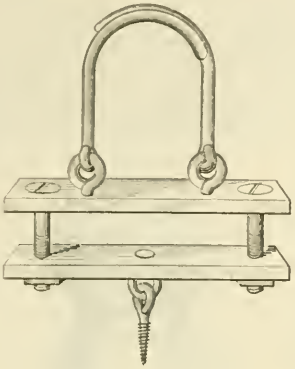
All plumbers whose names already appear on the register of the Plumber's Company, and those persons who have been engaged in business as plumbers prior to March 1, 1886, will be entitled to registration under the new act, without examination.

In its last clauses penalties are set forth for those who willfully misrepresent themselves as qualified workmen under the provisions of the new act. These range from a fine of $100 to imprisonment for 12 months.

Pipe Holder for Wiping Joints.

From S. F. B., *Leechburg, Pa.*—I inclose herewith a sketch of a serviceable little device that comes in every day use for the plumber. It is a pipe holder for clamping lead pipe to the bench or floor when wiping joints or two pieces of pipe together. It was my habit, during my time as a plumber, to use compasses for the purpose, with a pipe wrench or hook, or anything that would hold a pipe steady. With this simple device, of which I send a sketch, the work can be much more quickly and satisfactorily done. I do not claim the article as a patent, but simply send it to you in the hope that it may save some expense to the poor plumber on compasses.

The clamp is made of two pieces of band iron 4 inches long by 1 inch wide and $\frac{1}{8}$-inch thick, with three holes bored in the lower piece, the ones at the end being large enough to admit a sunk bolt of $\frac{1}{4}$-inch in diameter and the center hole large enough to admit a $\frac{5}{16}$-inch rod. This rod has an eye turned on it and is riveted on the lower strip. Before closing up the eye, however, a big screw eye should be put in it for the purpose of screwing it to the bench. The upper piece of band iron has four holes drilled in it, the two outside holes admitting two sunk bolts, as shown in the sketch, and the middle holes being for two more eyes of the $\frac{5}{16}$-inch rods. These eyes are riveted in likewise, and have two hooks passing through them, as shown in the sketch. The hooks are for gripping the pipe, and are fastened as shown. They can be used on pipe of any size or in any place, for horizontal or upright wiping. When the device is screwed



Pipe Holder for Wiping Joints.

in place the tightening can be done by an ordinary screw driver, by turning the sunk bolts.

Syphonage by Capillary Attraction.

From E. J. C., *New York.*—In your issue of February 4, in your remarks on what is called "dog's teeth," you say they are likely to syphon out a trap by "capillary attraction." I have been many years at the trade and I must acknowledge that I do not understand what it means and how the lumps of solder can help to break the seal of a trap. I am willing to be enlightened, however, if you are willing to do the enlightening part.

Answer.—To those who when dealing with effect search out the cause, greater opportunities for the acquisition of information will always present themselves. It is only reasonable to suppose that our correspondent has been often called upon to remove obstructions from traps and on such occasions has found among other things fragments of rags, cloths, thread, twine, &c., lodged in the trap and perhaps trailing over the crown and into the soil or waste pipe opening. Possibly he rested satisfied with having found and removed the obstruction without considering that the long shred of cloth, or other trailing substance, if left undisturbed, would eventually succeed in syphoning out the trap by what is known as capillary attraction or that form of attraction which causes liquids to ascend above their level in capillary tubes.

Defining capillary attraction in the simplest phraseology, we would say that the term is derived from the use originally of small glass tubes in which the liquid rose, the bore of which was not thicker than a hair, and which were called capillary tubes, from the Latin word for hair. The simplest illustration of capillary attraction which we can give is the following, which our correspondent can readily experiment on if he chooses: Let him put a quantity of water in a basin and immerse the end of a towel or strip of cotton cloth therein, allowing a portion of it to hang over the basin's edge. The water will rise through the pores and interstices of the cloth, gradually wet the dry part, and will eventually drip from the part which hangs over the basin, and so continue, if permitted, until the water is drawn out of the basin. The wick of a kerosene lamp wil also furnish an equally simple illustration of capillary attraction, as it is by this force in Nature that the oil is drawn up to feed the flame, which is generally about 2 inches above the surface of the oil. If it should happon that a plumber in putting in the vent in the crown of a 2-inch trap under a wash tray or kitchen sink, for instance, should leave "dog's teeth" behind him, and that thread, twine, ravelings of cloths or other similar substances passing through the trap should get caught in one of these little lumps capillary attraction would at once be established, and, as in the basin, the water in the trap, if not renewed for some time, would be completely syphoned out and a clear entrance permitted to sewer gas. It not unfrequently happens that cloths are carelessly thrown into water closets, and these may also be caught and be the means of emptying the trap. It will therefore be seen how much care should be exercised in the execution of plumbing work so that a well-arranged system of traps and vents may not be rendered almost useless by blundering which might be avoided.

Protection of Water Pipes Against Frost.

From J. F. G., *Opelika, Ala.*—Please give me some of the methods used to protect water pipes from freezing. The plumbing business is quite young in our town and there has been a great deal of trouble with burst pipes in ordinarily cold weather.

Answer.—The most practical sort of prevention of water pipe freezing is, in the first instance, to avoid running the pipes in exposed situations—that is, keep them away as much as possible from the outer walls and from exposed air shafts. If this cannot be avoided in every case the pipe should be covered with some non-conducting material, such as mineral wool or felting, and if such articles are not always available—if the water pipe is so situated as to admit of doing so—it might be boxed and the box filled with sawdust. If the pipe is run in the ground, it should be packed in charcoal dust or laid below the frost line.

Repairing Water Mains.

From W. M., *New York.*—We have a water main which was burst from the frost. Have any of the readers of *The Metal Worker* ever used bolted pipe bands, which are described in the plumbers' catalogues? These bands are made in two pieces to form a sleeve and fit over the pipe. I would like to learn if they give satisfactory results.

The Plumbing Situation in New York City.

The failure on the part of ex-Mayor Grant to comply with the mandatory provisions of the law passed by the State Legislature last year (Chap. 620, Laws of 1892) in relation to the examination, licensing and registration of plumbers, has led to more or less embarrassing complications. Under this law the Chief Inspector of Plumbing, the Chief Engineer of Sewers, two master plumbers and one journeyman plumber constituted the examining board, which should have been appointed within 90 days of the passage of the act. The eight months of Mayor Grant's term subsequent to the approval of the measure by the Governor were allowed to pass without any action being taken, and when in the first week of February of the present year the examining board was created by Mayor Gilroy the task set before the board—viz., the examination of nearly 1000 master plumbers in the short space of two or three weeks—was one utterly impossible of fulfillment. The consequences of this neglect can be readily appreciated when it is understood that under the provisions of the act referred to any plumber doing work in New York City after March 1, 1893, without having been examined and licensed by the examining board and registered in the Health Department, would be adjudged guilty of a misdemeanor. No permits could be issued by the Department of Public Works for opening streets or tapping mains, and the sewerage and water service of the city would, in the truest sense, be left to take care of themselves. The examining board, appointed on February 7, organized for business on the 10th of that month with Col. Geo. D. Scott, Chief Inspector of Plumbing of the Building Department, as chairman, but, with the exception of a small number of the old plumbers who had been in business many years, there was but very little progress made until the advent of March 1 apparently left the plumbers in a bad plight.

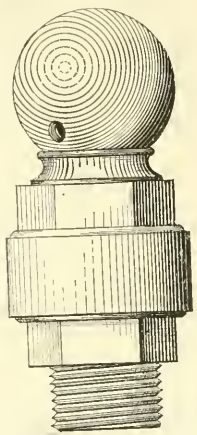
Desirous of ascertaining the status of the trade in this city under the embarrassing conditions above stated, a representative of *The Metal Worker* sought an interview with Colonel Scott at the office of the Building Department on the 1st inst., the date on which the old licenses became inoperative under the new law. The information afforded by Colonel Scott was to the effect that the utmost the examining board could do in the short time it was in existence was to receive the applications of those who sent them, with the statement that they would be notified of the date on which they would be required to appear before the board for examination. Colonel Scott next consulted with Mayor Gilroy and, after explaining the gravity of the situation, the city being virtually deprived of the services of the plumbers, suggested that an extension of time should be asked for to enable the board to complete the revision of the license record. A bill was in the meantime prepared, identical in all its provision with chapter 620, 1892, but extending the time to September 1, 1893, and this was forwarded to Albany with Mayor Gilroy's indorsement. On the 1st inst. a telegram was received by Colonel Scott from Albany stating that the bill extending the operations of the examining board to September 1 had passed both branches of the Legislature and received the Governor's signature. The board will now proceed to business, and the examinations will be held every Friday on the top floor of the Bradley building, corner of Eighteenth street and Fourth avenue, in which the offices of the Building Department are located.

There are at the present time the names of 95 licensed master plumbers on the books. Many of these are names of men no longer in the flesh, but whose licenses are used by their successors in the business. It is, we are informed, the purpose of the examining board to honestly investigate every applicant's claim to be considered a competent plumber, and as the *personnel* of the board is in the fullest sense satisfactory to the plumbers as a body, it is expected that the decisions reached will be accepted as fairly rendered and the standing of the craft be placed on a reliable basis.

Safety Valve for Kitchen Boilers.

In view of the fact that many accidents occur yearly from the explosion of kitchen boilers, an English exchange directs attention to a patent safety valve devised by Mr. Foord of Notting Hill, London, England, which is specially designed for the prevention of such accidents. We give herewith an illustration of this valve, together with the following description from our exchange:

The preventive, which is otherwise known as a "non-corrosive safety valve," is sketched in the illustration and is intended to be fixed either to the high-pressure boiler itself or in the flow pipe, the nearer the boiler, of course, the better. The active feature of the valve is a disk of mica, which is fitted in the circular body. For duly protecting the mica a lead washer is first laid upon the seat. Upon



Foord's Patent Safety Valve for Kitchen Boilers.

that is placed a washer of cardboard, and then upon the latter the mica disk is laid. Over the disk is placed another cardboard washer, and upon that again there is another washer of lead. The ball covering is next screwed on and the valve is ready to be fitted to the boiler or flow pipe by means of the screw shown at the base of the illustration. As mica is of a non-corrosive nature, the valve is always in a workable condition—a feature of prime importance, as need hardly be pointed out, where dependence has to be placed upon a part that may be called into automatic action at any moment, expected or unexpected. Assuming, now, that the valve is fitted and a servant, in ignorance of the fact that the water pipes are badly frozen, proceeds to light a fire in the morning as usual, the worst that will happen will be the bursting of the mica disk, an outrush of steam from the aperture in the ball covering, and a subsequent flow of water, causing a mess in the kitchen, of course; but that will be an insignificant matter, which can be soon set right. The ball covering, it should be added, is intended to be fixed so that the hole is against a wall, and in that position the outrushing steam will not fly in the face of the occupants of the kitchen. Or an alternative arrangement can be adopted where a little extra expense is not a consideration, and that is to carry a small pipe from the valve to the sink or other place where the steam and water can be discharged. The disks are tested to stand a pressure of 65 pounds. The sole agency for the United Kingdom has been taken up by James Dixon, Saracen's Head Buildings, Snow Hill, London.

TRAPS AND VENTS.

In a note in *The Metal Worker* of February 25 we referred to an address at the Third Annual Convention of the Connecticut Master Plumbers' Association, held at New Britain, Conn., February 9. The name of the speaker, however, should have been President L. H. Mills of Bridgeport, instead of Lyman D. Mills of Middletown.

The Keystone Gas Meter Company of Royersford, Pa., send out advertising matter of an interesting character. In addition to the *fac-simile* of a reprint from a foreign paper, to which we referred some time ago, they also distribute a little spring circular addressed to all gas companies, calling attention to the merits to be found in the Keystone meter. A serviceable souvenir is a blotter. Cards are also distributed, giving tables of burners, pipes, &c. The figures show the size of the meter, greatest number of burners to be put on it, and the size of pipe to be used, the meters varying from 3 to 500 light each.

The committee of the New York Master Plumbers' Association having in charge the presentation of a portrait of Col. Geo. D. Scott, Chief Inspector of Plumbing of the Building Department brought their labors to a close on Washington's Birthday, when the portrait was presented to Colonel Scott at a drill and reception held on that evening at the armory of the Eighth Regiment, of which he is Colonel. The presentation was made by President H. G. Gabay of the Master Plumbers' Association. The portrait is full life size, and represents the Colonel in full uniform. Accompanying the portrait was a handsomely engrossed set of resolutions suitably framed. The occasion was well chosen on which to make the presentation, as the regiment was being reviewed on that evening by Mayor Gilroy in the presence of a large assemblage.

"There are men," says a London (England) plumbing exchange, "who, from ignorance and incapacity, are unable to obtain the certificate of the registered plumber, yet they have the brazen effrontery to style themselves 'sanitary engineers.' One of these in a populous Southern suburb dubs himself an 'undertaker and sanitary engineer.' He was asked if he was a member of the Sanitary Institute. 'No,' said he, 'I belong to two local clubs, and that's quite enough for me!' Such a questionable qualification may perhaps bring him some 'nice funerals' of defunct members, but it is to be hoped that his sanitary knowledge will be held at a very low estimate."

Taking time by the forelock, the official commission for the International Exposition to be held in or near Paris in 1900, has already commenced its labors.

The Patent Office exhibit at the World's Fair will, according to the annual report of the Commissioner of Patents, comprise some 2500 examples, mostly working models, classified and arranged in chronological order; beginning, for instance, with the first elementary idea of a machine, or other object, and carrying it out through the successive stages of its development to the latest improved type. The collection should be of great interest and of remarkable educational value.

Western men are not at all pleased that in the Senate appropriations in aid of river and harbor improvements between Buffalo and the Soo Canal have been cut down about one-half.

THE RETAIL STORE.

The Stove and Tin Business.—I.

BY VETERAN.

There is no end to the study of business methods as related to what is called the stove and tin trades—no institute where one can graduate. It is the work of time and close application to methods that from time to time show best results. One must be as ready for a change to suit circumstances as a mariner looking to his course and the weather. There are, however, certain standard and reliable guides for business that must be in the foreground, and to which rules must tend. The first in importance is for the dealer to make up his mind what kind of trade will best pay him for his services and capital, at the same time taking into consideration his own age, experience and natural inclination.

A young man with small means, good health and a fair knowledge of the mechanical details can go to a new country and open up without much regard to style, and with his own hands make a stock of tinware cheaper than he could buy it and pay freight to distant points. His time is thus employed from the start, and he can play the old tune of "hand-made goods" for all it is worth and can get good profits on his labor. In the opposite extreme is the tony city store, located, without regard to expense, in the heart of business, with elegant fixtures, full lines of stoves and housekeeping goods, plated ware, clerks with high-standing collars, and where a common laboring man would never think of going to get his stove pipe fitted up or a leaky vessel mended.

Between these extremes are at least three grades of business. One is where no attention is paid to sales of merchandise and but a few of the most useful articles kept, but where it is all work, work, work, do anything from cleaning a furnace to putting up a corrugated iron building, and where a good, tight building in an alley will answer better than an elegant store in a block on the best street at same rent.

Next comes the combination business, where an effort is made to unite a store trade with shop work, and this is the business of the larger part of men known as stove dealers. Most of these concerns dabble in plumbing, gas and steam fitting and sell agricultural implements and builders' hardware.

Quite an important branch is that confined to furnaces, ranges, heaters and grates alone. This is naturally limited to the large cities, where nearly every new building has the heating and cooking apparatus permanent. This includes the various methods of hot air, steam and hot water. A few concerns are engaged in the sale of gas appliances for heating and cooking, but find the competition of the gas companies too much for them, as the goods are offered at the lowest wholesale prices at these establishments, solely depending on the increased use of gas for compensation.

The dry goods and furniture stores are in the business apparently to stay, and are sharp competitors; but as they do not strictly come under the head of stove dealers, they need not have attention or advice unless from the dealers who supply them, for they are looked upon as intruders by the trade in general. There is no good reason why an energetic dealer may not hold his own against these stores. There is but one way to do it, and that is to learn by personal knowledge and not by their advertising just what kind of goods they keep and the prices at which they are sold, and then to match them fairly.

Leonard Cleanable Hardwood Refrigerators.

Grand Rapids Refrigerator Company, Grand Rapids, Mich., are putting new styles of refrigerators on the market for 1893, one style of which is shown in the

The Leonard Refrigerator.

accompanying cut. In the new patterns the carving is changed from the old-style spindle work to conventional designs cut in the solid wood. They have also replaced the iron hinges with false ornaments by solid bronze surface hinges made at their foundry. The interior arrangement of the refrigerator is so made, it is stated, that not a nail head shows in the zinc work. For insulation charcoal filling is used, and as an extra safeguard against its settling down, an extra lining of heavy wool felt. The wool felt is nailed on the outside of the inside box. Their line of sideboard tops for refrigerators is referred to as artistic, and as not only useful, but highly ornamental, only the best bevel plate glass being used in these tops.

The Bristol Automatic Fishing-Line Float.

The Horton Mfg. Company, Bristol, Conn., are introducing the float shown in Figs. 1 and 2. Through the center of

Fig. 1.—Automatic Fishing-Line Float.

the float is a hole, into which at the small end is introduced a bent piece of metal. Between the parallel sides of the metal is a small clamp so arranged to hold the fish-

Fig. 2.—Interior Construction of Float.

ing line between it and one side of the metal. The float is thus securely fastened at any position on the line desired. In reeling up the line the float is automatically released from the line by the attachment tripping as soon as the end of the rod comes in contact with the float, as shown in Fig. 2. While the float is easily adjusted to the line, it as easily detaches itself, thus saving all annoyance and inconvenience and relieving the fisherman of all necessity of looking after his float while landing his fish. The automatic attachment is neat in construction, being but little larger than the ordinary wood or quill center in floats.

Gem Water Filter.

Edward G. Shepard, 142 Chambers street, New York agent for Jones Mfg. Company, Boston, is offering the above filter, as illustrated in the accompanying cuts. The filter, Fig. 1, is made of brass, nickel plated inside and outside, to give

Fig. 1.—Gem Water Filter.

protection from rust or corrosion. It is claimed that there are no soldered or complicated parts in their construction, and the caps at each end are held to the body by three screws, which may be removed at will. The filters are packed, it is stated, with especially prepared ground quartz, held in place by nickel-plated

Fig. 2.—Showing Distributing Disk.

brass strainers of woven brass wire. As shown in Fig. 2, a distributing disk is suspended in the center of the filter, and is designed to divert the flow of water from a straight course, break it into a spray and throw it into all parts of the filter, thus, it is claimed, greatly increasing its filtering properties. The glass filter, Fig.

Fig. 3.—Glass Gem Filter.

3, is constructed the same as the one already described, except in its external construction, glass being used for a body instead of brass. This necessitates the use of outside screws to hold the parts together; but it is readily taken apart for refilling, and allows the working of the filter to be seen, and also the condition of the filtering material. The glass is ¼ inch thick and, being cylindrical, the makers remark that the objection of breakage is almost entirely removed. Fig. 4 shows an attachment for plain bibbs, those having no threads, to fasten the filter to. By means of the attachment these filters may be placed upon smooth faucets of varying

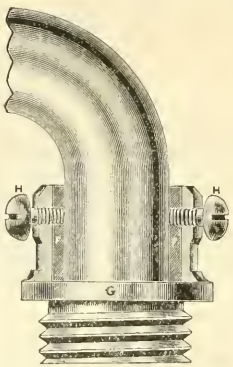


Fig. 4.—Plain Bibb Attachment.

sizes. The interior part F F is a piece of rubber tubing, held in place by the nickel plated brass cylinder G, having the necessary filter thread, and the whole fastened to the faucet by two set screws, H H. The attachment is made in nine sizes from $\frac{7}{16}$ to $\frac{15}{16}$ in $\frac{1}{8}$ inch sizes.

Twist Drill Gauge.

We illustrate herewith a new twist drill gauge, the opposite sides being shown in Figs. 1 and 2, manufactured by T. F. Welch & Co., 65 Sudbury street, Boston, Mass. The tool is made of cast steel, hardened. The holes, it is stated, are gauged accurately, and the principal improvement embodied in this tool is that it combines a drill gauge with the tap drill sizes. This is accomplished by indicating on reverse side the tap drill sizes by means of numbers. It is claimed that this is a great advantage over the old method of guessing the sizes required by the different taps. The point is made that the tool is well made and finished and sold at a moderate price.

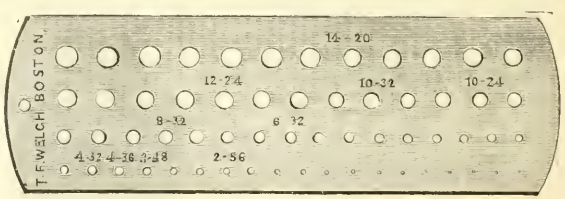


Fig. 1.—Twist Drill Gauge.

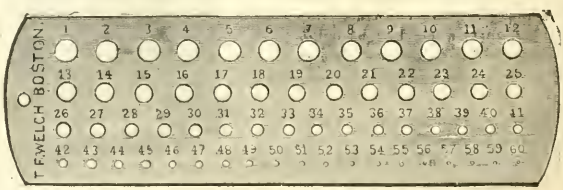
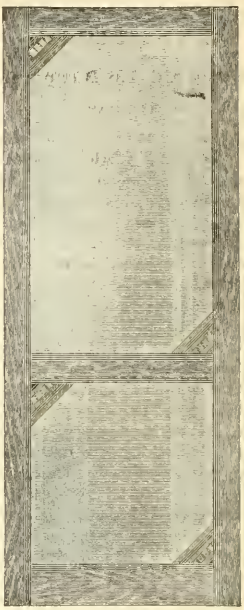


Fig. 2.—Gauge for Taps.

McFarren & Shutts is the style of a firm who have recently commenced business at Hornellsville, N. Y. The stock carried will include House-Furnishing Goods, Glassware, &c.

The Empire Fancy Screen Door.

The new pattern of screen door, as herewith illustrated, is manufactured by A. J.



The Empire Fancy Screen Door.

Phillips & Co., Fenton, Mich. It is made from selected pine, finished in natural wood, wood filled and varnished. It is referred to as having dowel joints, stiff, strong and handsome, and as first-class in every respect. It is made in six sizes, from 2 feet 6 inches by 6 feet 6 inches to 3 x 7 feet, ¾ and 1⅛ inches thick, covered with black wire cloth, unless otherwise ordered. The manufacturers advise us that the work and material on the door are first-class, but that the design admits of rapid manufacture, and consequently the door can be sold at a low price.

Herrick's Tool Brackets.

Brackets for hanging tools, as shown in Fig. 1, are being introduced by F. A. Herrick & Co., 228 Second street, Jackson, Mich. The brackets are made of cast iron, notched so that each tool is secure in its place. A strong dovetailed projection plate is screwed to the wall, over which the bracket is slipped. This permits the removal of the bracket at any time without taking out the screws. Brackets are made in three styles: For long-handled shovels, holding six shovels; for long-handled forks, holding eight forks, and straight smooth arm hooks for

Fig. 1.—Herrick's Tool Bracket.

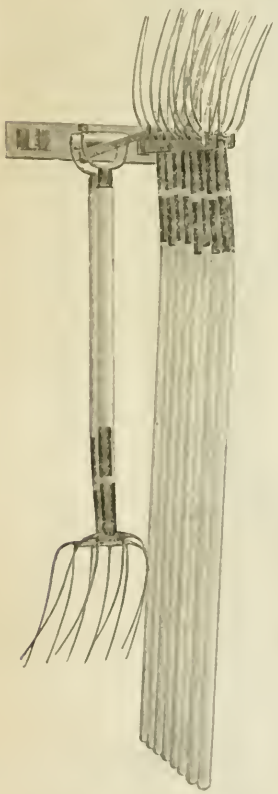


Fig. 2.—Brackets in Use.

D handled goods, that work well between the brackets and economize space, as shown in Fig. 2. The brackets are particularly designed for use in stores where floor space cannot be spared for tool racks.

The Wayne Self-Measuring Oil Tank.

The Wayne Oil Tank Company, Fort Wayne, Ind., are, among others, introducing the two forms of tanks shown in the accompanying illustrations. Fig. 1, their first floor tank, is encased in Southern pine, highly finished in natural wood, and attractive in appearance. The pumping apparatus is composed of metal entirely, being made with such accuracy, it is stated, as to require no packing. The indicator to this, as to all their tanks, is a simple contrivance indicating the exact quantity of liquid in the tank at all times. Stops attached to the pump regulate the amount of oil drawn at a single stroke, whether it be a quart, half gallon or gallon.

In measuring the quantity of oil desired to be drawn, it is explained that the proper stop is pushed inward, while raising and lowering the lever forces the exact quantity of oil indicated into the

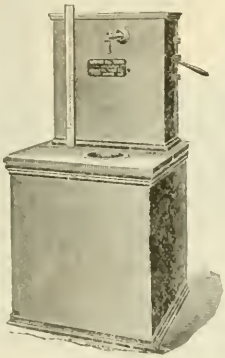


Fig. 1.—First Floor Oil Tank.

can or vessel, which is suspended on the discharge, thus avoiding the use of any and all measures and funnels. The advantages claimed by the makers are that all drippings are carried back to the tank; that the entire operation can be performed in the dark if necessary; that the drawing is rapidly done, leaving clean hands, avoiding greasy, bad smelling floors, checking all evaporation, and that the result is an exact measurement in every instance.

Fig. 2 illustrates their cellar tank and connections, the cabinet of which is above the floor, requiring but little space, and is carefully finished. The drip basin on the floor is to return all drippings to the tank, keeping the surroundings clean at all times.

Among the features for which the makers claim superiority are: That the plunger, being attached to a ratchet movement, operated by a lever, results in producing a quicker action with very much better results and greater ease than by direct motion; that it is made of solid metal, requiring no packing, and does not wear out or leak; that the valves are made of the best brass, ground air tight, and in the construction of the tanks only the best galvanized iron is used; that all measuring adjustments are on the outside of the tank or exposed so as to be accessible at all times, and that the pump can be connected to any sized tank.

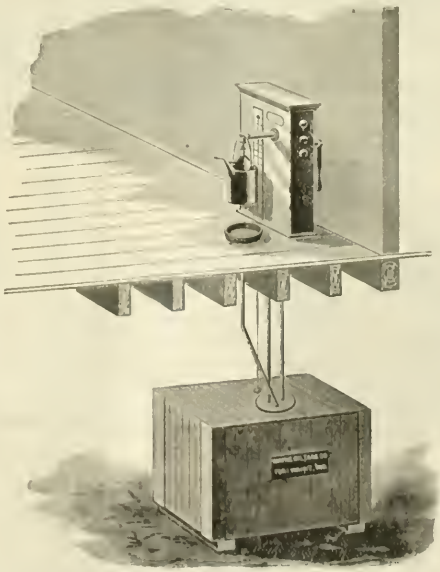


Fig. 2.—Cellar Tank and Connections.

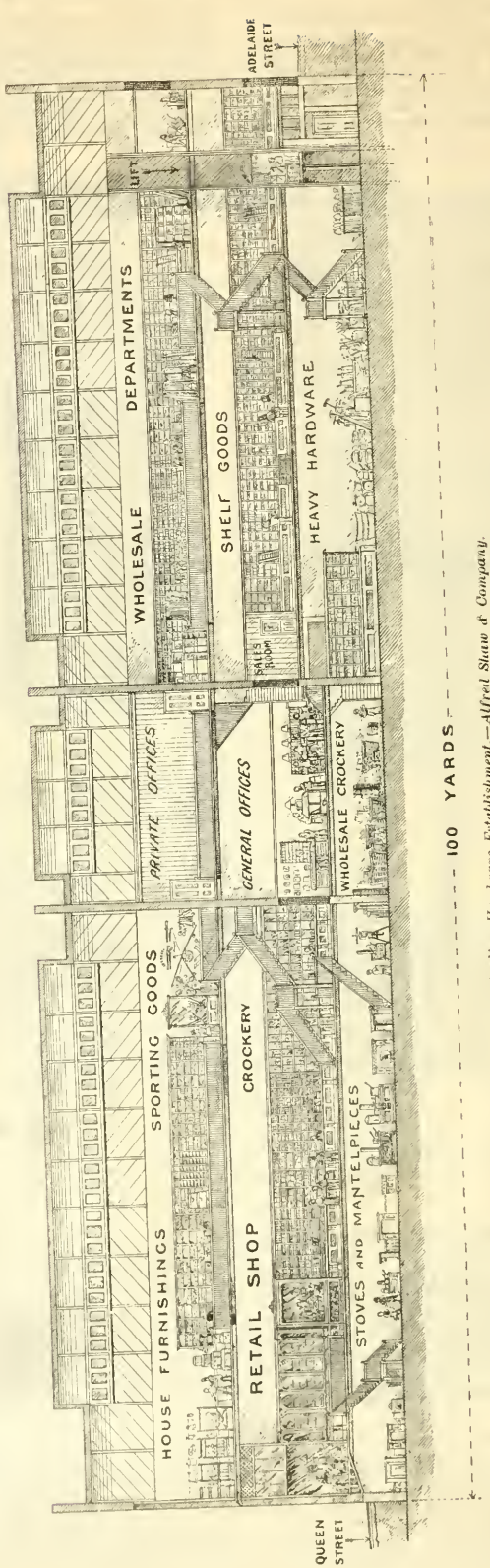
Leonard Cleanable Hardwood Refrigerators.

Grand Rapids Refrigerator Company, Grand Rapids, Mich., are putting new styles of refrigerators on the market for 1893. In these the carving is changed from the old style spindle work to conventional designs cut in the solid wood. They have also replaced the iron hinges with false ornaments by solid bronze surface hinges made at their foundry. The interior arrangement of the refrigerator is so made, it is stated, that not a nail head shows in the zinc work. For insulation charcoal filling is used, and as an extra safeguard against its settling down, an extra lining of heavy wool felt. The wool felt is nailed on the outside of the inside box. Their line of sideboard tops for refrigerators is referred to as artistic, and as not only useful, but highly ornamental, only the best bevel plate glass being used in these tops.

The company advise us that advertising matter for agents is in course of preparation, and will be of an attractive and ornamental character; a blue enamel sign to go under the window sill is one feature, a complete catalogue in miniature is another, also new designs in picture cards and show cards.

An Australian Hardware Establishment.

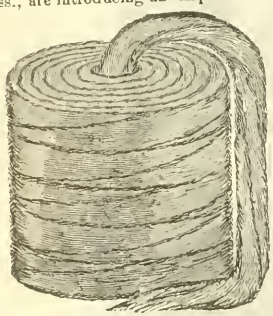
In the illustration herewith given we present a view of the interior of Alfred Shaw & Co.'s extensive Hardware establishment at Brisbane, Queensland. As indicated in the engraving, the building is 300 feet long, running from Queen street to Adelaide street. It has an L at about the center which is over 100 feet in length. A short distance away is a large Implement and bulk store, besides several acres of sheds and buildings where the firm's stock of Agricultural Machines, Metals, &c., is carried. As is true with most Australian Hardware houses, Alfred Shaw & Co. carry quite a line of Crockery and Lamps in addition to the regular Hardware and related lines. We are advised that they purchase about 20 per cent. of their Hardware from the United States, and are, in fact, referred to by competitors as an American house because of their seeming preference for this country's goods. They are large buyers of American Agricultural Machinery and Tools, and are agents for a leading manufacturing concern in the States on these goods. They have lately opened a Sporting-Goods department, and have imported from the United States Fishing Tackle, Bicycle Sundries, &c. The purchases from America would represent a higher percentage of the total purchases were it not for the fact that the heavier lines are all purchased from the old country, such lines including Galvanized Iron, Bar Iron, Horseshoes, &c. Alfred Shaw & Co. do a large retail business, as well as the heaviest wholesale trade in their territory. Being so far from the markets, they have to carry an exceptionally large stock of goods, and they state that if they turn their stock once and a half in a year they are doing very well. As an illustration of the early character of their purchases we may say that they are now ordering the goods which will be in demand next Christmas. The firm were organized in 1875, and by judicious enterprise and well-expended energy have increased their business from year to year until they are now doing the largest Hardware business in Queensland, and carry regularly a stock the value of which is estimated at $500,000.



An Australian Hardware Establishment.—Alfred Shaw & Company.

Coiled Oakum.

The Henry B. Newhall Company, 105 Chambers street, New York, and Boston, Mass., are introducing an improved form



Oakum in Coil.

of coiled oakum, as here shown. It will be seen that the strand is drawn from the center, as twine is drawn from a ball, the size of the strand being easily increased by folding or diminished by dividing it. The convenient form of putting up this article is referred to by the makers as especially desirable to consumers and dealers in oakum, thereby saving much time and waste, which frequently equals the cost. It is said to be particularly adapted to ship calking, plumbing, water pipes, &c. The material used in the manufacture of this article is new Russia hemp, and is put up in 5 pound coils ready for use, 10 coils to the bale.

Testing the Air in Buildings

The Department of State Inspection of Schoolhouses, Factories and Public Buildings in Massachusetts appears, from the annual report of the chief of the department, just issued, to be extremely active in insuring the proper ventilation of the buildings under its charge. Detailed reports are presented by the staff of inspectors in regard to the results obtained by them in their several districts, which show a marked advance in this important matter. These officers are, we are told, men who are well equipped for the work intrusted to them, and the results of their energy are apparent in the improved sanitary conditions which they have been instrumental in bringing about, especially in the case of school buildings. The vital necessity for maintaining a high standard of purity in the air supply of such places, where children are congregated, by means of effective ventilation, appears to have received very earnest attention. Mr. Wade, chief of the department, in his report, urges very strongly the desirability of legislation which shall give the inspectors larger powers in the matter of enforcing the provision of proper ventilating methods in all such cases.

METHOD OF TESTING AIR.

Among the means utilized by the inspecting officers for measuring air supply to, and exhaust from, occupied rooms and the testing of that air in order to ascertain its relative purity, humidity and temperature, is an instrument called the Wolpert air tester, after its inventor, Professor Wolpert. This instrument is very simple, consisting of a glass test tube, on the bottom of which is a black mark, an inner tube of glass, and a rubber bulb, together with a stand to hold the tube. The test tube is filled to a certain hight, marked on the tube, with lime water; and by means of the inner tube and bulb air from the room is passed through the water until by the formation in it of carbonate of lime, the water is rendered so opaque that the black mark or spot can no longer be seen. A table shows, by the number of times the bulb has been filled, how many parts of carbonic acid there are in 10,000 parts of air. This system has by comparison been found to correspond very satisfactorily with more elaborate chemical analysis made at the same time. Its ready method of working and simplicity of operation have been found very useful by the inspectors, who have become very expert in its use and in that of the other apparatus adopted for testing the heating and ventilating systems of schools and other buildings.

THE CARBON DIOXIMETER.

Another device for ascertaining the amount of vitiation in the air of occupied rooms has, we learn from Mr. Wade's report, above quoted, been recently introduced by that officer, which promises to give even better results, without continuous contact of the operator, so that any person may at once be warned by the instrument when the air of a room where it is fixed has become vitiated. This instrument has been called a carbon dioximeter. The apparatus consists essentially of a balance, inclosed in a glass case, with an electric bell attachment. Sufficient willow charcoal is placed upon one scale pan of the balance to absorb the carbonic acid gas contained within the glass case. The larger the amount of carbonic acid gas present the more rapid the absorption. The balance is so constructed that, in air containing ten volumes or more of carbonic acid gas, sufficient absorption will occur within 15 minutes to move the indicator to a particular point on the scale, where an electric connection is made and an alarm bell rings, thus announcing that the air is dangerously vitiated. As when carbonic acid gas reaches 10 or 12 parts per 10,000, we know that the air is charged with matter exhaled from the lungs of those present to an extent dangerous to health, the value of a device which gives instant warning of the fact that the danger line has been reached is obvious.

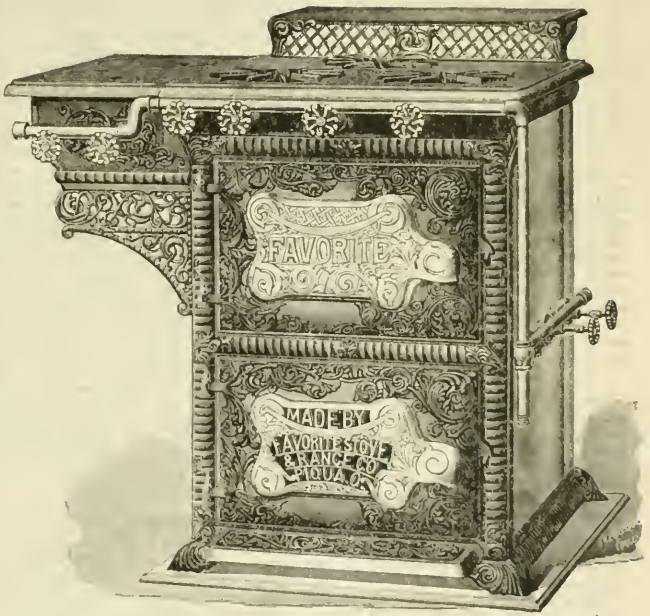
TESTS IN AN UNWHOLESOME SCHOOL HOUSE.

That some such device is, or was, badly needed is instanced in the report by the case which occurred some time since of a school building in which the inspector reported the ventilation to be quite inadequate. The report of an expert chemist in this case showed that samples of air taken from the schoolroom on the first floor, which contained 39 pupils, had in it 15 volumes of carbonic acid gas to each 10,000 volumes of pure air. The sample taken from a room on the second floor, in which there were a teacher and 44 pupils, contained 32 volumes of the gas in each 10,000 volumes of air. A sample taken from another room on the first floor yielded 36 volumes of carbonic acid gas to 10,000 of air. The first sample was taken after the windows had been opened 4 inches, and the third after the windows had been closed 20 minutes. Of the first sample the assayer reported, "It is undesirable for respiration;" of the second, "unfit for healthy respiration," and of the third, "the air is highly contaminated and positively unfit for respiration." The value of any practicable means of doing away with such a state of things, and the efforts which are being made to that end by securing effective ventilation of schoolrooms and other public buildings by the Massachusetts State authorities, cannot be overrated.

Governor Flower has concluded not to interfere at present with the sentence of the court in the case of James Hughes, the Master Workman of the Clothing Cutters branches of the Knights of Labor, who is serving a sentence of one year for the crime of extortion, in the Monroe County Penitentiary.

The Favorite Gas Range.

In the accompanying illustration we present a general view of a four-burner Favorite gas range, which has recently been placed upon the market by the Favorite Stove & Range Company of Piqua, Ohio. In this stove, we are informed, any kind of gas may be employed as a fuel, according to convenience. One of the special features to which attention is invited by the manufacturers is the fitting of the joints, doors, &c., while the ornamentation is of a character to please the eye. The stove here shown, which is but one of a large variety of styles and sizes which are being offered the trade,



The Favorite Gas Range with Hot-Water Attachment.

has four burners in the top plate, one of which is a double burner, and a hot-water heating attachment. Over the hot-water heater are two cooking holes which may be utilized when desired, thus giving six holes for cooking purposes. The ovens measure 8 x 18 inches and have a hight of 12 inches. The cast front doors and polished steel bodies, it is stated, will not tarnish or discolor, and are easily kept in good condition. The top oven plate is made of cast iron and there is a hood to catch all drippings. All burners are operated with steel needle point valves, with stop to prevent thread entering the packing. The double-oven burner has two valves. Some varieties of the Favorite gas range are provided with a step at the side, which has a powerful double burner and is intended for the reception of a portable oven, wash boiler or other vessel. The oven racks are adjustable and the ovens themselves thoroughly ventilated. The company's hot-water attachment can be mounted on any of several sizes in a few moments, thus avoiding the necessity on the part of the dealer of carrying all sizes in stock with hot-water attachments in order to have a complete assortment of the company's goods.

Carelessness in Pipe Fitting.

Habitual fault finding is not an agreeable trait, even when it may have a legitimate cause; but there are occasions when adverse criticism is not only excusable, but necessary. In this category may be fairly included the inexcusably careless manner in which so important a matter as pipe fitting, whether it be for gas, steam or water, is so often performed. Bad work is so common that where the job is a really good one—that is, as good at it always should be—it becomes conspicuous as something super extra by comparison. Of course, this should not be so. The bad job should be the noticeable one. There is neither fairness, nor even common honesty, in doing work at the expense of another in a manner which will cause him to suffer inconvenience or loss. The work is charged for at a price presumably sufficient to pay a fair business profit on cost of material and workmanship of good quality, and if either of these items be inferior (unless by special agreement between the two parties to the contract), the seller does not deliver what he sold and the purchaser is defrauded. That the former may be ignorant of the facts where bad work is done is no excuse; his responsibility to his customer renders it incumbent on him to know that the delivery is in accordance with the terms of sale. He, as the principal in the transaction, cannot delegate his responsibility to an agent, for, though the latter is responsible to him, that is a matter solely between themselves, and with which the customer has nothing whatever to do. He will naturally look to the party with whom the contract was made to see that the work is properly done.

LACK OF SUPERVISION.

There is too much trusting to subordinates and irresponsible employees, and not enough competent supervision, either in person or by deputy; and there is no doubt that much of the bad work done is due to this cause, while the employer neither intended nor is cognizant of the fact that it is other than it should be. In such cases, of course, while it may affect his reputation as to reliability, there can be no reflection on the honesty of his intentions.

There is, however, another phase of the matter, in which the effects are so far-reaching as to constitute a serious evil, and which—judging from the existence of self-evident facts—proves conclusively to be the result of dishonest intention. We refer to the class of work commonly made the subject of competitive bids, for which the contract is usually given to the lowest bidder, regardless of other considerations than the price bid and depending on the written specifications as to all details. For several reasons, however, this class of work is one which is peculiarly dependent on the honesty and reliability of the contractor. In the first place, while ostensibly complying with the specifications, the system of piping, &c., is generally out of sight, and therefore practically beyond the reach of efficient final inspection, which would be necessary to enable the detection of defects of material and workmanship. Then, too, such defects are usually of a character in which the effects may not become apparent immediately upon use, but develop in the course of time.

As a rule, however, no attempt, or pretense even, at such inspection is made, and the contractor, knowing this, and that any bad work is almost certain to remain undetected until all settlements on account of contract have been made, avails himself of the opportunity presented, and upon which he depended when making his estimate of cost, to enable him to bid enough lower than his competitors to secure the contract. Of course the close competition existing in large business centers is the cause of this state of affairs, as it is hardly to be doubted that, if sure of the job, the bidder would name a price at which he could do good work and realize a fair profit. But, in order to secure the contract, he will name a figure below the actual cost of honest work, and depend on "skinning" the job for a margin of profit even below what would be entirely legitimate for honest work.

CONTRACT WORK.

The buildings offering the greatest opportunities for such practices are that class of dwellings which are "built to sell." Not only the plumbing and pipe fitting, but all the different branches of work entering into the entire construction, are thus "skinned" down to the very bottom notch; and the result is that the unfortunate purchaser or tenant becomes possessed of a house which, while possibly of attractive appearance, is utterly deficient in all of the essential qualities of a comfortable, convenient and healthy home. There is, however, no one class of work entering into house construction which has so great an effect on the health of the occupants as that of the plumber. Where the work is badly planned and executed, the water closet, bath, stationary washstands and sinks may become veritable death traps—disseminating the deadly sewer gas throughout the house, and contaminating the atmosphere with the germs of diphtheria, scarlet fever, and all other diseases of a typhoid character. And not the least serious feature is the fact that this state of things may continue for a long time without the cause having been located, or even suspected. The layman in matters of sanitation is not, as a rule, aware of the dangerous effects of bad plumbing; and it may be hard for him to realize that so apparently simple and imperceptible a cause can lead to such serious results. For this reason, there may occur one case after another of sickness, and even death, before the cause is located and the only remedy applied.

INCOMPETENT WORKMEN.

But aside from such cases in which the work is intentionally slighted, there are those first alluded to as resulting from the employment of careless or incompetent workmen. Let us glance at a few of the many common defects existing in a system of wrought-iron piping for steam or water, say, a main line with numerous branches, valves, cocks, fittings, &c. There will be more or less cutting to lengths, for which accurate measurement should be made, to enable the pipe to fit in its place without forcing. But accurate measurements cannot be made by turning an extended 2-foot rule end over end as fast as a man can walk, though this is a very common practice. Either a measuring rod long enough for the purpose or a tape line should be used. It will always pay to have a wooden rod of, say, 1 inch square by about 16 feet long and another of half that length, as it is both more convenient and accurate than a tape measure By holding it in the position of required length of pipe to be cut, and marking with lead pencil, there can be no mistake, as might happen in reading from a rule or tape, and the length can be made sufficiently accurate without requiring special care in the marking, either in taking the measurement or in transferring it to the pipe to be cut.

The next thing is to cut to the mark, not ¼ or ½-inch one side or the other of it. Then as to threading the new end. It is a very easy matter to cut a thread practically true with the body of the pipe. But it is also easy, as well as very common, to cut it more or less crooked and the effect of this is serious, as will be referred to later on. All modern stocks for carrying the ordinary solid pipe die are provided with a full set of guide bushings—one for each size of die, and if they be used, and are in reasonably good condition it will be much more difficult to cut the thread crooked than straight. But owing to the ordinarily chaotic condition of the tool box, with its conglomeration of taps, dies, tongs, nipples, fittings, &c., the rummage for the right sized bushing is not always successful, all sizes not wanted are there, but they won't do. Then, after a very superficial search on the work bench or floor, among the tools and fittings scattered there, the search is given up and the thread cut without the guide. Of course, it is crooked, but "it don't show." The next dive into the tool box in search of something else, the missing guide is pretty sure to come to light. Or it may be that it had been found and used in the first instance, but from constant wear the hole had become so much larger than the pipe as to allow the die to start crooked. Of course it could not be out of true to the same extent as if none had been used, but still enough to spoil a good job.

CONDITION OF DIES.

Then, the die used may have been badly worn and dull, with half or more of the teeth points gone. This will give a thread that will render a tight joint almost impossible. The remedy for the above-named difficulties is obvious. Keep the dies and bushings in good order, and don't attempt to use them after they are sufficiently worn to affect the quality of thread cut by them—new ones are cheaper—and keep the hand tool box for its legitimate use. It is not any larger than necessary to properly hold the requisite tools; and when to these are added the miscellaneous accumulation of materials, there is sure to be much inconvenience and unnecessary loss of time, which somebody must pay for, to say nothing of bad work as the result of not being able to find such as are needed.

It is sometimes more convenient to lay the larger tools on the floor where the work is being done. This is all right, provided they are laid where they will be in plain sight and not allowed to become hidden by carelessly throwing them down among rubbish; but never put the smaller tools anywhere but in the tool box, or there is sure to be a hunt for them when wanted, and the box is sufficiently portable that it may always be kept within easy reach.

The next point from which trouble may arise is the neglect of the workman to carefully inspect the fittings before attempting to screw them into place. First, they should be examined to see that they are perfectly sound. All cast fittings are liable to have blow holes in them, some of which are quite small and have passed the manufacturer's attention, though possibly easily detected if looked for. This is more likely to occur in malleable than in cast-iron fittings, though not infrequently in the latter. There is also, occasionally, a fitting in which one or more of the threads has been tapped crooked; that is, they are not true with each other. This is easily detected by a good workman as soon as they are screwed into place by hand, and they should be promptly rejected for either of these imperfections. Sockets—or as sometimes improperly called, "couplings"—are of lap-welded or seamless wrought iron or mild steel. They are very rarely imperfect and need only a glance by way of inspection.

MAKING SCREWED JOINTS.

Now, as to making the screwed joint. Don't smear the threads with great daubs of red or white lead. A perfect pipe

thread is designed to make a perfectly tight joint in the thread itself, without the use of any foreign material, except, perhaps, by way of lubricant; and if it cannot be so made tight under any pressure to which the pipe should properly be subjected, no amount of red lead or putty will make it so. Much trouble is caused through its use, particularly when it is carelessly applied. The work is usually performed by the apprentice or helper, whose judgment is not of the best, and his idea of doing it is to be sure to get on enough. The result is that there is apt to be enough and to spare, as both the outside and inside threads are well daubed, and as there is no room to spare when the latter are screwed together, the red lead is pushed through to the interior of the fitting, and there remains to cause trouble more or less serious, as the case may be. It is not uncommon, in disconnecting such joints, to find some of the smaller fittings almost entirely stopped up from this cause, and in some instances it has even been necessary to disconnect on this account alone.

Another objection to the use of lead, particularly when mixed with drying oil, is the increased difficulty of starting the thread to break the joint, on account of the extreme hardness and adhesion to the threads. If used at all the lead should only be applied sparingly to the male thread, and that far enough back from the end to make sure none of it will work through into the fitting. A much better lubricant, however, will be found in journal grease or tallow, and the latter may be improved by the addition of a small quantity of black lead, such as is used about the engine.

In screwing up the fittings it is a common practice, while holding the pipe with the tongs or pipe wrench, to turn an ell, tee or cross by inserting a bar or handle of tongs in side outlet. This is a very bad practice, as it is liable to bruise and damage the thread to such an extent as to cause leakage, which no amount of screwing up (or over screwing, rather) will prevent. Much the best plan is to screw in, by hand, a piece of pipe of proper size, of a length to give the desired leverage. And as to this screwing up, don't keep on just as long as it can be made to turn by main strength—the joint in a good thread is made long before that point is reached, and anything beyond what is necessary only tends to strain and weaken the thread, even if it does not start it to stripping or else burst the fitting. In grasping the pipe with the tongs, don't use them in such a manner as to crush in the pipe; be sure they are of the proper size and in good order, or, if adjustable, properly set. In the smaller sizes, up to 1-inch, the pipes are butt-welded, and therefore more easily collapsed than those above that size, which are made with a lap weld. Many a pipe has been split, unnoticed, by this means, and has been the cause of much trouble and expense in taking down and replacing with a new one.

PROPER ALIGNMENT.

Be sure, as the work progresses, that each added section of pipe and its socket or fitting come fairly parallel with the general line of direction. If either should be out of true by reason of a crooked thread it will be necessary to throw an undue strain on the other to bring it into line, which may result in leakage or fracture after the pressure has been turned on. It is much better to throw out any crooked parts than to risk the consequences of using them, which, in case of a steam pipe, might be serious. In connecting a union, it very frequently happens that the two parts are out of line with each other, and it is almost impossible to get the nut entered. After it is once started, however, so that the wrench can be used, it is screwed up by main strength until the gasket joint is made tight, without regard to the severe and probably dangerous strain to which it is subjected. This should never be done; always make sure that the parts are properly in line, so that they will come squarely together without depending on the nut to force them into position. If they don't line, look for the cause and correct it; don't try to overcome it. The trouble may be caused by a slight bend in the pipes, or it may be that one or both parts of the union are not tapped true. In the latter case, throw away the defective union; in the former, straighten the pipe.

In laying out the general line of pipes, both main and branches, it is frequently the case that no attention is paid to the necessity of providing for drainage. This is a very important matter, whether the pipe be used for steam or for water. If the former, it is necessary to carry off the condensation and to prevent freezing in cold weather when steam is shut off. In the latter case, it is the only means of emptying the pipe in case it is not required to be in service. This is too often a matter of guesswork, whereas it should be a matter of uniform pitch, say, ¼ inch to the foot for pipes under 4 inches diameter, and ⅜-inch for larger sizes, if so much be possible.

Each section of pipe should be provided with a firm support, so as to prevent all undue strains on the joints and connections. This is an important matter which is often neglected, and it is not uncommon to see a length of from 25 to 50 feet between supports. There is no excuse for this, except in cases where the pipe fitter cannot find (nor obtain) anything to hang to, in which event, if he has duly represented the necessity, his responsibility ceases.

USE OF UNIONS.

In designing an extensive system of piping, if at all complicated in the way of branches and connections, it may save an endless amount of trouble and expense if the liberal use of unions be indulged in. It is usual to begin at the starting point of the system, and work toward the end by adding section after section, and branch after branch, in such a manner that a trifling defect at any one point may necessitate tearing down half or more of the entire system in order to rectify it. Have a union at each point when it may be necessary to disconnect—no matter if the erecting can be done without it—it will pay in the long run, and, if properly put up, with a metallic gasket, it will give no more trouble than any other fitting.

Now, a word as to cocks and valves. It is safe to say that nine pipe fitters out of every ten will screw them on the pipe by putting the wrench (or tongs) on the hexagon or square at the end of body farthest from the pipe, and that they will use as little care in the operation as though they were handling a plain fitting—apparently oblivious to the fact that the seats require to be absolutely true to enable them to keep tight, and that they are very easily sprung sufficiently to cause leakage. In fact, a leaky valve or plug cock, if new, is invariably attributed to carelessness on the part of the manufacturer, whereas it is almost always the fault of improper handling in making the connection. It should not be necessary to say that the hexagon next the pipe being screwed is the place for applying the wrench, and a good workman is always careful to observe this point. Furthermore, the pipe tongs should never be used for this purpose, but always a wrench. If the hexagon is too large for a screw wrench, there should be a key wrench provided, as the use of tongs is almost sure to spring or crush the tapped end of fitting, and cause leakage if not breakage. With brass fittings, particularly, it is important to stop screwing as soon as it is sufficiently far to insure a tight joint, as the brass will keep on stretching indefinitely, and it cannot be made tighter than tight. With cast iron valves, &c., there is danger of bursting if screwed unnecessarily far.

FLANGE JOINTS.

In making flange joints on large pipes and fittings it is important to see that the two parts line properly and that the flange faces are parallel with each other. Being usually of cast iron, though of ample strength to resist the legitimate strains to which they are subjected, they are not strong enough to bear the added strain of the bolts necessary to force the faces together on the gasket, against the spring of the pipes caused by want of proper alignment. And on large steam pipes the danger is very serious, as the effects of a broken flange while under pressure is almost sure to cause much damage, and possibly loss of life. While there are undoubtedly many other points of more or less importance which have not been touched on in these remarks, enough has been said to point out the difference between good and bad work (and workmen). Such of the remarks as may be considered in the light of strictures on the latter class are intended to apply only to whom they apply. Every fitter, be he master or workman, can elect to which class he properly belongs, and at least will not be averse to this mention of some needed improvements in so important a branch of work as that of pipe fitting.

The collapse of the scheme for controlling the New England coal trade, conceived by Mr. McLeod, proves to be one of the most colossal failures that lately have overtaken business enterprise. It only has a parallel in the Argentine collapse, the Baring's failure, and the defeat of De Lesseps at the Isthmus of Panama. The Boston & Maine and the Reading systems, which he hoped to join together, were to be linked by two lines—the Poughkeepsie Bridge route over the old Connecticut Western (now Central & New England) to Hartford and the New England line. These two lines, while pretty far apart, in a certain sense parallel each other locally—both meeting at Hartford—and in a larger sense compete with each other on through traffic, especially as to freight. The idea of President McLeod seems to have been substantially as follows: First, to make the Poughkeepsie Bridge route the main line for through freight traffic, and, secondly, to make the New England self-supporting—in the railroad term, "wash itself." Altogether, had Mr. McLeod succeeded, he would have combined under one management more than 2000 miles of New England railroad track; and the primary object was to secure a market for the enormous coal export which the control of anthracite fields in Pennsylvania made possible.

There are now 30 steamboats navigating the Upper Congo. This indicates more rapid progress than is made by the American residents of Liberia, where years ago Mr. Scheffelin of New York erected a number of sugar mills. Recently the statement was made that the machinery from one of these mills was used in propelling a boat. The signs are that Liberia is "badly left" by settlers in other parts of the continent.

The fruit trade of New Orleans is increasing rapidly since the railroad lines in that section made a concession in their freight rates to Western points, and the local papers claim that the trade is being diverted from New York.

STOVE TRADE NOTES.

abor Troubles in Evansville Stove Foundries.

'he Stove Manufacturers' Association Evansville, Ind., which includes the iana Stove Works, the Evansville ındry Association, Kiechle, Brentano Oberdorfer and Kahn, Myerhoff & , have recently held meetings with a v to determining upon a course of ac- by which trouble with their work- ı may be avoided in the future. Ac- ding to accounts published in the local ers, differences have frequently arisen ween the manufacturers and their men, the relations have at times become so ined as to make a strike appear im- ent. It is said that recently the inters in one of the foundries ceased k and that the Manufacturers' Associa sent a letter to the mounters' union ing that all differences existing between manufacturers and their workmen be once settled by arbitration. After ting a reasonable time and no response ıg made to this letter, the members of four concerns mentioned held a meet- and agreed to close their works until difficulty was satisfactorily arranged. bearing upon the situation and show- the position taken by the manufact- rs, the firms named have issued the owing announcement:

Ve, as manufacturers, composing the ve Manufacturers' Association of Evans- e, desiring to have the people of our know the full facts, beg leave to state we append the entire correspondence tive to the trouble existing between ın, Myerhoff & Co. and their mount- After writing to the Mounters' on on February 11, 1893, that unless l mounters employed by Kahn, Myer- & Co. would return to their work by sday morning, February 13, we would e down our shops, to which notice no y was ever made by the Mounters' on, the association called another ting on February 14, and there re- ed that, in order to settle all difficul- between Kahn, Myerhoff & Co. and r mounters, a disinterested committee uld be appointed by said mounters and his association and these two commit- should agree upon the price to be l by Kahn, Myerhoff & Co. to their nters. No reply was received to this er.

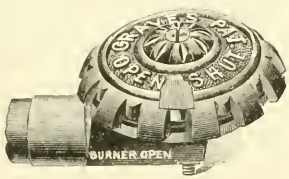
his recital of facts plainly shows that proprietors of the various foundries in nsville must pay prices fixed by the nters' Union and manufacturers are to be consulted as to what they are to pay for such work. It is a further that similar stoves to such as are in ute are mounted by mounters belong- to the same union for other foundries his city for less money, and if our busi- is to be managed by our employees the employer having no part in it, the ıer we shut down the better we fare. onsequence, at a meeting held to day he association, it is resolved to close n this evening, until the mounters will e to their senses and realize that arbi- ion is the only just way to adjust es where differences exist between loyees and employer. While it was ered by the association that the shops uld close down on the 13th, this order suspended at a subsequent meeting, as e of the parties of the association were of the opinion that the mounters, if the case were properly presented to them, would have sufficient good judgment to see that they were in the wrong, in being unwilling to meet a disinterested committee to adjust differences.

(Signed) Ed. Kiechle, Sec'y
Kiechle, Brentano & Oberdorfer.
Indiana Stove Works.
Evansville Foundry Association.
Kahn, Myerhoff & Co.

The correspondence referred to in the announcement consists of letters which passed between the manufacturers and the Stove Mounters' Union. Subsequent to the meeting of the Stove Manufacturers' Association at which it was resolved to close their works unless the strikers returned to work, it was found that the natural consequence of such action would be to throw out of employment several hundred men who were not concerned in the difficulties, and in justice to them it was suggested that the Mounters' Union appoint a committee of three to meet a similar committee from the association for the purpose of adjusting the differences at issue. This is the status of the case at the hour of latest mail advices.

Graves Gas Stove Attachment.

Eugene Munsell & Co., 218 Water street, New York, are introducing what is known as the Graves Permanent Gas Stove Attachment, as shown in Figs. 1, 2 and 3. The purpose of this device is to afford housekeepers facilities for instantly



Graves Gas Stove Attachment.—Fig. 1—Gas Burner Open.

availing themselves of the conveniences incident to the use of gas as a fuel, when for any reason a range fire is undesirable either in summer or winter. It is always ready for use and dispenses with the handling of wood, coal and ashes, and can be started or discontinued in a

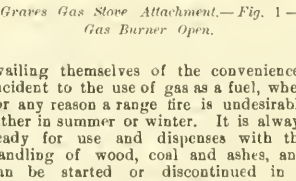


Fig. 2.—Gas Burner Shut.

moment, for the preparation of a quick breakfast or light meal. The location of the attachment is such that it in no way interferes with the regular operation of the range, while a coal fire, it is said, does not affect or injure it. The top of the range offers a suitable place on which may be placed cooking utensils that have been or are about to be used. Fig. 1 shows the burner, which is about 3 inches in diameter, open ready for lighting. Fig. 2 illustrates the burner closed and as it ap-

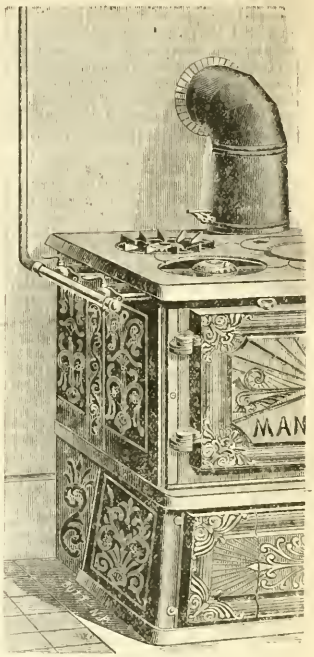


Fig. 3.—Graves Permanent Gas Attachment applied to a Range

pears when not in use, preventing it being clogged with soot or ashes from the range fire. Fig. 3 shows a portion of a range with the gas attachment applied. It will be seen that one or both burners may be used at the same time, first closing the damper to prevent the heat being drawn up the chimney. The burners are located in the center of the fifth and sixth holes, and two open-work covers are sent with each attachment, which may be used in place of the solid covers, affording better results. Baking can be done by placing a tin oven over one or both holes. The gas tube—$\frac{3}{8}$ inch—and air mixer are placed outside the body of the range and are protected by an overhanging top. The position of air mixer insures a sufficient supply of air from the outside. The makers refer to the burners as being made on the same principle as those used in connection with their Manhattan gas stoves for the past two years, regarded by them as conclusive concerning the power and economy of the burner. Under full pressure each burner will consume, they say, about 10 feet of gas per hour. The intensity of heat can be regulated quickly by turning the faucets regulating the supply. This attachment is applied to all styles of their Manhattan line of portable and brick-set ranges, and all sizes of the Home and Prize except Nos. 60, 70 and 80.

Stove Catalogues of Half a Century Ago.

Doubtless there are many readers of these columns who are curious to know what sort of trade literature was circulated among stove dealers early in the present century, and also what kind of stoves were at that time offered for sale. Through the courtesy of George H. Waldron of Chester, Vt., we are permitted to reproduce the pages of a little volume issued in 1833 and describing what was at that time known as "Stanley's Improved Cook Stove." In this little volume the construction named is illustrated and full directions for its operation set forth. We have reproduced the pages by photography and present them in *fac-simile* herewith. The first figure represents the title page, showing the appearance of the stove, while in the figures following is to be found the text of the catalogue.

We also have from Mr. Waldron a pamphlet issued in 1839 and illustrating and describing "Woolson's Improved Patent Cook Stove," made and sold at the Tyson Furnace, Plymouth, Vt. The pages in this case are a little larger than those presented in *fac simile* and carry, in addition to a description of the stove and directions for its use, a number of "certificates," as they were then called, showing what those who used the stove thought of its operation. A view of the stove and its accessories is shown in Fig. 12. After stating that more than 6000 of Woolson's Patent Cook Stoves were in use at the time the catalogue was issued, there is given a brief description of the stove, from which we quote as follows:

"A FURNACE for hard or soft coal or small fuel has been recently attached to the stove, for summer use, in such a manner as to be used in boiling and also for the baking of small bread, and that, too, with the smallest possible consumption of fuel, being so arranged as not in the slightest degree to interfere with the other operations of the stove. This alone is found to afford the advantages of an ordinary cooking stove, and when in use does not cause inconvenience by giving out heat, smoke or gas.

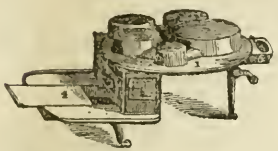
"A valuable improvement in *roasting* has been added to this stove which will roast meat, fowls, &c., in a more perfect and

REMARKS AND DIRECTIONS

FOR USING

STANLEY'S PATENTED

ROTARY COOKING STOVE.



1 Revolving Top. 4 Slide Hearth
2 End Door. 5 Outlet for Smoke
3 Front Door.

TROY

NORMAN TUTTLE, PRINTER,

225 RIVER-STREET—SIGN OF THE PRINTING PRESS

1833.

Fig. 1.—Title Page of an Old Catalogue.

4

When several boilers are in use, and it is required to make the heat more or less intense on any one of them, you are, with a stationary top, under the necessity of lifting perhaps a large boiler filled with hot water, from the hole where it was first placed, and with it displace some other boiler which must be placed over the hole from which the first was taken. And should the boilers differ in size, the holes must be suited to one or both of them, by means of circles or rims prepared for that purpose. To this trouble must be added the inconvenience of the smoke, which, during the time of exchanging boilers escapes into the room.

But with the revolving top, the object is attained by two or three turns of the crank, which brings the boilers to the position required, without the trouble of lifting them, or the inconvenience of smoke.

Boiling can be effected even at the greatest possible remove from the fire room, but the time required will be in proportion to the distance from the fire. Were the heat to be raised to a degree just to keep up the operation of boiling, and no more, at the greatest distance from the fire, the same heat would require several hours to boil water in the same situation, had it been put in

Fig. 3.—Page 4.

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DIRECTIONS FOR USING THE ROTARY STOVE.

Regulating the Fire.

A steady uniform heat is the most desirable for cooking, as well as for heating a room. The best method for obtaining this, is to put a suitable quantity of wood into the fire room, and when it is sufficiently ignited, or well on fire, to close up the slide hearth. The sliding hearth is the principal regulator of the fire, and by a proper attention to the management of it, much may be saved in the consumption of fuel. The stove should be closed when no more heat is required than can be kept up with it in that situation, for the more air there is admitted, the more fuel will be consumed, and consequently the more heat escape into the chimney.

By closing up the hearth, the progress of combustion is checked, the blaze or flame almost ceases, and the stove is thus kept at nearly the same temperature for a number of hours, without the addition of more fuel.

During this situation of the fire, should the heat be found insufficient, it can be

Fig. 5.—Page 6.

STANLEY'S

IMPROVED COOKING STOVE.

REMARKS.

THE improvements in this stove are worthy the attention of the public—the most prominent of which, is the revolving of the top plate. This adds great value to the stove, secures many important advantages, and gives it a decided superiority over any other. The groove in which this plate moves round with great exactness, by means of a crank and cog wheel, should be partially filled with a composition of black lead and oil, which will make the movement very easy.

The principal advantages gained by the revolving of the top plate, are in the facilities it affords for equalizing the heat in the top ovens, and for obtaining at any time such a degree of heat as may be required for either boiling or stewing, and likewise in the great saving of fuel.

Fig. 2.—Fac-Simile of Page 3.

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that situation when cold. Therefore, with a stationary top, you must take more time, more fuel, and change boilers. Whereas, with the revolving top, the time and fuel are saved and trouble avoided.

That there must be a great saving of fuel by the rotary stove, will appear to every one at first sight. The fire room is so small that a large quantity of wood cannot be put into it. The heated surface being very extensive, allows the heat to be thrown off freely in every direction. And notwithstanding first impressions are frequently unfavorable, on account of the small size of the fire room, experience has proved that the stove is sufficient to warm large rooms, and to do all kinds of cooking, even with the grate raised to the bottom of the end door, as designed for summer use.

Most families will find this stove capable of doing all the business of their kitchens, with the grate raised. And this fact, together with the advantages of the revolving plate, and the slide hearth, will so much diminish the quantity of fuel from that required for other cooking stoves, that it will be found good economy to use this through the year.

Fig. 4.—Page 5.

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raised to any required degree, by drawing back the slide hearth. And for the purpose of making a draft only, it will seldom be necessary to draw it back more than one inch, and when there is but little fuel in the stove, the heat will be more intense, if drawn back but half that distance.

Roasting

Roasting is done in the best manner by reflection in the tin oven underneath the stove, (where it is to stand) and may at the same time be done on the front part of the stove, in the common reflector which most families have.*

Baking also is often done in this oven.—The articles to be baked are placed upon the rack which may be raised or lowered according to the space required above it. The most suitable position for the rack in *broiling, roasting, baking bread, cake, pies,* or any article that does not require to stand level, is to place the front part of the rack on the second slide from the top, and the back part of it on the third slide, giving it a small

*Front reflectors will be found very convenient in large families and in public houses, and when desired, are furnished with the stove.

Fig. 6.—Page 7.

satisfactory manner than can be done in any other way, the old-fashioned *ten foot fire place not excepted*. The oven is warranted superior to that of any other stove in use, the heat around the same being more evenly and quickly controlled than in any other stove yet introduced; for such as choose, an *elevated oven* is added and so arranged as not to interfere with the top of the stove, being quite accessible and out of the way, and equal to anything of the kind in use.

"The proprietor wishes it to be distinctly understood that the top of this stove does not revolve, its construction being such that it is the decided opinion of those who have had them in use that the boilers are at all times in *precisely the right place*.

"There is to this stove an aperture for an unusually large boiler, so arranged that the heat is applied to the best possible advantage, affording a convenience for heating a large quantity of water or for dairy use superior to any stove yet introduced; whether in *boiling*, *baking*, or *broiling*, *frying*, *roasting* or *toasting*, they have invariably proved deserving of the commendations bestowed upon them; and it is confidently asserted that no other cooking stove in the market can do so much business with so little fuel, in any given time, as 'Woolson's *Improved Patent*.'

"The TOP of this stove being large and of an even surface, with considerable space unoccupied by the boilers, adds greatly to its convenience and value. The construction and operation of this stove being such as to render the top at all times of a different temperature on different parts of its surface, so much so that while liquids are boiling in flat bottom vessels upon one part, other parts will be found to vary from boiling down to blood heat, therefore forming the best possible place to boil coffee, make tea, gravies, &c., and to place cooked dishes upon which it is desirable to keep warm until served up. Persons who have used this stove regard the convenience of the top as nearly indispensable."

DIRECTIONS FOR USE.

The directions for setting up and using "Woolson's" cook stoves are as follows:

"Place the stove on the legs according to the marks.

"If the chimney is a good one to draw, the funnel may pass into it near the floor overhead, in the same room. They draw better, however, to have the funnel go through the chamber floor, and enter the chimney as high as possible. Be sure to have the fire place closed, which communicates with the flue that receives the funnel.

In the summer season the stove may be placed near the fire place, when there is one in the room, and the funnel extended 8 or 10 feet up the flue of the chimney, or until the draft is sufficient, for perpendicular funnel always increases the draft, the fire place being left open to carry off the heat, steam, &c.

"*To kindle a fire and cook observe the following directions:*

"In order to kindle a fire quick, open both dampers, to increase the draft, having the fire and wood laid close to the front door.

"To bake, close both dampers. If the oven should be too hot draw one or both dampers partially or wholly till the heat is to your liking. As the draft of some stoves, owing to various causes, will unavoidably be quicker than others, it may be well to observe that when the draft is brisk it does not require the wood to be of a quality to produce so much blaze as when the draft is dull.

"To boil, with the greatest speed, draw the upper damper and have the lower one closed; to moderate the boiling close the upper damper and open the lower one.

"To broil, draw both dampers, open the doors, draw out coals and broil on a grid iron as before a common fire. If the draft be good it will draw the smoke into the stove.

"Whenever the oven is found not to bake so readily as when first put up, or as might be wished, the soot and ashes which have collected on and under the oven should be cleaned out with care; to do which, take off the piece of iron, which is fitted on a hole made for that purpose at the bottom of the stove, on the foreside; brush all the ashes from the top of the oven, or take them out on the top; then with the small hoe, made for that use, draw the ashes under the oven out at the

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inclination, and thus equalizing the heat—otherwise, place it level on the third slide.

This rack will also be found the most convenient place for baking potatoes.

When the fire grate is raised, some difficulty may be experienced in baking in this oven any article that requires heat on the bottom, and cannot be turned over. To obviate this, a little fire may be kindled underneath the fire grate, which will heat the lower edge of the back plate, and consequently the bottom of the oven.

Broiling.

It is hardly necessary to say that broiling is done in the most convenient manner, in front of the stove by drawing back the slide hearth and bringing out the coals in the sink beneath it. The smoke and fumes from the gridiron, will mostly be carried up by the draft of the stove. Broiling may be done also, by placing the meat upon the rack of the under oven, or in the same manner in the common reflector, which may be used in front of the stove.

Fig. 7.—*Page* 8.

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Boiling and Stewing.

To derive the full benefit of the fire, the boilers, stew pans, or kettles, should drop within the curb as low as may be, and not interfere with the revolving of the plate. The various sizes of holes for boilers &c., will enable families to use most of the utensils for cooking they may have on hand The boiler first to be heated, is brought by means of the crank directly over the fire, and when boiling commences, may, by the same means, be removed to give place to another, or to obtain a more moderate degree of heat, and so on, bringing up each in its turn as may be required, until all are made to boil, which may be done in a short space of time considering the number of boilers. With an ordinary fire, boiling will continue at any situation on the stove

Baking

We have already said that baking may be done in the under oven. But experience fully demonstrates, that with the advantages of the revolving top plate, it can be done under the large top oven in a better

Fig. 8.—*Page* 9.

in the sash door, and place your Tin Kitchen or Roaster opposite—at such distance as may be necessary to obtain the heat required. If proper attention is given, neither Roasting nor Baking will

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manner, and with more ease and convenience, than by any other method ever introduced, however objectionable it may appear to some who have been accustomed to the common oven.

To prevent the articles from burning on the bottom, bricks must be placed upon the griddles, and the basins, pans, or plates, containing the articles to be baked, must be set on the bricks. To avoid the bad effect of setting the articles upon any thing cold, the bricks should be heated. This may be done by placing them on the griddles and the oven over them, fifteen or twenty minutes previous to setting the articles in. If necessary, time may be gained by turning the hot side up. At this time, also, the top plate should be turned half round, bringing the coolest part over the fire; and during the process of baking an ovenful of bread, or pies, the turning should be repeated once or twice.

The quantity of wood required for baking is so small, that those unacquainted with the stove, almost uniformly raise the heat too high, and baking is commenced too rapidly. Two or three small sticks of dry wood will make sufficient heat to bake.

The best temperature for baking is ob-

Fig. 9.—*Page* 10.

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tained with the draft closed, as described under the head of directions for regulating the fire.

When baking is in operation, care must be taken not to remove the cover of the oven too frequently, or keep it off long—and should the oven be too hot, the cover must not be taken off for the purpose of cooling it, but the end door of the fire room may be thrown open.

The small round oven is used in the same manner as the large one, for all kinds of baking, and it is to be set over the largest boiling place.

The plate, pan, &c., used in it, should not be so large as to prevent the heat ascending freely all around it, for on this depends the baking of the top.

The proper degree of heat for baking may be very correctly ascertained, by placing the inside of the hand upon the top of the oven, which should be so hot as to be rather above what can be borne.

Those who have the care of baking, are often too anxious to see the bread begin to brown. With a proper temperature of the oven, this appearance will not commence in loaves of ordinary size, until about twenty-five or thirty minutes after they are set in.

Fig. 10.—*Page* 11.

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Heating Flat Irons.

For this purpose a sheet iron flat heater accompanies the stove, suited to the largest aperture.

Fig. 11.—*Page* 12.

STOVE CATALOGUES OF HALF A CENTURY AGO.

hole above mentioned. Lastly, replace the piece of iron in the hole as before.

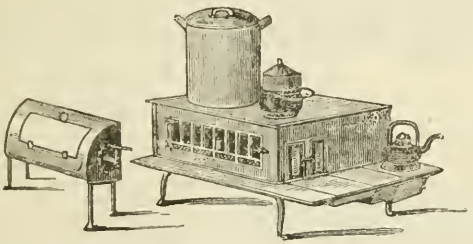
"To ROAST, put on the Sash or Mica Door—make a fire of chips or small sticks laid along the side, near the small holes interfere in the slightest degree with the other operations of the Stove.

"To put the Furnace in operation, draw the slide at top about 1 inch, and box at bottom, so as to open the grate, on which

place fire and coal or light fuel. By the use of light fuel, to make a brisk fire, small bread can be baked in the oven of the stove from the heat of the furnace. When the furnace is not in use, the slide at top and box at bottom should be returned to their places to close the draft."

Wrought Iron Range Company.

We are indebted to the Wrought Iron Range Company, St. Louis, Mo., and with branch factory at Toronto, Canada, for a copy of a catalogue which they have just issued relating to the Home Comfort wrought steel ranges and hotel kitchen outfits. The volume is of large and, it must be confessed, unwieldy size, measuring 10 x 14 inches, and consists of 124 pages of letterpress profusely illustrated. The paper is of a good quality and the printing clear and sharp. The first leaf of the volume carries a view of the general offices, salesroom and factory in St. Louis, and also of the company's works at Toronto Junction. The title page informs the reader that in addition to Home Comfort wrought-steel cooking ranges, the company manufacture French ranges and complete kitchen outfits; steam tables, laundries, carving tables, urns, ovens, &c., adapted to meet the requirements of hotels, restaurants, private dwellings, public institutions, dining cars, steamboats, railroad camps, army posts, &c. With regard to the Home Comfort steel ranges, the company state that these goods are now known and designated by numbers in place of letters, thus making it more convenient and definite when either ordering ranges or repairs. During the past year many prominent changes have been made, and the general style of the goods, as well as the finish and appearance, improved. The ovens have been enlarged, making them nearly square; all parts and pieces subject to strain are made of malleable iron and wrought steel, while their malleable water backs for either hard or soft coal are tested to 180 pounds. Other features of the Home Comfort goods include patent triplex grate so constructed that clinkers cannot form on it. The grate bars for the hotel and restaurant ranges are so made as to be easily removable when cleaning out the fire box or making repairs. The front of the doors and ash-pans are polished flat, leaving no open spaces as receptacles for grease and dirt, while a finished and handsome appearance is given to the ranges by fitting them with nickel-plated brass protecting bars in front. The end flues of the ranges are lined with asbestos, which tends to retain the heat where it is most desired. Reasons are given why Home Comfort ranges are superior to stoves, and throughout the entire volume is to be found much of interest and value to those desiring goods of the description named. The illustrations cover a wide variety and show the goods described to advantage. A long list of hotel ware and culinary appliances, together with coffee and spice mills, hotel cooks' and butchers' cutlery, &c., constitute features of interest. One page is devoted to directions for ordering Home Comfort ranges, while another is devoted to directions for ordering repairs for them. A long list of references and testimonials occupy several pages at the close.



Stove Catalogues of Half a Century Ago.—Fig. 12.—Woolson's Cooking Stove.

ODD PLATES.

THE WELLS MFG. COMPANY, Greenfield, Ind., send us a copy of a very attractively printed circular which has just been issued from the press. In entering upon the second year as manufacturers of Model stoves and ranges, the company state that it has been their aim to keep their line up to the highest standard of excellence, and that they have added many new features during the past season. At the present time they are engaged in the preparation of several handsome patterns, which will appear from time to time. Their shops are equipped in every department with the latest improved machinery and tools and manned by competent workmen. The Model cook stove is designed to meet modern requirements for a stove possessing liberal dimensions in all essential parts, while operating with a minimum consumption of fuel. The stove is shown by means of well executed engravings, and is adapted for burning coal and is also made for wood. The company make under the same name a four-hole range for coal and several varieties for using wood as a fuel. The Model Oak is a neat, medium priced construction provided with the modern features. The Model Gas is a handsome Franklin stove, with fire-clay deflector, which is said to add greatly to its heating capacity. It is supplied with a burner or draw center grate, as may be desired. Fire-clay linings, above the fire bowl, are provided as a protection to the sides and back. The stove is ornamented with nickel and art tile, but is also made in plainer designs.

THE PORTLAND STOVE FOUNDRY COMPANY of Portland, Me., send us a four page circular, telling how to manage coal furnaces and hot water heaters. One page is devoted to an illustration of the Atlantic coal furnace, and also to water section, as placed in the furnace for the purpose of making a combination furnace. Another page illustrates the triangular grate used in connection with the heater.

THE BRADFORD STOVE COMPANY is the name of a concern recently incorporated at Chicago, with a capital stock of $100,000. The incorporators include Francis Jackson, Thoman P. Paxton and Arthur C. Conway.

THE PHILLIPS & CLARK STOVE COMPANY of Geneva, N. Y., are the subject of an illustrated article in the Troy *Daily Times* of February 26. The works are briefly described, reference being made to the number of men employed, the capacity of the plant, shipping facilities, &c. The article is illustrated with excellent likenesses of George H. Phillips, one of the pioneers in the stove trade, his connection with the business covering a period of fifty years, and of Walter A. Clark, who is treasurer of the company. Mr. Phillips has personal supervision of every department and carefully watches the construction of the Andes goods from beginning to end. He was born at Brunswick, N. Y., in 1816, and at the age of 18 years went to Troy, where he learned the carpenter's trade. In 1852 he identified himself with the firm of Davy, Anthony & Co., which later became Davy, Ingrahm & Co., who were in turn succeeded by Ingrahm & Phillips, and still later by Ingraham, Phillips & Co. In 1868 he retired from this firm and founded the stove business of George H. Phillips & Co. In the following year Walter A. Clark was admitted to partnership and in 1882 the name was changed to Phillips & Clark. In 1885 the firm removed to Geneva and were incorporated. Mr. Clark, the treasurer of the company, began his early business career with J. M. Warren & Co., where he remained until he engaged in the business of stove manufacture in 1869, when he and his father-in-law, Mr. Phillips, formed a copartnership. Mr. Clark has looked after the commercial side of the business, which has grown to large proportions.

THE NEW BUILDINGS of the Scranton Stove Works are being pushed forward as rapidly as circumstances will permit. William R. Williams, the contractor, has a large force of men engaged, and we understand that a portion of the superstructure has already been raised. It is the intention of Mr. Williams to have the contract completed by the first of May.

THE CHICAGO & ERIE STOVE COMPANY of Erie, Pa., favor us with circulars of their four-hole range, which is made under the name Modern Helper. It is a cast-iron construction with steel range improvements, which the company refer to as good selling points. The oven is 18 x 20 inches, and has steel bottom oven plate, making it a quick baker. The oven door is so balanced as to open easily, and when dropped into a horizontal position forms a convenient shelf. The Modern Helper is made with four No. 8 holes, and also with four No. 9 holes, and can be furnished with or without high shelf, high closet, reservoir and water front. Brick linings are made for hard and iron linings for soft coal.

IN A NEATLY PRINTED 16-page pamphlet, bound in colored paper covers, which has just been issued, is a brief sketch of the life of William Westlake, for many years prominently identified with the stove board business. The pamphlet is dedicated to the young men of America, and carries as a frontispiece an excellent likeness of Mr. Westlake.

THE TOLEDO STOVE COMPANY is the name under which the stove foundry business, heretofore conducted by Jacob Leonard & Co., has been incorporated. The new concern have been organized, we understand, for the purpose of increasing the capacity of the present plant, sufficient capital having been put in the business to warrant the establishment of improved and increased facilities in the manufacture of stoves. The directors met on February 13 and elected George G. Metzger president, Jacob Leonard vice-president and general manager, and Theobald Shunk secretary and treasurer.

WE UNDERSTAND that the Eclipse Stove Company of Mansfield, Ohio, have recently increased their capital stock from $60,000 to $100,000.

THE MAGEE FURNACE COMPANY of Boston, Mass., are distributing a very neat advertising novelty in the shape of a pocket barometer, which, upon exposure to the weather, is claimed to indicate the atmospheric conditions likely to exist in the near future, by the varying color of these spots in the center. It is known as Dessau's Pocket Barometer and consists of a disk 1¼ inches in diameter and one-eighth of an inch in thickness. Upon the back of it is the inscription, "Magee furnaces, ranges and stoves are warranted to please." In the same box containing the barometer we find a handsome nickel-plated match box which, without directions, is somewhat of a puzzle to open. Upon one side of it is the name of the company and their various addresses, while upon what may be designated as the top of the match box is the inscription "Magee furnaces, ranges and stoves are the best." The match box is got up in a very neat manner, is highly polished and is likely to prove not only useful to the recipient, but will serve to keep constantly before his attention the name of the company sending it out.

THE CLEVELAND FOUNDRY COMPANY of Cleveland, Ohio, have just issued from the press an attractive pamphlet of 48 pages, constituting a catalogue of the specialties manufactured. Attention is given to oil and gas heating and cooking stoves, registers, sad irons and hardware specialties. The goods are profusely illustrated, and, in connection with descriptive letter press, afford ample opportunity for the reader to gather a comprehensive idea of the merits claimed by the manufacturers. The list of stoves shown include the Puritan, Chief and Triumph lamp stoves; the Paragon and Banner oil stoves, and the Banner gas stove. The design of the front cover of the pamphlet is largely typographical in character, while the fourth page carries a *fac simile* of the company's trade-mark. There is also shown a bird's eye view of the company's office and factory at Cleveland. The cover bears the imprint of Gies & Co., Buffalo, N. Y.

A NOVEL HEATING APPARATUS very much resembling one of our open grate fires has been patented by Philippe Mancheron, Nevers, France. The construction of the device is such that the inventor claims to be able to use different combustibles at the same time, thus securing efficient combustion and utilizing a poor quality of fuel.

A CIRCULAR illustrating the Reliable gas ranges reaches us from Hughes & Stephenson of 747 Craig street, Montreal, Canada, who are agents for these goods in that section. The range is shown with water heater attached and connected with a circulating boiler. The size of the heater is 21 x 11 inches at the top and is 7½ inches in hight. It is operated by two separate burners, which permit of cooking operations at the same time the water is being heated.

THE AMERICAN OILGAS COMPANY of 44 Hanover street, Boston, Mass., refer to the Standard Gas Generator, which they manufacture, as being adapted for use in connection with any stove or heating apparatus. It is claimed to generate gas from kerosene oil and to operate at a very small expense, without smoke or odor.

THE ECLIPSE STOVE COMPANY of Mansfield, Ohio, are offering their Brilliant Eclipse in two sizes and adapted for burning coal and wood. It is of good design, has four boiler holes in the top and embodies the latest improvements. W. H. Peckham of St. Anthony Park, Minn., is agent for the company's goods in Minnesota and North and South Dakota.

THE MILLER GRATE COMPANY, with office at 100 Euclid avenue, Cleveland, Ohio, send us a very attractive catalogue of the Miller patent reversible shaking and dumping bar and curtain grate which they manufacture. The pages, which are oblong in shape, are bound in covers by means of metal fasteners, which can be readily removed. The object of using these fasteners is to allow sheets of new designs to be inserted as they are issued by the company. The line of goods illustrated embrace a large number of handsome designs, which are printed on tinted paper in such a way as to form with the black ink in which the engravings appear a striking contrast. The latter portion of the volume is in the nature of a supplement for this year, and gives a number of designs of adjustable summer pieces and open grates, together with descriptive particulars and dimensions as to hight and width. The latest addition to the company's assortment is the Sun gas fire place, which so distributes the gas over the fire place as to make a bright and brilliant fire with intense heat. The parts are so arranged that it is said to be impossible to light at the mixer if properly arranged.

THE PENINSULAR STOVE COMPANY'S Chicago house have brought out an envelope of new design, which must prove an attractive advertisement to everybody through whose hands it passes. The trade-mark is shown on the left side, with raised letters. Back of the trade-mark is a partial view of the sun, whose rays form a halo round the design, fading into a light blue tint, extending over the remainder of the face of the envelope.

JAMES BOYLE & Co. of Salem, Ohio, send us a calendar printed in two colors for the month of March. The card is embellished with an illustration of the prize Keystone four-hole cook stove, below which appears the days of the week and month. Below this in turn is the inscription. "Look for us April first." The statement is made that Frank A. Peterson & Co. of Minneapolis, Minn., are agents for the company's goods in the Northwest.

ARRANGEMENTS have recently been perfected whereby Charles King, secretary of the Union Iron Works & Mfg. Company of Denver, Col., has secured for his concern the control of the New Idea warm air furnace in the Western market. The New Idea furnace is the property of Schill Bros. of Crestline, Ohio, and we understand that Mr. King's concern agree to manufacture at least 500 furnaces the first year, and not less than 1000 each succeeding year. The local papers state that a shop right of $2500 was paid by the Denver concern and that they will also pay a royalty of $4 on every furnace which they manufacture. The works of Schill Bros. in Crestline, Ohio, are now busy getting out patterns for the Union Iron Works & Mfg. Company. Mr. King is reported as expressing the opinion that the New Idea furnace is not only satisfactory, but far surpasses his most sanguine expectations, and that his firm would place the furnace among the trade on the Pacific Coast before the close of another year.

WE ARE INDEBTED to Fletcher, Russell & Co., Limited, Warrington, England, for a copy of an interesting volume relating to gas-heating and labor-saving appliances. It is a volume of 120 pages, profusely illustrated, and covers a wide range of gas-burning constructions manufactured by the concern named. These goods, as might be supposed, differ in some particulars from the gas ranges turned out in this country, a noticeable feature being the arrangement for baking and broiling. The bake oven is closed, very much like those in coal and wood stoves, while the broiling is done on top, there being a drip pan placed just beneath the broiler for the purpose of catching the drippings. Some of the ranges are made of galvanized iron and all parts interchangeable. Some have open roasters and others divided ovens, in which all roasting, broiling and toasting is done under the burner in the lower oven. Another feature of some of the goods turned out by this concern is a plate warming arrangement on both sides of the stove. The volume gives attention to a varied assortment of burners and also to gas-heating stoves. A great deal of interesting matter relating to gas-burning appliances is also presented, together with illustrations of crucible furnaces, condensing stoves, hall-table stoves, chancel stoves, &c. While the volume is devoted exclusively to goods of English manufacture, there is a good deal in it that is likely to prove of interest to American readers.

THE SUPERIOR FURNACE COMPANY of Little Falls, N. Y., have just placed upon the market a new steel range of pleasing design and embodying attractive features which they feel confident cannot fail to be appreciated by the trade generally. It is finished in a careful manner and the ornamentation, considered as a whole, is of a character to please the eye. The range is made under the name Superior and has large flues which facilitate combustion, a free draft insuring an even and steady heat to the oven and making the stove a rapid and satisfactory baker. All the flues are lined throughout with heavy asbestos board. The ovens are thoroughly braced to prevent warping or buckling, while the joints are so riveted as to allow of an equal contraction and expansion of the metal, which the manufacturers state is of the highest grade of cold rolled open-hearth steel plate. The only cast iron used about the stove is in the fire-box linings and the top cooking surface. The general proportions, sizes and dimensions of the oven and cooking surface have received careful attention at the hands of the company, and the stove is placed upon the market in the confident expectation that it will meet with a large sale and rapidly become popular with the trade wherever introduced. No little attention has been devoted to the ornamentation and the manufacturers feel that the Superior will prove one of the most attractive steel ranges which has been placed upon the market. A feature of the decoration is found in the nickel corners and the adjustable bars at each side of the stove. The high closet and shelf are convenient and unique. The warming closet door has roll top, while the other doors are so made as to drop down, the oven door forming a convenient shelf when open. In the production of this range durability has been one of the objects in view on the part of the manufacturers. The Superior is now made in four sizes, and is brought out to supply a large and well-defined demand made upon the company by their larger customers in the Western cities, where this class of goods is very popular.

GEORGE W. GRAVES, sales manager for Eugene Munsell & Co., 218 Water street, New York, attended the inauguration today at Washington as one of the delegates from the Cleveland & Stevenson Iron and Metal Club.

SCHILL BROTHERS, Crestline, Ohio, are bringing out a line of open-front heating stoves for either soft coal or slack fuel. The new heater will embody all the principal features so successfully used in their New Idea hot-air furnace, and will, it is claimed, consume the smoke arising from the fuel used, being gas-burning in principle. The fire pot consists of an inner cast-iron receptacle, with a series of openings near the center and corresponding openings at the top. This cast fire pot is surrounded by a steel jacket, with an air space between, into which air is admitted

and thoroughly heated before reaching the fuel. The outer steel jacket, with air space between, prevents the same from becoming red hot. In addition, the construction of this stove is such as to cause the fuel to continually burn through its center and away from the casting or lining. Two cast-air ventilating ducts are provided, one at each side, back of stove front.

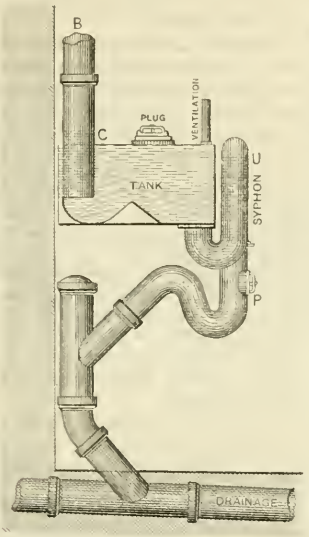
One of the German papers contains a very entertaining account of the roasting of a whole ox by means of gas on the occasion of some festivities at Hanau not long since. The account states that the roasting chamber was made of sheet iron 3.2 meters long (10 feet 6 inches), and 2.4 meters (7 feet 10½ inches) wide, and of sufficient hight to permit the ox to be placed within on a spit. The latter was turned from the outside by suitable gearing. The carcass was strongly trussed by screwed skewers and iron straps so as to hold it together. A perforated pipe ran above and parallel to the spit, terminating outside in a funnel at each end, for the purpose of basting the meat, and there was a suitable dripping pan underneath it. The roasting apparatus was separate from the casing, and consisted of a wagon-shaped frame work of gas piping. The two semicircular ends of this frame work were made of 2-inch pipe, connected by 16 longitudinal pipes ¾ inch diameter, eight on each side, the two lowest being set inward so as to throw some heat underneath the carcass. These pipes carried 448 burners in all, and the gas, measured by a 100-light meter, was connected to both ends of the frame work, so as to insure regularity of burning. The whole affair was got up with an eye to effect, the oven being inclosed in a shed fitted up with carving and serving benches, and surmounted by a colored lantern with the words "Cooking by Gas." The ox weighed 650 pounds as trimmed for roasting. It was killed six days before being cooked, flavored with 3 pounds of pepper and 15 pounds of salt, the back covered with parchment paper, and roasted from 9 in the morning till 3.30 in the afternoon, with a consumption of 300 cubic feet of gas. The cookery seems to have been a great success, the meat being described as "extraordinarily savory, tender and juicy." In an hour and a half from the time the carving commenced nothing but the skeleton remained.

"The latest thing in penny-in-the-slot machines," says the English correspondent of a contemporary, "is one for the supply of food, drink and even articles of dress. It is on view now in London, and the writer was shown how tea, coffee, aërated waters, and malt and spirituous liquors were supplied by it. The tea and coffee is delivered hot. There are also machines for dispensing to the public fruit, cakes and the like, and others are adapted for supplying handkerchiefs to those who have left home without that useful article, and collars and cuffs for those who may desire a change in the middle or at any time of the day. There is something rather funny in the idea, but the whole scheme seems to be practicable, and the machines are very ingenious in their construction."

The argument is advanced, not without some show of reason, that the increased amount of cotton, wheat and other commodities now being carried by speculators, as compared with one year ago, is the direct result of an abundance of money, loans being obtained for this purpose much more easily than in some former years. The excess of cotton now carried in stock is 534,000 bales, compared with last year at this date, and of wheat 40,000,000 bushels. The former item alone represents $24,000,000. Instead of borrowing, speculators would find it more advantageous to sell if money was not so easy.

Water-Closet Flushing Apparatus.

A correspondent of an English building exchange, writing from Paris, comments upon the drainage system of the French capital and the difficulty experienced in flushing its drains with the least possible waste of water, owing to the scanty supply of that element possessed by the city. Incidentally he describes an ingenious apparatus adapted for this purpose, the invention of a Monsieur Laffargue, which has recently been approved for adoption by the Municipal Council of Paris. The device is stated to work very satisfactorily. Though it can hardly be called a step forward in the science of sanitation, the adoption of some such contrivance is rendered absolutely necessary in Paris while water is so scarce. We present herewith a drawing of the apparatus, together with a description, which may be of interest, as showing the principles of sanitation pursued abroad.



Flushing Apparatus in Use in Paris.

The apparatus works automatically by means of compressed air, and, according to the inventor, will save nearly 70 per cent. of the water now wasted in drainage of water closets. The apparatus is exceedingly simple in arrangement, and, what is a great thing in the eyes of house proprietors, may be adapted to the system of closets at present in vogue. The down pipe B falls into a tank, as shown in the sketch, of general dimensions about 20 x 16 x 14 inches. This tank, which is hermetically sealed, is furnished with a syphon of large diameter (5 inches). The tank is fed by a service pipe of very small diameter, allowing a very small quantity of water to gradually fill the tank. Rain and slop water may also be allowed to run into the tank. The soil, &c., falls by the down pipe into the tank, and there mixes with the water contained in the tank. The air in the portion of the syphon between U and P is compressed to a more or less degree. As soon as the level of the water in the tank attains the point C the air in the pipe between U and P becomes compressed to a great degree, and this pressure overcoming the water seal P, forces the water into the drains, and starts the syphon U, the whole contents of the tank being rapidly and forcibly drawn away into the drain pipes. This takes place each time that the water attains the level C.

All Chicago Tracks to be Elevated.

Persistent agitation against grade crossings by steam railroads in Chicago has at last borne definite fruit. The city council, on the 23d ult., by a unanimous vote, passed an ordinance to compel every railroad company operating tracks in the city to elevate them within a specified time. The city is divided for this purpose into three zones. The heart of the city forms the first district, within which the work of elevation must begin not later than July 1, 1893, and be completed by January 1, 1895. Very little mileage lies in this section. The second district is important, covering a zone which includes the terminals and a considerable length of track of every road. Work in this district is to begin not later than July 1, 1895, and be completed by January 1, 1897. The third zone takes in the suburban districts of the city, and work must there begin not later than July 1, 1897, and be completed by January 1, 1899. Regulations have been carefully provided to cover the character of the elevated roadbeds and their minimum hight above the street grade. The roadbeds must be supported by girders of iron or steel, on iron or steel columns. The minimum hight prescribed is 16 feet above grade.

The penalty provided for violation of the ordinance is ingenious. Not only are all tracks remaining at grade after the specified time declared to be a nuisance and to be removed and abated by the Commissioner of Public Works, but also the crossing of a street at grade by a locomotive or car is declared unlawful and every such act is a nuisance, finable in the sum of not less than $100 nor more than $200.

The railroad interests of Chicago are so vast and the burden imposed upon them by this action of the council is so great that at first blush it would seem too stupendous a task to be successfully carried through on the lines laid down. The elevation of all the tracks of steam roads now entering Chicago, if elevated over their present roadbeds, would cost an enormous sum, perhaps beyond the ability of any but the very greatest railroad financiers to raise. It is estimated that in the case of some of the roads an investment equivalent to one-fourth or more of their entire share capital would be necessary. Their side tracks and connections with factories along their line would have to be raised as well as the extensive yards which nearly all possess within some part of the city limits. To such a pitch, however, has public opinion been aroused on the subject of grade crossings, in consequence of the increasing number of fatalities, that the railroad companies and the manufacturers who will be affected were not able to influence a single vote in opposition to the ordinance. It had been in course of preparation for a long time and all its provisions were very thoroughly considered before it was put upon its passage.

Now that the railroad companies are obliged to face the inevitable, busy brains will be put to work on plans which will accomplish the purpose with the least expenditure of money. It is probable that yards for the storage of freight cars will be gradually removed outside the city limits, to reduce the number of tracks to be elevated. It is further probable that more roads will unite in the construction of depots and terminal facilities than hitherto, and that the Torrence scheme of track elevation and terminals will be greatly amplified. The opportunity now exists for the display of the highest engineering talent and business ability in systematizing and concentrating the intramural railroad traffic of Chicago, so as to bear with as little burden as possible on individual roads. It is a great problem, but now that it is to be taken resolutely in hand a way will doubtless be found to carry it through in spite of the formidable financial obstacles apparently darkening the way.

TRADE REPORT.

The Iron Market.

There have been no developments in the Iron market during the past week which are particularly encouraging, for while demand is on the increase, prices do not hold their own, but slight concessions are made to secure orders. There has been no decided change in the situation of the market, and taken as a whole the market seems slightly irregular, the firmest holders of Pig Iron being disturbed more or less by the low quotations made on Iron in which Mill Cinder figures prominently and on the product of furnaces whose owners are not strong enough financially to withstand the pressure incidental to an accumulation of supply on a quiet market. In reviewing the Iron business for the past month for the Eastern portion of the country, it may be said that all the business that had been figured on has become actual orders in hand, and yet there is extreme depression. It is difficult to account for this feeling, as the volume of business is large, larger probably than at any previous time; the only rational explanation seems to be that the capacity for production has increased even more rapidly than consumption. The shipyards never had so much work in hand; the locomotive works are running full time with over 4500 hands; bridge builders are doing well; the large engineering and machine shops are working to full capacity; manufacturers of saws, files and hardware specialties are doing their full share, while the stove and heating trades never had so large a business, and yet complaints of unremunerative business are met with on every hand. Improved methods of construction and manufacture have done much to increase the producing capacity and to cheapen cost, but there are so many complaints that there must be some basis of truth in the claim that prices are too low, and if there is, it is hard to see how to get around it. The only chance for any radical improvement in the Iron and Steel trades is a heavy demand for Rails, and of that there is no immediate prospect, and, as a matter of fact, such a movement in large proportions is not likely to occur until conditions change very materially. With a capacity of from three to four million tons per annum, there is no reason to apprehend scarcity at any time within sight, consequently the roads only order such lots as are required from month to month. Hence, while there are no great spurts of activity, neither are there any periods of very serious depression, and for these reasons no very extraordinary demand for Rails is figured on. The development of the electric railroad systems may help the mills out, and some hopes are entertained of an export trade, but both of these factors, if we may use the expression, are at present in the future.

To summarize the entire position, however, it may be said that there is plenty of business, but it is done at unremunerative prices, due to too rapid an expansion of productive capacity.

In Western markets the month of February, in point of volume of the Iron business, showed considerable improvement over January. Prices, too, on some lines of both raw and finished material were better during the month just closing than in January. Steel is in fairly good demand. Structural Material, Plates, Bars and Wire Nails are in better demand, without any better prices, except on Wire Nails. Pipes and Tubes are in fair demand, but prices are somewhat demoralized. Taken as a whole, the condition of business as we find it on March 1 is fairly satisfactory as far as demand is concerned, and while prices have improved in some directions there is much room yet for further betterments.

In Pig Iron, buying has again assumed the hand-to-mouth character which prevailed so largely before the sharp advance came in the middle of February. The principal reason for the falling off in demand is the fact that several large Steel makers in the Pittsburgh and one or two in the Wheeling district, who came into the market at about the same time as buyers of metal, have satisfied their requirements and may possibly be sellers before long. In regard to the future, the impression prevails that prices are not likely to go higher for a time, in view of the limited demand, and also on account of reports of sales of Ore at even lower prices than prevailed during the latter part of 1892. Production has been increased to some extent by the blowing in of several furnaces in Pittsburgh during the month.

In and about Chicago the business in Pig Iron for February is stated to have been the largest ever done in one month. Consumers are generally realizing that prices are as low as they can expect them to go and orders for long deliveries have been more frequent of late than for two or three years past. Cases are frequent in which purchases have been doubled after the situation had been carefully pondered. The more satisfactory condition of the makers has led to a slight improvement in prices and changes are therefore made in our quotations to correspond with the firmer feeling. A better trade is reported in Southern Coke, the buying being more general. Large contracts are not numerous, the orders running for moderate lots for comparatively short deliveries. Further cuts are reported in prices by the leading Southern companies, and the market can hardly be called strong. On the other hand, the Southern market continues to show additional weakness, and it now seems impossible to predict when the downward tendency will be checked. Each sale reported seems to have been made at a shade lower than the previous one, and, in the absence of any large buying, the market is in a position to be forced down even lower. As an evidence of the voracious appetite of the furnaces, the placing of an order for 1000 tons of No. 1 Soft and Gray Forge by a car works last week is an indication. To secure this order, nine agents offered their figures, and, of course, the lowest-priced Iron was ordered. It is claimed that the price at which the Iron was bought was the lowest yet made, and in consideration of the fact that nine agents were after the business, it can readily be believed that no fancy price was obtained.

In the New York market some brands of Pig Iron bring full former prices—that is, the basis of $15 for No. 1 Extra Foundry—but concessions of 25¢ @ 50¢ ℔ ton are not infrequent. We quote Northern brands at $14.75 @ $15.25 for No. 1; $14 @ $14.50 for No. 2, tide-water. Southern Iron, same delivery, $14.75 @ $15 for No. 1; $13.75 @ $14 for No. 2 and No. 1 Soft; $13.25 @ $13.50 for No. 2 Soft.

Pig Iron prices have not changed either for better or worse in the Philadelphia market. There is a full supply of Iron of one kind or another, and for the kind that is not specially wanted prices are inclined to be weak and irregular. Standard brands are well taken care of, and holders have no difficulty in sustaining prices, and to that extent the market may be called steady; but the feeling is not sanguine, and sellers seem to think they are doing pretty well to stave off concessions. The present market is a waiting one, and until something occurs to give it a new turn the range of prices will probably be as follows for Philadelphia and equivalent deliveries, with 25¢ to 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X.....	$17.00	@ $17.25
American Scotch, No. 2X.....	16.00	@ 16.25

In the Pittsburgh market the quotations remain unchanged, although on others than Foundry brands it is admitted that prices would be shaded under favorable conditions. We quote as follows:

No. 1 Foundry.....	$13.75 @ $14.00,	cash.
No. 2 Foundry.....	12.75 @ 13.00,	"
Charcoal Foundry No. 1....	17.00 @ 18.00,	"
Charcoal Foundry No. 2....	16.50 @ 17.00,	"

Reports from Chicago indicate that local Coke Iron is still moving quite

freely, with additional business in sight. The very large sales made within the past six weeks have put the manufacturers here in very good condition. The competition for business has thus far been confined to the smaller companies and it remains to be seen how long the larger ones will refrain from pressing their attention on consumers. Lake Superior Charcoal is quiet but firm. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	$16.50 @ $17.00
Local Coke Foundry, No. 1	13.25 @ 13.75
Local Coke Foundry, No. 2	13.00 @ 13.25
Local Coke Foundry, No. 3	12.75 @ 13.00

In the South it is difficult to see anything very encouraging in the future, and it now looks as if prices will make a record that has never yet been reached. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry,	$13.75 @ $14.25
Southern Coke, No. 2 Foundry,	12.50 @ 12.75
Southern Coke, No. 3 Foundry,	12.00 @ 12.25
Missouri Charcoal, No. 1 Foundry	13 50 @ 14.00

Billets and Rods.—Neither domestic nor foreign products have met with freer sale, and the market remains in somewhat unsettled condition, with prices still leaning somewhat in buyers' favor.

Steel Rails.—In this market few and only small contracts have been placed during the past week. To all accounts 5000 tons will cover the entire business.

Metal Market.

Copper.—The market is weaker, if anything, than it was at the date of our last review. In any event, offers to sell at prices that appeared to have been exceptionally low a week ago are now common, and the demand drags along wearily, with little indication of immediate improvement. In fact, the purchases by consumers appear disappointing thus far this year, and the comparatively light movement serves, in a measure, to offset the intended effect of the reduction in output. For the present, the appearances are that improvement prior to the opening of navigation is improbable, since consumers are disinclined to buy ahead, except at prices a round fraction below those generally asked. Export demand is extremely slow at the moment.

Pig Tin.—Speculation as to an extra session of Congress and action upon the matter of abolishing the duty prescribed in the McKinley Tariff law has kept a lively interest in the market and served to cause somewhat violent fluctuations in the prices here and in Europe. Up to the present time the indications are that more "short" interest has developed in Europe than on this side of the Atlantic, and it is a remarkable fact that spot stock has, during the past few days, commanded a premium in this market, while the margin between spots and futures has widened in London to about 7/6.

On Tuesday, February 28, the House of Representatives, on motion of Chairman Springer of the Ways and Means Committee, passed the bill repealing that section of the McKinley bill which imposes tax of four cents a pound on pig tin after July 1 next. The bill is expected to go to the Senate in a few days, when it is supposed it will be put through without opposition.

Pig Lead.—Under the influence of freer offering for March and April shipment from the primary sources of supply, and apparent indifference about buying on the part of consumers, the market has weakened a trifle. Production has been somewhat larger of late, and the prospects are that there will be a further increase as soon as weather conditions permit.

Spelter.—Heavy production has sufficient weight to keep smelters anxious for orders for future shipments. Sales have been fair, chiefly for April and later shipment, but not liberal enough to have any pronounced bearing upon the market.

Antimony.—Outside of ordinary jobbing distribution there has been little movement, and prices have varied to a moderate extent only.

Tin Plate.—The demand for future deliveries has fallen off to comparatively small proportions, and business contrasts distinctly with that executed during the week preceding the one under review. Spot transactions have been of commonplace character, moderate, all told, and chiefly at old prices. Supplies here are only fair, and the assortment, particularly of full weight Cokes and Charcoal Ternes, is still rather poor. While the amount of business that has been done in Tin Plates during the past month is considered fair, the demand has been limited. But little, if any, outside work has been done owing to snow and storm, and the lack in demand has had a tendency to weaken the price on some grades of Terne Plates.

Coal.

In the Anthracite Coal trade the general situation is confused and uncertain, owing to the Reading troubles, but prices are not affected. The combine schedule still holds good and is closely followed by the independent outsiders, so that one of the largest of the latter remarks that no sales below are heard of. At the same time Coal is in good supply, and the recent scarcity of small steam sizes is hardly felt any longer. Lehigh Pea is $2.40 and Free Burning, $2 65, f.o.b.; Buckwheat, $1.85 to $2.35, according to quality.

The quantity of Coal moving out for consumption is large. The effects of the Reading rupture are seen in the feeling of uncertainty respecting the future, there being little disposition to buy except from necessity. There is a general understanding that spring prices will drop April 1 to a minimum, the plan being to work up gradually by a succession of advances through the season. The basis, however, both for Anthracite and Bituminous is higher than it was a year ago, say $1 average for the former and 25¢ for the latter. Railroad tolls for Bituminous will be advanced 25¢ @ 50¢ per ton April 1, the Baltimore & Ohio and Pennsylvania having already given notice to this effect. The final outcome of the Reading situation nobody pretends to know. It is assumed that the Lehigh Valley will stick to the combine whatever happens in New England. The Jersey Central is out to stay. Competition by the railroads to obtain Coal transportation is therefore not improbable. At Tuesday's meeting of agents nothing was done.

The total shipment of Anthracite Coal for the week ending February 18, as reported by the several carrying companies, was 840,606 tons, an increase of 57,828 tons, and for the year to that date the total tonnage has been 5,267,030 tons, an increase of 129,595 tons over last year.

Financial.

The failure of two or three large iron concerns in Pennsylvania, the insolvency of a great railroad corporation and rumored receiverships in prospect for several others are events which have divided attention with the Treasury situation and the silver problem. Happily the gold drain is checked for the moment, leaving an alleged respectable balance of $3,000,000 or upward of free gold for the new administration. The proposed bond issue is still in abeyance, though the advocates of this measure suggest, as a reason for prompt action, that any encroachment on the $100,000,000 reserve might make it no longer possible to sell 3 % bonds at par for gold. With the Government credit impaired, bonds expressly payable in gold might not find a ready market, the metal being held for a premium. An admonition is also found in the fact that although wheat and other commodities are so much depressed, imports are disproportioned to the volume of exports. It is an assuring circumstance that heavy losses among speculative operators have no perceptible effect on legitimate trade. Domestic trade is satisfactory for the season. The east-bound traffic from Chicago is so heavy that the railroads are unable to handle it.

United States bonds were firm at the following quotations:

U. S. 4½s, 1891, extended	99½
U. S. 4s, 1907, registered	113
U. S. 4s, 1907, coupon	112½
U. S. currency 6s	107½

In the merchandise market there are no radical changes. Fluctuations in grain are narrow. Breadstuffs were weak and lower, with dull foreign markets, light export demand and good receipts West.

The possibility of a tight money market inspired caution. While the visible supply of wheat has decreased, the total is at least 111,000,000 bushels, and the holders show signs of fatigue. The foreign markets are supplied in good measure from other sources. Hog products have undergone some reaction and prices are easier. Orders for all sorts of merchandise are curtailed by difficulties in transportation. Rubber is less active. A break in the cotton mills strike in England excites hopes of a better demand for the staple.

The Canadian Pacific Railway is being extended to secure a winter port at Lewisbourg.

Chicago Report.

Scrap.—Old Iron continues very weak, consumers being determined to force prices lower. Dealers quote the following buying prices:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	...
No. 2, such as Shovels, Hoes, &c.	4.50	...
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12 00	....
Old Gas-Pipe and Boiler Tubes	9.00	..
Cast Borings	5.00	....
Turnings	6.00	.
Horseshoes	13.00	..
Copper Bottoms	.	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	...	4 ¢
Pipe Lead	...	3 ¢
Tea Lead	....	2¾¢
Zinc	...	4
Rubber	...	3 ¢

Anthracite.— The demand continues heavy. Spring is near at hand, however, and quotations remain as follows on carload lots of 12 net tons:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	10.00
Cheyenne, Wyo	
All points between Denver and Missouri River	9.35

The London *Ironmonger* publishes the following words of caution to inventors in regard to the proceedings of a questionable French institution calling itself the "Paris Academy of Inventors," which appears to have beguiled a number of British inventors: "We note that quite a number of English inventors have subscribed to the 'Paris Academy of Inventors.' In one case, we know, and probably in others, the academy sent a circular to an inventor as soon as his name was published as having taken out a provisional specification, informing him that he had been elected an honorary member of the Academy for his important invention, and had been awarded the great gold medal (gilded) of the academy. The circular went on to invite him to send £2 to pay for this medal and the diploma accompanying it. In this instance no notice was taken of the circular, but others appear from a set of testimonials accompanying the circular to have been less wary. Had the 'academy' waited till the publication of the complete specifications, its action would have appeared less questionable, but acting as it has done, it is obvious it neither knows nor cares what the invention is to which it awards its diploma, as until the patent is completed its title only is published."

Hard times in Canada are believed to be at the bottom of the agitation for annexation.

CONDITION OF THE

Hardware Trade.

THE BUSINESS of the past month is generally regarded as very satisfactory and as having been larger than last year. There was a heavy trade in some of the staple lines, which still continues, keeping manufacturers busy and suggesting that perhaps there may be a shortage before long. At the same time, the business in general Hardware has been at least up to the average, so that there is little reason for complaint, in view of the trade with which the year has opened. With the advance of the season there is now an increase in orders, and both jobbers and manufacturers are kept fully occupied. In prices there is some improvement on certain lines of goods that lie near the raw material, but, as a rule, the Hardware market is not characterized by special strength. There is a disposition on the part of the trade to buy only in such quantities as their business is sure to demand in the near future, their policy being to purchase frequently and in moderate lots rather than to place liberal orders. There is an evident sluggishness in collections in many parts of the country, which is accounted for in part by the general financial condition and also by the disposition of the farmers to hold their products, while, at the same time, the condition of the roads and the character of the weather have interfered to some extent with the usual course of business.

Advices from Chicago.—Hardware jobbers report a better condition of trade, which has been improved to a considerable extent by the firmer feeling in staple goods. The tone of reports now coming in from traveling salesmen has changed decidedly. Up to the past week they complained of brisk competition on Wire Nails and other staples and expressed very bearish views on the situation. Advices received from headquarters, however, withdrawing former quotations and insisting on the cancellation of offers previously made, immediately brought about a very decided change. Merchants came to the conclusion that the bottom had been reached and orders from that time have been coming in briskly. The Shelf Hardware jobbers and Heavy Hardware jobbers both report their sales larger than up to the corresponding time last year. A still heavier rush is expected as soon as spring opens, which must be during the course of the present month unless all reasonable signs fail. The question will then be how to get goods rather than what they will cost. Collections are not as favorable as they have been. This is imputed partly to the policy of the farmers in continuing to hold on to their stocks of grain, and partly to the efforts of Eastern banks to create an artificial scarcity of money. The situation is not regarded with apprehension, but is expected to clear itself up naturally as the season advances and grain stocks are released from farmers' hands.

Notes on Prices.

Cut Nails.—The adoption of the Wire Nail card by the Eastern manufacturers at their meeting at Philadelphia, 21st ult., ratifying the action of the Western manufacturers at the Pittsburgh meeting, 15th ult., is generally regarded by the trade with approval. The object sought to be accomplished—namely, the doing away with the troublesome system of averages and simplifying business by the use of a common list for both Wire and Cut Nails—is commended very heartily, and hopes are expressed that the project will be successfully carried out. Quotations in the East are on a basis of $1.25 in carload lots at mill, and $1.40, New York, which is slightly higher on usual assortments than the price recently ruling. Manufacturers both East and West are making quotations on the basis of the new card without any reference to average, but specify in some cases that the price named is for "ordinary assortments," one company stating that their future quotations "will be made at a straight base price with the single condition that the quotation is made for ordinary assorted specifications." It is also understood that at the meeting of the Eastern Association last week it was stipulated that no order would be considered assorted unless it averaged as high as 10d Nails, or 50 cents per keg above base.

In adopting the Wire-Nail card for Cut Nails the Eastern manufacturers, as mentioned in our last issue, made some slight modifications so as to adapt it more fully to Cut Nails, and it is understood that these changes will be ratified by the Western manufacturers. The modifications made are shown in the lists given below, which represent the regular Wire-Nail card, and also that adopted by the Cut-Nail manufacturers. It will be observed that the Cut-Nail card differs from the regular Wire-Nail card in the extras named on Fine Finishing, Clinch, Tobacco and Flooring Nails, as it provides for Nails omitted on the regular Wire-Nail card, while it increases the extras on Clinch Nails to 50 cents above the same size of Common Nails, instead of about 20 cents. Other changes are also made. On the leading goods, however, the two cards are identical, and these minor differences will probably be of little practical importance. We give below the regular Wire-Nail card and that adopted by the Cut-Nail manufacturers in parallel columns, so that the precise differences may be perceived at a glance:

Common, Fence, Sheathing, Hook, Brads and Shingle.	Extras. Cut Nails.	Wire Nails.
	Base	Base
60d	$0.10	$0.10
50d	.25	.25
30d and 40d	.35	.35
20d	.45	.45
12d and 16d	.50	.50
10d	.60	.60
8d and 9d	.75	.75
6d and 7d	.90	.90
4d and 5d	1.20	1.20
3d	1.60	1.60
2d		
Casing and Box.		
30d and 40d	.40	.40
20d	.50	.50
12d and 16d	.60	.60
10d	.65	.65

8d and 9d	.75	.75
6d and 7d	.90	.90
5d	1.10	1.10
4d	1.25	1.25
3d	1.50	1.50
2d	1.75	1.75
Fine Nails and Fine Blued.		
2d	1.90	1.90
3d	1.60	1.60
4d	1.25	1.25
Common Barrel and Barrel.		
¾ inch	2.00	2.00
⅞ "	1.75	1.75
1 "	1.50	1.50
1⅛ "	1.40	1.40
1¼ "	1.20	1.20
1⅜ "	1.00	1.00
1½ "	.90	.90
Slating.		
2d	1.40	1.40
3d	1.20	1.20
4d	1.00	1.00
5d	.90	.90
6d	.80	....
Clinch.		
1 inch	2.10	1.80
1¼ "	1.70	1.40
1½ " and 1¾ inch	1.40	1.00
2 " " 2¼ "	1.25	.90
2½ " " 3 "	1.10	.80
3 "	1.00	.70
3¼ " and 3½ inch	.95	.60
4 "	.85	.50
Cooper, Tobacco and Warehouse.		
3d	1.30	. .
4d and 5d	1.00	. .
6d and 7d	.85	....
8d	.70	....
10d	.60	....
Tobacco Manufacturers' Box.		
3d caddy	1.60	....
4d and 5d caddy	1.20	....
4d and 5d lining	.90	....
6d and 7d "	.75	....
Fooring.		
6d and 7d	.90	.75
8d and 9d	.75	.60
10d	.65	.50
12d and 16d	.60	.45
Common Brads.		
2d	....	1.60
3d	....	1.20
4d and 5d	....	.90
6d and 7d	....	.75
8d and 9d	....	.60
10d	....	.50
12 and 16d	....	.45
20d	....	.35
30d and 40d	....	.25
50d	....	.10
60d	....	Base
Finishing.		
2d	1.75	..
3d	1.50	....
4d	1.25	....
5d	1.10	....
6d and 7d	.90	....
8d and 9d	.75	....
10d	.65	....
12d and 16d	.60	....
20d	.50	....
30d and 40d	.40	....
Smooth Finishing.		
2d	....	1.90
3d	....	1.65
4d	....	1.45
5d	....	1.25
6d and 7d	....	1.10
8d and 9d	....	.90
10d	....	.75
12d and 16d	....	.65
20d	....	.60
Fine Finishing.		
1 inch	1.90	....
1¼ "	1.65	....
1½ "	1.45	....
1¾ "	1.25	....
2 " and 2¼ inch	1.10	....
2½ " " 2¾ "	.90	....
3 "	.75	....
3¼ " and 3½ inch	.65	..
4 "	.60	....
Lining Nails or Light Barrel and Lining.		
¾ inch		2.50
⅞ "		2.20
1 "		1.90
Roofing.		
¾ inch	2.00	....
⅞ "	1.75	....
1 "	1 50	....
1⅛ inch	1.40	....
1¼ "	1.20	....
1⅜ "	1.00	....
1½ "	.90	....
Hinge Nails.		
4d		1.50
6d		1.25
8d		1.00
10d		.90
12d and 16d		.85
20d		.80
Cut and Wire Spikes	.50	.50
Boat Spikes	.75	....

Advices from Chicago.— Manufacturers report large shipments during the past week, as specifications have been coming in rapidly on old contracts. The new price of $1.42½, Chicago, for factory lots with no average is maintained, but buyers are withholding their purchases as long as possible to see whether the rate is firmly fixed on the basis named. Jobbers report that the rate of $1.50 from stock on the new card is adhered to, and that so far they have met with no trouble in putting the new arrangement in operation.

Wire Nails.—During the past week or two there has been a large business in Wire Nails, some of the leading jobbing houses having placed heavy orders, and many smaller concerns covering their future requirements. The market is characterized by an excellent tone and prices are somewhat higher. At a meeting of the manufacturers held in Cleveland last Friday the price was advanced to $1.50 for round lots at mill. Small lots from store in New York are selling at $1.75 to $1.80.

Advices from Chicago.—Heavy contracts were made during the early part of last week by merchants in the Northwest, who at last became convinced that prices of Wire Nails were on a firm basis and that it would no longer be advisable to defer their necessary purchases of stock. Those who did so were wise, as manufacturers held a meeting later in the week and advanced prices to the equivalent of $1.65, Chicago, for factory shipment. The advance is likely to be sustained now, as manufacturers are loaded with contracts. Stocks are reported light everywhere in the hands of distributors, and the usual spring demand is expected to reach larger proportions than ever. Jobbers have advanced prices to $1.70 on small lots from stock.

Barb Wire.—The Barb Wire market is characterized by an excellent tone, with a large and increasing volume of business. Some of the mills are withdrawing their extreme quotations, and prices are somewhat higher than they have been. For carload lots at mill $2.40 to $2.45 represents the market, but some of the manufacturers are asking higher figures. Small lots of Galvanized Four Point from store in New York are regularly held at $3.10, an abatement of 10 cents per 100 pounds being made in carloads.

We are advised by George H. Munroe, receiver, that he has booked orders and closed out the entire stock of Barb Wire of the Joliet Enterprise Company, there being less than 1000 tons now in the warehouse, which will all be shipped not later than 15th inst. Sixty days ago there were nearly 4000 tons on hand. The Wire has been sold largely to old customers of the Joliet Enterprise Company and at fair prices, the receiver having taken special pains not to demoralize the Barb Wire market while closing out this stock. The plant has not yet been offered for sale.

Advices from Chicago.—The demand is now quite large from manufacturers, and is improving from jobbers. Inquiries are coming forward in constantly increasing volume, and the question will probably be in a couple of weeks to the manufacturers: "Can you ship the Wire?" A very heavy trade is expected from all indications. The high grade Barb Wires sold through exclusive agencies will be advanced, it is stated, at least 10 cents per 100 pounds this week to, say, $2.75 for Galvanized and $2.35 for Painted, in carload lots from factory. An advance on other Wire is regarded by manufacturers as a decided probability within the next week or two. Jobbers are now quoting $2.65 for Galvanized and $2.25 for Painted in small lots from stock.

Wrought Iron Pipe.—The volume of business is fair, but the market is weak and manufacturers are apparently very desirous of securing orders, and to this end are naming concessions on former prices. Quotations now ruling are, we are advised, lower than have prevailed for the past 18 months.

Shot.—The Shot market continues without important change, prices being steady, with only a moderate business. The Philadelphia Shot Tower, Thomas W. Sparks, 121 Walnut street, Philadelphia, in sending out their regular quotations state that an additional discount of 2½ per cent. will be allowed on lots of 2000 pounds and upward.

Cork Screws.— Detroit Cork Screw Company, Detroit, Mich., issue a list of Cork Screws and Cork Extractors manufactured by them, from which it is seen that the line covers a large range both in styles and prices. The list prices are as follows and subject to a discount of 33⅓ per cent.:

	Per doz.
Davis Knife and Cork Screw	$2.00
Davis Cork Screw	6.00
Columbus Power Cork Screw	3.60
No. 1 Cut-Worm Cork Screw	1.50
No. 2 Cut-Worm Cork Screw	1.00
No. 3 Cut-Worm Cork Screw	0.75
No. 3 Greely's Cork Extractor	1.50
No. 4 Greely's Cork Extractor	1.80
No. 6 Greely's Cork Extractor	2.50
No. 7 Greely's Cork Extractor	2.50
No. 8 Greely's Cork Extractor	2.50
Puddefoot Cork Screws	3.00
Cut-Worm Screws for Bar Cork Pullers, per 1000	90.00

Chicago Spring Butts.—Chicago Spring Butt Company, Chicago, Ill., have recently reduced the list prices of their Nos. 41 and 51 Double Spring Butts. The revised list is as follows, which is subject to a discount of 30 per cent.:

	Per pair.
⅜ to 1-inch, Nos. 41 and 51	$7.25
1⅛ to 1¼ inch, " "	8.00
1⅜ to 1½-inch, " "	10.75
1¾ to 2-inch, " "	18.00
2¼ to 2½-inch, " "	27.00
2¾ to 3½-inch, " "	36.00

Motley's Adjustable Sash Holder.—This article, which is manufactured by Peter Motley, 750 South Broad street, Philadelphia, is sold, medium size, in gross.

lots, at $1.50 per dozen; subject to a discount of 40 per cent.

Glass.—The glass market is quiet and uninteresting, with but little doing in either American or imported Window Glass. This is largely due to the severe weather experienced throughout the country, which has almost entirely caused the suspension of building operations. At a meeting of the National Window Glass Company, held at Chicago, last week, a change was made in the discount for Glass in any quantity less than carloads. The revised price for less than carloads is 80 and 10 per cent. discount, instead of 80 and 10 per cent. discount for 100 boxes and over, and 80 and 5 per cent. discount for less than 100 boxes, as formerly. Discounts on other quantities remain unchanged. A freight allowance will, however, be made on carload lots and larger quantities, not to exceed 17½ cents per 100 pounds. Less than carloads will be sold f.o.b. at the shipping point. We are advised that the National Window Glass Company now include 93 per cent. of the Pittsburgh, Western and New York State factories, and 90 per cent. of the Glass jobbers in the country. The New York importers of Window Glass held a meeting on the 27th inst., but came to no decision regarding future prices. While the nominal discount on imported Glass is 75 and 10 per cent., in the absence of business no definite price can be named. Glass is, however, being sold at from 80 to 80 and 5 per cent. discount. The Plate Glass market remains without change, both in regard to prices and demand. We quote as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 80 per cent. discount to 80 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	@	.03
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔ lb.	@	.04½
Wringer Wire Rolls, ℔ lb.	@	.02
Syringes, ℔ lb.	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb	10¢
Light and Tinned Copper	℔ lb	9¢
Heavy Brass	℔ lb	7¢
Light Brass	℔ lb	3½¢
Lead	℔ lb	3½¢
Tea Lead	℔ lb	2½¢
Zinc	℔ lb	14¢
No. 1 Pewter	℔ lb	7¢
No. 2 Pewter	℔ gross ton,	$17.00
Wrought Scrap Iron	℔ gross ton,	10.00
Heavy Cast Scrap	℔ gross ton,	7.00
Stove Plate Scrap	℔ gross ton,	5.00
Burnt Iron		

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags	℔ lb	4¢
No. 2 White Rags	℔ lb	3¢
Mixed Rags	℔ lb	1¾ @ 1¾¢
Blues and 3ds	℔ lb	1¾ @ 2¢
Hard Sized White Shavings	℔ lb	2¾ @ 3¢
No. 1 White Book Shavings	℔ lb	2¼ @ 2⅝¢
No. 2 White Book Shavings	℔ lb	1½ @ 1¾¢
Light Book Shavings	℔ lb	⅞ @ 1¢
No. 1 Mixed Shavings	℔ lb	1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @ ⅞¢
No. 1 Printed Books	℔ lb	1⅜ @ 1½¢
Ordinary Mixed Books	℔ lb	¾ @ ⅞¢
Newspapers	℔ lb	½¢
No. 1 Manila Paper	℔ lb	1⅛ @ 1¼¢
No. 2 Manila Paper	℔ lb	⅞ @ 1¢
Bogus Paper	℔ lb	⅝ @ ¾¢
Common Paper	℔ lb	¾ @ ⅞¢
Straw Chips	℔ lb	½ @ ⅝¢
Binders' Clippings	℔ lb	½ @ ⅝¢
Jute Butts	℔ lb	1¼¢
No. 1 Jute Bagging	℔ lb	1¼ @ 1⅜¢
Mixed Bagging	℔ lb	1¢
No. 2 Bagging	℔ lb	¾¢
Hemp Twine	℔ lb	2½¢
Manila Rope	℔ lb	2¼¢
Jute Rope	℔ lb	1¾ @ 2¢
Mixed Rope	℔ lb	¾ @ ⅞¢

Cut Nail Card from the Jobbers' Standpoint.

The following letter from a well-known house in Ohio discusses the question as to the desirability of a revision of the Cut Nail card, referring especially to the inconvenience suffered by wholesale houses who sell Nails to the smaller trade. Our correspondent points out the advantage it would be if the system of averages were abolished. Whether the adoption of the Wire Nail card for Cut Nails will accomplish this remains to be seen:

I read with interest a recent article in your paper on Cut Nail card. If the writer of the article had to sell Nails in a jobbing way to the retail trade I think he would sing another song. Jobbers cannot charge their customers on the same basis they have to buy on. Only last week we received the following order for Cut Nails:

6 kegs 40d.
3 kegs 20d.
4 kegs 60d.

This order was from a coal company who use scarcely any small Nails. The average above base is 5 cents a keg. Now, what would our customer say had we charged him the same rate manufacturers would charge on such an average? He would have returned the invoice for correction, and possibly added some exclamation points. A great many retail dealers are sharp enough to buy their large sizes from jobbers and small ones from manufacturers; in that way they can shape their stock so as to get a high average and low price when they are ready for a carload. There is no good reason why the loss on one-sized Nail should be added to another size. Manufacturers know what it costs to produce each size, and the only correct way is to sell each size on the basis of the cost of same. Why should a man who wants a keg of 50d Nails pay more than they are worth to help some one else buy a keg of 3d Fine for less than they are worth? And if the manufacturers' system is carried out, that is just what the buyer of the 40d will have to do. The jobber cannot fix a price based on exact cost on more than one purchase at a time. He may have a car this week with a high average and low prices, and the next car may cost him, on a different average, from 5 to 10 cents a keg more; but he dare not change his price unless manufacturers have made a change.

The average dealer knows nothing about the present system, and it would take one man's time to explain it to them so they would remember it. If they could take a Nail card and know the base price, they could tell exactly what Nails would cost them; and it makes no difference to them whether a customer buys 3d Fine or 60d, he makes his profit.

We would like to see a card so arranged that manufacturers could return to the old system, and think it would be fully as profitable to them and much more satisfactory to jobbers and retailers.

Trade Notes.

The New York Exhaust & Blow Pipe Company, 26 Mechanic street, Hartford, Conn., publish an illustrated circular relating to Galvanized Steel Exhaust and Blow Piping of their manufacture. A description of the Piping is given and a list of testimonial letters presented.

The Clayton & Lambert Mfg. Company, Ypsilanti, Mich., issue an illustrated circular descriptive of their No 1 Gasoline specialties. They introduce the circular with a brief history of their No. 1 Burner, and then proceed to give illustrations and general descriptions of the several varieties of Fire Pots, Torches, &c., of their No. 3 Fire Pot and No. 4 Brazing Fire.

The Challenge Iceberg Hardwood Refrigerators, manufactured by the Challenge Corn Planter Company, Grand Haven, Mich., are referred to in an announcement elsewhere in this issue. Illustrations are presented and a list of agents given.

Seavey & Co., Tinware manufacturers and dealers, for a number of years located at 93-97 North street, Boston, will remove to the convenient building 120-122 North street, directly opposite their present quarters. The change will be made about May 1.

The Peck, Stow & Wilcox Company, Southington, Conn., and 27 Chambers street, New York, are just issuing what they designate as a Columbian edition of an illustrated catalogue and price-list devoted exclusively to the treatment of a line of goods known to the trade as Tinsmiths' tools and machines. The book is finely printed on plate paper and has 160 pages 7½ x 5½ inches. In addition to the staple goods so long and favorably known to workers in sheet metals in this and foreign countries, we note the incorporation of many new numbers and sizes of articles already well introduced, thus affording a larger variety to select from. This is most marked in the assortment of Forming Machines and Squaring Shears for hand, foot and steam power, while various patterns and styles of Corrugating Machines and Beaders are entirely new.

H. M. Hillson, manufacturer of Tinware and house furnishing goods, at 247-251 North street, Boston, Mass., will, about May 1, remove his offices, show and shipping rooms to the building, 93-97, on the same street, now occupied by Seavey & Co. Mr. Hillson has purchased these premises, and will remodel them to suit his requirements. The former offices and storerooms will be added to his manu-

facturing plant, which will make in all six floors available for factory purposes. The new move will bring Mr. Hillson into the heart of the Tinware district, and prove a convenience to his patrons, who will be welcomed with the old-time cordiality in the new quarters.

WORTHLEY'S BROAD GAUGE IRON STALL WORKS, 53 Elm street, Boston, Mass., issue an illustrated catalogue of their Stable Fittings, which include a variety of articles, such as Mangers, Cesspools, Water Troughs, Racks, Stall Guards, Hinges, Lanterns, &c.

THE MICA INSULATOR COMPANY filed articles of incorporation March 1, 1893, at Elizabeth, N. J., the authorized capital being placed at $100,000, all paid in. The company's plant is located at Schenectady, N. Y., while offices will be maintained at 218 Water street, this city, and also at Elizabeth. The incorporators are: Eugene Munsell of Branchport, N. J.; Lewis W. Kingsley and Franklin Brooks of Elizabeth, N. J.; Charles W. Jefferson and Arthur H. Salisbury Dyer of Schenectady. The company will manufacture Micanite for electrical insulation, a description of which appeared recently in our columns. Through processes controlled by this interest mica waste is now utilized in all forms and shapes for insulating purposes at a much reduced cost, with no diminution in efficiency.

JAMES A. COE & Co., 106 Mulberry street, Newark, N. J., make an announcement this week respecting the American roofing plate known as Staple, which they handle. The advertisement also refers to Black and Galvanized Sheet Iron and Sheet Zinc.

IN *The Metal Worker* of February 25, referring to the New York office recently opened by N. & G. Taylor Company of Philadelphia, there was an error in the number of the street. It should have read 231 Water street, New York.

SUMMERS BROS. COMPANY, at Struthers, Ohio, have been running full time. A number of important changes will be made in these mills during the coming season. A new sheet mill will be built which will be one of the best equipped plants in the valleys.

WE LEARN from the E. W. Bliss Company, Brooklyn, N. Y., that in consequence of increased facilities for the manufacture of their Standard Presses, they are offering their Adjustable Power Presses Nos. 10, 12, 12½, 18 and 19 at reduced prices. They state that these Presses are kept in stock and shipment can be made at once.

HAYDOCK & BISSELL, 12 Murray street and 15 Park place, New York, announce an important auction sale on Tuesday, March 7, when a large assortment of Agate, Blue and White Ware and Stamped Tinned Ware Seconds will be offered by order of the Lalance & Grosjean Mfg. Company. First quality Enameled Sheet Steel Drip Pans and Wrought Steel Kitchen and Pantry Sinks, enameled, galvanized and painted, will also be disposed of. The above goods will be sold in quantities to suit the jobbing and retail trade and without any reserve.

F. G. FERAUD, for many years cashier of the Peck, Stow & Wilcox Company in New York, but since 1887 a resident of California, has recently been elected secretary of the Redlands Electric Light & Power Company, of Redlands, in that State, a town of 4500 population, about 60 miles from Los Angeles. This is in addition to other duties, among which may be mentioned the cashiership of the National Bank there, and an executive position in an irrigation company.

CHARLES F. BROOKER, for 24 years secretary of the Coe Brass Mfg. Company of Torrington, Conn., has been elected president of that company to fill the vacancy caused by the death of Lyman W. Coe.

THE SALEM NAIL COMPANY, O. Nelson, proprietor, 292 Pearl street, New York, issue a card under date February 10, in which they state that, having anticipated the recent advance in the price of Cut Nails and having excellent facilities and a commodious warehouse, they are in a position to fill orders promptly at the lowest market prices. They mention that they always carry a full line of Plain and Galvanized Wire and Cut Nails.

THE BROWN DEVELOPING COMPANY, 97 Chambers street, New York, and 45 Oliver street, Boston, have been carrying on a test of their Crematory Furnace at Boston, consuming the city garbage. During the test the temperature at the head end of the furnace was 2500°, at the rear end 1800°, and at the neck of the stack 1650°. A 45-inch stack was substituted for the 20-inch one in use, which it was expected would carry the temperature from 500° to 800° higher. Of this company J. C. McCarty, of J. C. McCarty & Co., 97 Chambers street, New York, is secretary.

ERIE SPECIALTY MFG. COMPANY, Erie, Pa., were the recipients during 1892 of a largely increased trade, which has necessitated the enlargement of their plant and the addition of new machinery. The company are now running overtime, and the books contain many large orders, the prospect for business during 1893 being very gratifying.

Price-Lists, Circulars, &c.

THE BRONSON SUPPLY COMPANY, New York, sole agents for Puritan Cookers: Illustrations and list prices are given of a variety of styles of Puritan Cookers, also of Five o'Clock Tea Kettles, Coffee Pots, Chafing Dishes, Baking and Vegetable Dishes, Egg Poachers, Cuspidors, Spice Nest, Tea Steepers, Universal Measures, &c.

THE ST. LOUIS REFRIGERATOR & WOODEN GUTTER COMPANY, St. Louis, Mo.: The Centennial Refrigerator. Illustrations are given of Refrigerators, Sideboard Refrigerators, Ice Chests, Grocers' Chests, Barroom and Saloon Chests, Wine Cooler Refrigerators, Portable Refrigerators, Grocers' Butter Boxes, Beer Coolers, &c.

THE LUDLOW-SAYLOR WIRE COMPANY, St. Louis, Mo.: Illustrated catalogue of Crestings, Finials, Stable Fixtures, Tower Ornaments, Weather Vanes, &c. In addition to these goods, the company call attention to all goods of this character, as well as to their general line of manufactured Wire Goods; also Barb and Plain Wire, Metal Work of all kinds, Wire and Iron Fences, Wire Nails, &c. Catalogues and prices will be furnished upon application by the company.

NORTH BROS. MFG. COMPANY, Philadelphia, Pa.: Seasonable Helps for Household Use. Illustrations are given of Gem, Blizzard, American and Crown Ice Cream Freezers; Freezer Clamp, Ice Chipper, Keystone Beater, Gem Cake Pan, Gem Cake and Batter Mixer, Perfection Meat Cutter, Gem Ice Shave, &c.

PARAGON MFG. COMPANY, New Haven and New York; salesroom 112 Chambers street: Illustrated price-list. Cuts show Pipe Vises, Cast-Iron Hammers, Gas Pliers, Can Openers, Speed Indicators, Ice Picks, Brackets, Tack Claws, Coat and Hat Hooks, Tinners' Snips, Scratch Awls, &c.

Beet sugar production in Europe has entirely cut off the demand for Cuban sugar in that direction.

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See Standard Lists on Following Pages.

CHICAGO, MARCH 2, 1893.

Tin—

Straits pigs.....22¢@22½¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

	Per box.
IC, 10 x 14	@ $6.75
IC, 12 x 12	@ 6.75
IC, 14 x 20	@ 6.75
IC, 20 x 28	@ 13.50
Calland and IX, 10 x 14	@ 8.75
Melyn Grade IX, 12 x 12	@ 8.75
IX, 14 x 20	@ 8.75
IX, 20 x 28	@ 17.50
DC, 12½ x 17	@ 8.50
Allaway Grade, IC, 10 x 14	@ 6.50
" IC, 12 x 12	@ 6.50
" IC, 14 x 20	@ 6.50
" IC, 20 x 28	@ 13.00
" IX, 14 x 20	@ 8.00
" IX, 20 x 28	@ 16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14, 14x20	@$6.00
IC, 14x20, 90 ℔	@ 5.75
IC, 14x20, 100 ℔	@ 5.85
10 x 20	@ 9.00
20 x 28	@ 12.00
IX, 10x14, 14x20	@ 7.50
BV Grade.—IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—

IC, 14 x 20	@ $5.62½
20 x 28	@ 11.25
IX, 20 x 28	@ 14.25

Worcester Brand not equal.—

IC, 14 x 20	@ 6.12½@ ....
IC, 20 x 28..12.25	@ ....
IX, 14 x 20.. 7.62½	@ ....
20 x 28..15.25	@ ....

American Tin Plates

Charcoal Plates.—Bright.

Irondale, A. A.—IC, 14 x 20	$7.00
" " IX, 14 x 20	9.00
" " IXX, 14 x 20	11.00
" " IC, 20 x 28	14.00
" " IX, 20 x 28	18.00
" " IXX, 20 x 28	22 00
Florence.—	
IC, 10 x 14, 12 x 12, 14 x 20	$7.00
IX, 10 x 14, 12 x 12, 14 x 20	9.00
Palma.—	
IC, 10 x 14, 12 x 12, 14 x 20	$7.50
IX, 10 x 14, 12 x 12, 14 x 20	9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, IC, 14 x 20	$9.25
Royal, extra, IC, 14 x 20	7.25
Merlon, IC, 14 x 20	6.75
Almond, IC, 14 x 20	6.50

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (205 ℔), 20 x 28	@$11.50
Crescent, IC, 20 x 28	@ 12.00
" IX, 20 x 28	@ 15.00
Hickory, IC, 20 x 28	@ 13.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20 x 28	@$14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.00
" IX, 20 x 28	@ 18.00
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@$21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	$23.00
Ironclad.—	
IC, 14 x 20	$6.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Scott's, Stamped and Resquared, IC, 14 x 20	8.50
Scott's, Stamped and Resquared, IX, 14 x 20	11.00
Scott's, Stamped and Resquared, IC, 20 x 28	19.00
Scott's, Stamped and Resquared, IX, 20 x 28	22.00
Neville, Stamped, IC, 14 x 20	6.25
" " IX, 14 x 20	7.50
" " IC, 20 x 28	12.50
" " IX, 20 x 28	15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)	$8.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	11.00
" IC, 20 x 28	12.00
Globe, IC, 14 x 20	5.75
" IC, 20 x 28	11.50
Miami, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
" IX, 20 x 28	15.00
" (Redipped), IC, 20 x 28	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50
		Per box of 50 sheets.
X, 14 x 56	29.50	16.50
XX, 14 x 56	32.50	18.20
X, 14 x 60	31.50	17.65
XX, 14 x 60	35.50	20.90

Sheet Iron—

Black.

Nos.	Common American	Refined.
10 to 16	℔ ₵ 2 7-10¢	3 3-10¢
17 to 20	℔ ₵ 2 8-10¢	3 4-10¢
21 to 24	℔ ₵ 2 9-10¢	3½¢
25 and 26	℔ ₵ 3¢	3 6-10¢
27	℔ ₵ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ ₵ A, 10½¢; B, 9½¢ dls. 5%
Craig Polished Sheet Steel.....℔ ₵ 8¾¢

Galvanized.

List on following page.
Juniata, or first quality.....dls. 70&2½%

Copper—

Ingot.

Lake.....13¢ @ 13½¢
Casting Brands.....12¢ @ 12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17¾¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 ℔.

Above 5-16 inch to 3 inch inclu...	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ¼ inch	60¢
Plain, 3-16 inch	$1.00
Plain, ⅛ inch	$1.50
Fancy Tubing, Brass, to No. 20 incl.	43¢ ℔
Bronze Tubing, 3¢ ℔ more than Brass	

35 & 10%

Roll and Sheet Brass.

List on following pages. 33 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 ℔ casks.....7¢
Less than Casks, ℔.....9¼¢

Lead—

Soft Pig Lead.....4¢
Bar.....4½¢@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10%

Solder—

½@½.....13¢@13½¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....12¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

⅛ and under, Plain	60&10%
¼ and under, Galv	52½&10%
⅛ and over, Plain	70&10%
⅛ and over, Galv	60&10%
Boiler Tubes, list Oct. 24, 1892	65%
Casing, list Nov. 16, 1892	62½%
Inserted Joints Casing, list Nov. 16, 1892	47½%
Steel Boiler Tubes	27½%
Cold Drawn Seamless Steel Tubing	50%

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dls 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted	55%
Austin's Corrugated	60%
Gordon & Gilbert's Corrugated	55%
Ritchie's (Galv. Iron only) Cor'd	55%
Ritchie's Spiral Lock Seam, Galv'd	50%
Austin's Spiral Ribbed Pipe	55%
Plain Adjustable Elbows	55%
James A. Miller Bros. (Galv'd Iron only) Corrugated	55%

Steel Roofing—

Perfection	$3.75 square
Climax	$3.50 square

Metallic Shingles—

Cushman's	$1.25 square
Merchant & Co.'s Spanish Tiles:	
Copper, 14 oz	$36.00 square
Steel, painted	$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	℔ ₵, 2 ¢
" Brown	℔ ₵, 1¾¢
" Purple	℔ ₵, 2½¢
" Ground in oil, B. Red	℔ ₵, 6½¢
" Ground in oil, Red	℔ ₵, 6½¢
" Ground in oil, Brown	℔ ₵, 6½¢
" Ground in oil, Purple	℔ ₵, 6 ¢
Linseed Oil, Boiled, in bbls	51¢
Linseed Oil, Raw, in bbls	48¢
Mineral Paints	@6¾¢
Orange Mineral	10¾¢
Pure White Lead in Oil	6¾@7¼¢
Dry White Lead in bbls	6¼@6¾¢
Red Lead, American	6½@7½¢
Red Venetian, English, dry	$1.65@$1.70
Red Venetian in oil; asst'd cans, 8¾¢; kegs	7¼¢
Sluc's Japan Oil, in bbls, ℔ gal	31¢
Spirits Turpentine, in bbls, ℔ gal	40¢
Asphaltum, Trinidad Refined, ℔ ton	$45
Coal Tar, Felt, 1 Ply, ℔ 100 ft	$1.65
Coal Tar, Felt, 2 Ply, ℔ roll 108 sq. feet	$1.50
Coal Tar, Felt, 3 Ply, ℔ roll of 108 sq. feet	$2.00
Roofing Pitch, ℔ bbl. of 300 ℔	$3.20

NEW YORK, MARCH 3, 1893.

Aluminum—

In Ton Lots—

No. 2 Grade.....℔ ℔ $0.75
No. 1, guaranteed 98⅝ pure.....℔ ℔ .90
Lots under a ton, 10¢ ℔ ℔ additional.

Antimony—

Cookson.....℔ ℔, 12½¢
Hallett's.....℔ ℔, 10¾@11¢

Brass—

Planished—

List on following page.....net

Roll and Sheet—

List on following page.....35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per ft.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above 3 inch	45
Plain, 5-16 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu	43

35&10%

Copper and Bronze Tubing—

3¢ ℔ ℔ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c.

Over ¼ to 3½ inches inclusive....17¢ ℔ ℔
Over 3½ to 5 inches inclusive.....18¢ ℔ ℔

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ ℔
Over 3½ to 5 inches inclusive.....19¢ ℔ ℔

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $1.50 per doz.....10&10%

Conductors

Corrugated. Round or Square—

Lists on following page.
Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....50%

Spiral Riveted—

List on following page.
Galvanized.....50%

See also *Elbows and Shoes; Eave-Trough Miters; Strainers. Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.

List on following page.....15@25%

Ingot.

Lake.....12¾¢
Ansonia Grade Arizona.....12¢
Ansonia Grade Casting.....11¾¢

Planished.

List on following page.....net

Sheet and Bolt.

List on following page.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering.* in Current Hardware Prices.

Damper Clips, Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

List on following page.
Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

List on following page.
Lap or Slip Joint.....list, net

Elbows—

List on following page.

Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Foot Piece.

1 to 5	5½ to 6	7 inch.
$0.78	.87	.90

.50 1.20 per doz. .20 ¢

Elbows and Shoes—

List on following page.

Flat Crimp.

Tin.....35%
Galvanized.....35%

Corrugated.

Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ ℔, 12@13¢
Patent Planished....℔ ℔, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ ℔, 8½¢

Galvanized.

Nos.	B. B.
10 to 16	℔ ₵, 4 2-10¢
17 to 22	℔ ₵, 4½¢
23 to 24	℔ ₵, 4¾¢
25 to 26	℔ ₵, 5¢
27	℔ ₵, 5¼¢
28	℔ ₵, 6¼¢
29 and 30	℔ ₵, 6½¢

Filter Joints—

List on following page.
Lee's.....33⅓ %

Lead—

American Pig.....4¼@4½¢
Bar.....4¾¢

New York Prices,

Pipe.....6¾¢, 20%
Tin Lined Pipe.....12¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ ℔.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ ℔, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ℔, .05½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Door Mats, Galvanized	25%
Window Guards, Paneled	15%
Tree Guards, Paneled	15%

Mitres, Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.

Dry Yellow Ochre	1¾@3
Dry Venetian Red	1¾@3
Linseed Oil, Boiled, in bbls	48¢
Linseed Oil, Raw, in bbls	51¢
Brown Metallic Paint	1¾@3
Red Lead, American	7½¢
Pure White Lead in Oil	7¾¢
Red Venetian, English, dry	$1.65@$1.70
Red " in oil, ass'd cans, 11¢; kegs, 8¢	
Spirits Turpentine, ℔ bbl	30¢
Asphaltum, Trinidad Refined, ℔ ton	$50.00@$55.00
Asphaltum, Rock, ℔ ton	$14.00
Coal Tar Felt, 1 Ply, ℔ ℔	2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.45
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl	$2.24
Plumbago, F. L., Pc., ℔ ℔	4@6¢
Plumbago, American, ℔ ℔	6@10¢
Plumbago, Gunpowder Glazing, ℔ ℔	10¢
Plumbago, Shot Polish, ℔ ℔	10¢

Pipe, Drain—

List on following page.....50%

Pipe and Fittings, Cast Iron Soil—

List on following page.
Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive.....60&40&10%
Other sizes.....55&55&10%
Cast Iron Fittings, Tarred, sizes 2 to 6 inches.....60&40&10%
Other sizes.....55&55&10%

Pipe, Spiral—

List on following page.

Galvanized	60%
Tin	60%

Pipe, Wrought Iron—

List on following page.

For discounts see Current Hardware Prices.

Rivets and Burrs—

List on following pages.

For discounts see Current Hardware Prices.

Rock and Slag Wool—

	℔ ℔	₵ cub. foot.
Slag Wool, ordinary	1¼	10¢
Slag Wool, ex.	4½	38½¢
Rock Wool, ordinary	2¼	27¢
Rock Wool, extra	7¼	43½¢

Rosin—

Common and Good—Strained.

Rosin, C. & D	℔ bbl. $1.52@$1.50
Rosin, E. & F	℔ bbl. $1.55@$1.63
Rosin, G. & H	℔ bbl. $1.75@$2.15
Rosin, I. & K	℔ bbl. $2.55@$3.25
Rosin, M. & N	℔ bbl. $3.85@$4.00

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, March 11, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....229 South Fourth Street
BOSTON .....146 Franklin Street
PITTSBURGH.....Room 509 Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....219 Superior Street

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

The Duty on Pig Tin.

An extraordinary state of affairs grew out of a mistake made by the representative of the Associated Press at Washington last Saturday. In the rush of the closing hours of business in the Senate the reporter was led to the assumption that that provision of the McKinley bill had been repealed which calls for the imposition of a duty of four cents per pound on pig tin after July 1, 1893. All the leading daily newspapers had accounts of the passage of a repeal act, and accordingly the metal showed a declining tendency at the exchange. Some doubts as to the accuracy of the information arose, and soon a number of telegrams were forwarded to different persons in Washington asking for precise information. The answers were conflicting and in some instances evasive. Thus, one of the New York Senators replied that his impression was that the duty had been abolished. It was only after a day's suspense that the news became definitely known that the bill had failed of passage. One leading broker before the opening of the exchange purchased a considerable block on advance information, but the market declined at the opening, since no authoritative reports were at hand. It is stated that the uncertainty thus created led to sales of part of the metal acquired. Then prices began to advance, and have risen since, with occasional slight declines, the net result being quite a considerable advance. It was reported that all the leading houses are pretty well supplied with the metal, and that the wholesale trade generally looks with gratification upon the outcome, since it seems to afford the first opportunity for some years to make a fair profit on transactions in the metal. London, too, had its period of suspense, when a short interest was developed. The leading speculative clique is reported to have held its ground and to have punished its adversaries by a sharp advance, the price jumping £2 sterling in one day. It may be well questioned whether in the history of the metal trade there has been so curious an instance. It is deeply to be regretted that the act failed, since it has become quite obvious that no sufficiently rapid development can take place during the next few years to justify the expectations held out when the law was passed.

Touch as a Test of Temperature.

It is a common practice with steam and hot-water heating fitters to base a judgment of the working of a heating apparatus upon the temperatures of pipes and radiators determined by sense of touch. When experience has matured judgment the sense of feeling may indicate and locate defects that otherwise could not be discovered in any other way so easily, since it is impracticable to insert thermometers in all parts of a system of pipes and radiators; and even were this to be done the process of reading thermometers is slower than the application of the hand. By practice one may learn to touch a very hot pipe without danger of burning, and by this brief test to estimate its temperature with sufficient accuracy for the purpose of determining whether it is working effectively or not. On the contrary, an estimate of the temperature of a room by the sense of feeling, unchecked by the indications of a thermometer, is likely to be very much at fault. To one person a room may feel comfortably warm, while to another it will seem chilly. In two hours' time the first may be complaining of chilliness, while the second feels warm enough; and either one, if too warm, will generally estimate the temperature as several degrees higher than a thermometer would show it to be, or if they felt cold would make an error precisely opposite. We have, therefore, this peculiarity of the human skin clearly manifested—to wit, that it is more reliable in its sense of temperature changes in solids (the same may be said as to liquids) than it is for the temperature of air; and as air is a mixture of gases it may be generally said of these, as a class, that an approximation to their temperature by the sense of feeling is more unreliable than it is with other substances.

An Explanation.

The human skin varies sensibly in temperature within small intervals of time. In taking the temperature of patients, physicians place the bulb in the mouth or sometimes in the armpits, these latter parts being protected largely from external influences that affect the temperature of the skin. In a room heated by a stove or by steam or hot-water radiators placed directly in the apartment, the skin, all other things being the same, will be warmer than in a room heated to the same temperature by indirect systems. This is an effect of radiation directly upon the skin from the apparatus that supplies the heat. To produce an equal degree of comfort in a room warmed by heated air only a higher temperature will be required. Let a person step from one room to the other, both being at an equal temperature, as shown by a thermometer, and he will nearly always think the room indirectly heated is the colder.

Errors in Guessing Temperature.

But there are other and more effective causes for errors in such estimates—that is to say, causes for temperature changes in the skin itself; for people feel warm or cold, according to the temperature of their skin, often quite independently of the temperature of the air and surrounding objects. A man lying in the hot July sun and shivering with chills feels cold, not because there is less total heat in his body that there was five minutes before the chill began, but because the skin has become colder than is normal. The warm blood has temporarily left the vessels of the skin and has been forced into the interior blood vessels. In a short time this condition will be reversed, and then the sufferer will complain of heat, the temperature of the air all the while remaining the same. It is clear that a man with fever and ague would be a very poor judge of the temperature of heated apartments. Aside from conditions of disease or health, there are always four things that influence the temperature of the skin. These are heat radiation from either an artificial source, as a stove, a direct radiator, burning gas, &c., or from a natural source, as the heat of the sun, the presence of moisture in the air, the temperature of the air, and air currents. Of these, radiation from sources of heat, moisture in the air, and the elevation of the temperature of the air, all tend to increase the temperature of the skin; while air currents, even when the air is as warm as the skin would be were there no currents, are cooling in their effects because they promote evaporation, and evaporation of moisture from the skin always cools it. None of these influences materially affects sensation in placing the hand upon a heated solid. The nerves respond to the touch of hot iron almost as quickly in the patient undergoing a chill as in a well person, and his skin can be burned as readily in the cold as in the hot stage. It is thus seen that while there are a group of causes that tend to render the sense of feeling unreliable as a test for temperatures in air, none of these materially affects the sense of touch as a test for temperatures of solids and liquids.

Ventilation of Public Schools.

In a recent lecture delivered before the Department of Pedagogy of the Brooklyn Institute, Dr. Jerome Walker made some startling assertions relating to the defective ventilation of public schools generally, and of the Brooklyn schools in particular. The lecturer's remarks about the Brooklyn schools attracted immediate and marked attention on the part of the Brooklyn newspapers, because it has been given out, and very generally believed, that the schools of that city are

very much better ventilated than those of New York City, and that they compare favorably as respects ventilation with those of most cities in the United States. Dr. Walker charges the following ailments common among public school pupils to defective ventilation: "Lassitude, headache, nervous fatigue, irritability, glandular enlargement, scrofula, sore eyes and various infectious diseases." He insists, according to printed reports of his lectures, that proper ventilation of a school cannot be effected with less than the admission of 1800 cubic feet of pure air per hour for each pupil. A school of 100 pupils would therefore require 180,000 cubic feet per hour, and estimating five hours per day as the average time which scholars attend in cities, and that during the noon hour ventilation will be maintained at the above rate in order that the air in the room shall be pure upon the reassembling of the pupils for the afternoon session, 1,080.000 cubic feet per day for every hundred pupils will be required, and to heat this air from zero to, say, 65 F. would require 16,707,600 units of heat. Allowing that in a boiler large enough for this amount of heating 9 pounds of water per pound of coal burned will be evaporated per hour to produce the heat for warming the air for this amount of ventilation, about a ton of coal will be needed to be daily burned for each 100 pupils, which, at an average of $5 per ton, would cost 5 cents per day for each pupil. to say nothing of the cost of maintaining some heat in the building during the intervals between daily sessions, and the expense of circulating such a quantity of air, only possible practically by the use of mechanical appliances.

Excessive Ventilation.

Ventilation may be said to be excessive when its cost is unnecessarily increased. If pupils in schools could each get 500 cubic feet of pure air per hour properly admitted it would be more than on an average is supplied even to schools now thought well ventilated by all but extremists; and if the percentage of foul gases cannot be kept down to within the proper limit by the admission of air in this proportion to each pupil, as indicated by the usual tests, the reason should be sought, not in volume of air admitted, but in defective circulation. It might be that even 1800 feet of air for each pupil could be driven through a room containing 100 of them in such manner as to be very inefficient in removing noxious gases and vapors. Effective ventilation not only requires a sufficient air volume, but it also requires that this volume shall be forced through the space to be ventilated in such manner as to expel impure air. It would be well if all who are interested in heating and ventilation would realize (to paraphrase a very old maxim in medicine) that an ounce of expulsion is worth a pound of dilution.

To Evade the Sunday Law.

A decidedly unique suggestion comes from the West anent the World's Fair Sunday-opening question. As our readers know, a very stubborn fight has been made on the Congressional enactment forbidding the local management to open the gates on Sunday. Sabbatarian regulations in Chicago, as well as in some other cities of the West, are decidedly at variance with Eastern customs. The cosmopolitan nature of their people is the cause. Therefore public sentiment approves the use of Sunday for purposes which the more orthodox East most heartily condemns on that day of the week. Residents of other sections of the country do not comprehend the situation, and have consequently been surprised at the vehemence with which the Sunday "openers" have contended for the adoption of their views in the regulation of the World's Fair. They will be still more surprised at the suggestion how to evade this law, to which reference was made in the opening sentence.

Running Factories on Sunday.

The proposition is made, and evidently in all due seriousness, that the factories in and near Chicago should be run on Sunday during the fair, and that the employees should take their day of rest on Monday. The substitution of Monday for Sunday would, it is claimed, give artisans the chance to visit the exposition weekly, for which they have been contending. The Sunday "openers" have steadily asserted that their sole object has been to give working people the opportunity to obtain educational advantages as afforded by the exposition without the loss of time, which is a heavy tax on those who work for daily wages. The proposition to run the factories on Sunday instead of Monday would meet the objection to closing the fair on Sunday, if it were not for the religious question involved. It is true that Sunday is growing less and less a day strictly observed by devotional exercises and more and more a day for relaxation and recuperation. But we are inclined to believe that, even in our most cosmopolitan cities, the time has not yet arrived for such a radical departure from time-honored custom as the substitution of Monday for Sunday would involve. Employers are more conservative than their workmen. A striking lesson can, however, be drawn from this rather startling suggestion, which is that a community is very apt to find a practicable way of defeating a law, if it is not upheld by a strong public sentiment.

Law of Signatures.

One of the simplest things a man does in business is to sign his name, and yet it is a matter around which very much important law is gathered. One law goes back to the time when a signature was of little legal effect. As an incident to legal formality, signature in some form has always been recognized, but it is within a comparatively recent period that men could effectually bind themselves in law by the signing of their names. But now the legal instruments which the law requires to be attested with more ceremonious formalities are few. There are some matters, notably real estate transfers and some others, which the law requires to be witnessed or acknowledged, or both; but for the most part the signature is enough.

In the first place, the signature is merely evidence of the assent of the person whose name is signed to that to which it is affixed. And so it follows that the signature must be genuine, or the person is not charged. And the burden of proving the genuineness of a signature is on the person who claims under it. The one who presents a note for payment must prove the signature to be genuine. Hence it is that one whose name is forged is not put to the proof of the forgery until some proof is made that it is his signature. It takes, however, but a slight degree of proof to throw upon him the burden of showing the forgery. The presumptions of law are all in favor of the genuineness of all records, and where any proof of genuineness is made, it throws upon the other party the burden of showing an alleged falsity.

Assuming, however, the signature to be genuine, it must be a free act of the person to be charged, for it stands only as evidence of assent, and like other evidence, may be disproved. If it has been secured through fraud or duress—that is, under compulsion of threats or personal violence—it is as void as if it were forged, because it is not what it purports to be.

On the other hand, if it actually represents the assent of the person signing, it need not be in his own handwriting. If the name of a person is signed by another in pursuance of instructions to that effect, it is as binding as if signed personally. That simply adds another element to the proof; authority as well as genuineness must be shown. And this principle has been held to apply to those contracts which the statute of frauds requires to be "signed by the party to be charged thereby," because, under the maxim of law that "what one does by another he does himself," the substituted signature is, as a matter of law, his own.

And there is a very important rule applicable to substituted signatures, which all agents, and their principals as well, should bear in mind. The signature must be that of the person to be charged. Let us suppose the execution of a note, with the following signature: "John Smith, Agent for James Jones." There are many who would suppose that to be the note of James Jones, by his agent, John Smith; but this is not so. Such a signature would bind the agent personally, the descriptive matter being stricken off as surplusage. The signature should be, "James Jones, by John Smith, his agent." The signature, "James Smith, President Ninth National Bank," has been held to create a personal liability on the part of James Smith, and not a corporate liability on the part of the Ninth National Bank. The signature should be "Ninth National Bank, by James Smith, President," and this applies to all corporate signatures. Sign the name to be charged, and follow that with explanatory or descriptive designations.

These few points in regard to signatures should be interesting to all business men, because modern business is transacted almost wholly upon informal writings, evidenced only by the signatures of the persons to be charged. The old formalities have gone; they were too ponderous, too slow for this rushing age. And while things are moving so swiftly it is well to know how they are moving.

THE LETTER BOX.

Trouble With a Gas Range.

In *The Metal Worker* of January 28 we published a letter from a correspondent who complained of condensation arising from the use of a gas range. We gave as an explanation that the condensation was due to the lack of ventilation, as the product of the combustion, of course, was water, and unless this was carried off through the flue it would condense on the walls of the room. In *The Metal Worker* of February 18, we published another letter from the same correspondent, stating that the range was connected with the flue by means of a 4-inch pipe. This being the case, we could not understand the cause of the difficulty and referred the matter to our readers. Being considerably puzzled over the subject, we submitted the whole matter to an expert, who has had not a little experience in gas ranges and the use of gas as domestic fuel. His answer to our inquiry is as follows:

"In reply to what you ask about the condensation trouble, I would say that your explanation is correct. If the products of combustion could be carried off there would be nothing to condense. I presume your correspondent has used a canopy with a 4-inch outlet. Now, canopies are a mighty poor arrangement for carrying off steam, smoke or odors. The remedy lies with the makers of gas ranges. Let them make them on the same principle as cook stoves or ranges. I never heard of any trouble from natural gas being piped into a common cook stove or range."

An Appreciative Reader.

From J. T. M., *Cleveland, Ohio.*—I am a constant reader of *The Metal Worker*, and hope to always find its pages as interesting in the future as in the past. I have been silent like the army of subscribers, willing to stand by and listen to others, and then wonder why we do not get more ideas from subscribers who are practical mechanics, and who have a storehouse of knowledge, which has been gained after many years of hard thought and experiment, for mechanics are, as a rule, thoughtful men. Where we say mechanics we say it with its full meaning. The duffers we do not include, as they find their level. Some will say, Who do you class as the mechanic? He is the man who takes a pride and interest in his work, makes it a point to work for his employer's interest, strives to gain a full and competent knowledge of his trade, and has a desire to gain the top round of the ladder.

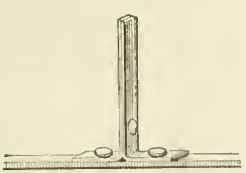
I have a practical talk with my men occasionally on that line, placing myself on a level with them. I advise them how they can become more expert in their work, demand more wages, &c. The great failure in the majority of workmen is they are too ready with this assertion: "We are paid so much money for so much work and do not intend to do any more," so they content themselves with grinding out a day's work, looking toward quitting time, which comes after a long and tedious day. They are afraid they will do too much work for the wages they are getting, hence they work after that style, and the consequence is when slack time comes there is a sifting of the chaff from the wheat. The man who stays is the man who takes an interest and pride in his work and his employer's and has gained a score over his indifferent shop brother, so that he retains his position and is an example for others to follow.

I advise all young men who are training for a trade in the tin shop to subscribe for *The Metal Worker*, as its pages are full of interest and valuable advice. We can all help make *The Metal Worker* more valuable to one another by adding our little mites, for there is no doubt but that all could make some suggestion to simplify ways of doing work and save material from waste.

How often we feel like sending our ideas to the editor on some particular thing, but are so afraid we cannot word our subject right and that we will be criticized by our fellow-craftsmen. But I am sure the editor will overlook our shortcomings and present our ideas to the best advantage for our brother subscribers to ponder over. We are all a family gathering with one object, which is seeking after knowledge, and why not add our little mite, which will be read by hundreds. I can say I have followed the ideas of other writers that have saved me dollars, and had I known them before would have saved me hundreds of dollars. I am a young man in the business and full of ambition to learn from my older brother subscribers their ideas and ways of doing business.

Disposal of Tin Scrap.

From M. N. B., *Sullivan, Ind.*—While working in different shops, I have noticed quite a wastage in scrap tin. When a small article was to be made it was more



Disposal of Tin Scrap.—Method of Making Gutter Hangers.

convenient to cut it from a new sheet than to hunt over the scraps for a piece of suitable size, and the scrap not being properly sorted and cared for, soon became damaged so that its value for anything was very much deteriorated. Consequently, when I took charge of a shop I arranged three large boxes, into which I assorted the tin as follows: Into No. 1 I put all pieces of bright tin large enough to work into tinware. A good many bottoms for articles can thus be taken care of. Into No. 2 all large pieces of terne; and the smaller scraps of all kinds into No. 3. The large pieces of terne make gutter heads, outlets and flashing. The scrap in the third box does for gutter stays and roofing cleats. When a rainy day comes I overhaul this box, first cutting all the strips $1\frac{1}{4}$ x 10 that I can get, next my stays, and lastly roofing cleats. With the strips I make my eave gutter hangers (this may be of interest to some), which I make as follows: First taking two strips, I rivet them together with one rivet about $1\frac{1}{4}$ inches from one end; next I bend the two ends at right angles and form a T, which I rivet on to the center of a gutter stay, as in the annexed illustration. My stays are double folded and folded $\frac{1}{8}$ inch across the ends at right angles, which gives a better hold in soldering into the gutter.

To further stay the gutter and prevent its swinging, I solder some of the strips on the under side and nail them to the cornice. This holds the gutter perfectly rigid and out under the eaves where it belongs, whereas with the old tin strap I frequently meet with gutters that barely catch the drip, and in heavy rains the water entirely overshoots them.

While I do not contend that my hangers are as servicable as the patent ones on the market, I insist that they are much superior to the old strap; and being made from the scrap, are inexpensive. Thus my scrap is disposed of, and without much expense, as the shop boy need not have much experience to do all that is required.

How to Form up Wash Boilers.

From O. J. B., *Troy, Ind*—Can you, or some of the readers of *The Metal Worker*, tell me the easiest and quickest way to form a wash boiler without a former or using a mallet?

Note.—We do not see how this question can be answered to satisfy our correspondent. Any tool or machine which may be made use of to shape the body of a wash boiler, would, we believe, be properly termed a former. The easiest and quickest method to form up a wash boiler body, and which is made use of in most shops, is to form the half-round ends by using the rolling machine for this pupose. Expert mechanics on boilers often form up any number of bodies by this method without using a mallet.

If any of our readers have any special device or machine which could be easily rigged up in a shop for this purpose, we would be pleased to hear from them.

Galvanizing Iron Castings.

From A. M., *Leonardsville, N. Y.*—Please tell me through the columns of *The Metal Worker* how to galvanize malleable iron castings. Can they be coated successfully in such an apparatus as may be arranged in a country workshop? The castings are light, the heaviest not weighing over 1 pound.

Answer.—The following account of galvanizing is given in one of the technical receipt books as applying to sheet iron, iron castings and the like, and presumably is adapted to the needs of our correspondent: The articles are first cleaned by scouring and immersion in a bath of water acidulated with sulphuric acid to remove the oxide. The bath consists of pure zinc, the top being covered with a layer of sal ammoniac. The castings are taken from the water, where they have been placed after being treated by the sulphuric acid, and dipped in the melted zinc. Small castings are taken out in an iron skimmer,

and have to be separated, for as soon as the zinc cools it will solder them together.

Finding the Contents of a Room.

From W. S., *N. Y.*—Please put in plain form the following problem to settle a dispute: How I can find the cubic feet in a room 15 feet long, 14 feet 7 inches wide and 9 feet 1 inch high; also a room 14 feet 6 inches long, 12 feet 9 inches wide and 10 feet 11 inches high.

Answer—To find the contents of the rooms mentioned by our correspondent, it is only necessary to multiply the three dimensions together. It should be borne in mind, however, that the dimensions must be put in feet and fractions, as it will not do to multiply feet by inches. In other words, the first room, to put it in the form of whole numbers and fractions, would be 15 by $14\frac{7}{12}$ by $9\frac{1}{12}$ feet in size. Fifteen multiplied by $14\frac{7}{12}$ is $218\frac{3}{4}$; this number multiplied by $9\frac{1}{12}$ is, when reduced to decimals, 1986.98 cubic feet, or the contents of the first room. Multiplying the dimensions of the second room together in the same way—that is, $14\frac{6}{12}$ by $12\frac{9}{12}$ by $10\frac{11}{12}$—we have 2018.216 cubic feet.

Walls Discolored From Radiators.

From W. J. Y., *Winston, N. C.*—Can you tell me what causes steam pipes and radiators to blacken the walls? In a steam-heated building my attention was called to the fact that just above the radiator and pipes the walls looked as if they had been smoked. The apparatus has been in use seven years, and it was not noticed that it hurt the walls until about two years ago.

Answer.—The discoloration of the walls in this case is due to the current of air set up by the steam pipes or radiators, and which, continually flowing against the walls, deposits little particles of dust and dirt from the atmosphere. This trouble is not confined to a radiator in a room, but is due to any cause that produces a current of air setting in one direction against a wall—that is, where there is any dust in the atmosphere, and there are few places where there is not considerable dust in the atmosphere. The ventilating registers at the top of rooms, especially where there are many lamps burning, will streak the wall for a considerable distance about their orifices. Our correspondent, therefore, need not blame the radiator, for if he had a cold jet from a blower forcing air in the same direction the result would be similar.

Size of Registers for Round Pipes.

From E. S., *New York.*—The following tables can be used to assist one in determining what size of register is required for a certain size of round pipe. As the flow of air is somewhat obstructed by coming in contact with the ornamental face of a register, it is usual to select one having a greater capacity than the pipe with which it is connected. It is also convenient to have the register of such a size that the collar can be attached to the register box and retain its circular form, which renders it more convenient to connect the elbow. By consulting the tables we see that the capacity of a 9-inch round pipe is given as 63 square inches, of a 9 x 12 register as 72 square inches, and of a 9 x 14 register as 84 square inches. Under ordinary circumstances it is probable the 9 x 12 size would be used. The capacity of a 10-inch pipe is 78 square inches, and there are three sizes of registers adapted to this size of pipe, for which the 10 x 14, having a capacity of 93 square inches, is the most used. For an 11-inch pipe, having a capacity of 95 square inches, one can use a 12 x 15 register with a capacity of 120 inches.

Capacity of Round Pipes

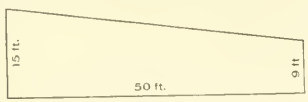
Diameter of pipe.	Area in sq. inches.	Diameter of pipe.	Area in sq. inches.	Diameter of pipe.	Area in sq. inches.
Inches.		Inches.		Inches.	
7	38	12	113	22	380
8	50	14	154	24	452
9	63	16	201	26	531
10	78	18	254	28	616
11	95	20	314	30	707

Capacity of Registers.

Size of opening.	Capacity in sq. inches.	Size of opening.	Capacity in sq. inches.	Size of opening.	Capacity in sq. inches.
6 x 10	40	10 x 14	93	20 x 20	267
8 x 10	53	10 x 16	107	20 x 24	320
8 x 12	64	12 x 15	120	20 x 26	347
8 x 15	80	12 x 19	152	24 x 24	406
9 x 12	72	14 x 22	205	25 x 25	486
9 x 14	84	15 x 25	250	25 x 38	684
10 x 12	80	16 x 24	256	30 x 30	600

Dividing a Roof.

From C. A. J., *Cobden, Ill.*—As the readers of *The Metal Worker* are anxious to solve problems, I have one which looks very easy, but is very deceiving. Two



Dividing a Roof.

tinners agreed to cover a roof in partnership. The roof was 50 feet long, 15 feet wide at one end and 9 feet wide at the other end. As each one was willing to do his share of the work, they start laying the tin at both ends. Where will they meet and how wide is the roof at the meeting point?

Note.—We have reproduced the diagram showing the shape of the roof, with the dimensions. The problem is to divide the roof into two equal parts, and will, we think, be found somewhat difficult of solution by arithmetic. By another method it is found the roof is 12.37 feet wide at the meeting point. The roofer working from the 9-foot end will have to lay 28.08 feet and the roofer working from the 15-foot end 21.92 feet, if both are to lay an equal number of square feet.

Painting Conductor Pipe.

From F. P. K., *Delaware, Ohio.*—I second the letter of "J. H. W.," Williamsport, Pa., which appeared in *The Metal Worker* of February 18. I think if tinners would pay more attention to what kind of tin to use and let the painters do the painting, it would be much better for them. It is a great nuisance to have everything in the shop daubed with paint. I do very little painting, and if my customers want it done I refer them to some good painter, telling them that he can do a much better job of painting than I can.

Tribulations of the Tinner.

From C. U. B., *Kentucky.*—In reading *The Metal Worker* of January 28, I noticed that our nearest neighbors, the plumbers, were very highly spoken of in regard to their endurance during the cold weather we have been having, soaring way above all other mechanics. Now, although I heartily sympathize with them, and am glad to see that their work is appreciated, I do not think they deserve all the praise. For I think of the sheet-metal worker who goes in to learn his trade, and works for $2 and $3 a week, having to study hard in order to become a good mechanic, and then to have to go out and lay tin, or do a ventilating job on some large building that must be finished within a given time—which is generally very short—with the thermometer ranging from 10 to 35 below zero and the wind blowing so you can hardly stick on the roof. And then think of the poor helper inside the main vent with the warm (?) air that you find about the last of January ventilating his pants legs, with his wages so small that he cannot afford to wear underclothes. Do these men not deserve a little praise, or, what is far better for a poor man, more money? It makes me tired to read advertisements asking for a tinner who can do plumbing, steam fitting, &c.; wages, $10 or $12 a week. But I hear some one say, he is a chump for doing so. Go to his home. Neat and tidy, to be sure. But where is his wife? Sick, sir, with three or four children crying in a corner. It is to keep this little lot a-going that he does it.

City "Lofts."

From A. V. E., *Ottawa, Kan.*—Will you kindly say, through the columns of *The Metal Worker*, what is meant by the many signs I saw on a late visit to New York City: "Loft to Rent," "Second Loft to Rent," &c. On Broadway they attracted my attention particularly. Out here a loft is an open space over a barn, and an advertisement to rent a loft would bring no inquiries.

Answer.—A loft, in city parlance, is a bare unfurnished floor of a building, without fittings of any kind. The first loft is the second floor, or first story above the street, and so on upward.

Trouble with Hydraulic Ram.

From C. S. P., *Duluth, Minn.*—I would advise "C. L." of New Haven, whose trouble with a hydraulic ram has been discussed in *The Metal Worker*, to see that his lead pipe is positively air tight. As to the advice from the correspondent who suggested the use of weight on top of valve, would say that the ram is supposed to, and will, work without it if the difficulty can be located. I claim that the trouble is due to the air getting in between the spring and ram.

Sweating Roof.

From G. W. B., *Newville, Pa.*—Will some reader of *The Metal Worker* please explain to me the cause of a flat roof sweating? One-third is covered with tin, which does not sweat; the remainder is covered with steel, which sweats so badly that the water drips through the ceiling.

"Indian Seam."

From T. A., *Detroit, Mich.*—The following may be of interest to readers of *The Metal Worker* belonging to the tinning fraternity. A manufacturer who, as a young man, was apprenticed to a tinner in Adrian, Mich., relates a story told him by his employer, as to the origin of the term "Indian seam." It appears that the Indians, who at one time, many years since, were quite numerous in that section, would come occasionally to the shop to buy some article of tinware. Unless,

however, the article gave evidence of a burn or scorch mark of the soldering iron, they declined to purchase it, contending that it would not hold water. To satisfy them, it became a practice with the tinner to send the article wanted to the shop and give it the desired scorch, or "Indian seam"—a term then used, which may still be familiar to some of the elders in the trade.

Washington News.

WASHINGTON, D. C., March 7, 1893.

In the haste and confusion of the expiring hours of the Fifty-second Congress conflicting accounts have been published concerning action on the bill to repeal that portion of paragraph 209, tariff of 1890, known as the McKinley bill, which provides that after July 1, 1893, a duty of 4 cents a pound shall be imposed upon block tin.

It was announced that the repeal had passed and this information had reached the Treasury Department of customs division as a current rumor. The Department, however, telephoned to-day to the clerk of the Senate Committee on Finance inquiring as to the status of this subject, and received the reply that the bill of repeal did not pass, therefore the duty on block tin after July 1, 1893, will be 4 cents a pound.

Representative Stone of Warren, Pa., having succeeded in passing in the House his bill for establishing a standard gauge for sheet and plate iron and steel was also successful in getting it through the Senate by giving his personal attention to its progress in that body. The bill also received the approval of the President and, therefore, is now a law.

The text of the bill as passed is as follows from the *Congressional Record:*

Be it enacted, etc., That for the purpose of securing uniformity, the following is established as the only standard gauge for sheet and plate iron and steel in the United States of America, namely (then follows the table of gauges printed in *The Metal Worker* February 11).

And on and after July 1, 1893, the same and no other shall be used in determining duties and taxes levied by the United States of America on sheet and plate iron and steel. But this act shall not be construed to increase duties upon any articles which may be imported.

SEC. 2. That the Secretary of the Treasury is authorized and required to prepare suitable standards in accordance herewith.

SEC. 3. That in the practical use and application of the standard gauge hereby established a variation of 2½ per cent. either way may be allowed.

Therefore in the future all sheet and plate iron and steel must comform to these statutary requirements.

The Western papers report a peculiar migration in progress. Farmers are removing from various localities in States east of the Mississippi River to Southwestern Minnesota, Northwestern Iowa and to Nebraska. The cause of their removal is stated to be the high value of the land which they have tilled for years and the very low price at which they can obtain good farms further West. The enhancement in value is a temptation to those who own their farms to realize, while in other cases landlords are demanding increased rentals this year to correspond with the improvement in value, thus almost forcing their tenants to look elsewhere. Only a few years since cash rents were $1.50 to $3 per acre, but are now $3 to $6. The movement promises to reach large proportions, in some localities having already assumed the appearance of an exodus.

How a Plumber Got Religion.

Our shop enjoys the acquaintance and friendship of several clergymen of different denominations. Among them is a disciple of John Wesley, who stands 6 feet 4 and tips the beam at two-forty. He is not a city preacher, but a true circuit rider. Having spent over a full score of years among the mountains of Virginia, West Virginia and Tennessee, he has acquired a store of personal adventures that would make a rare volume if written and possibly rival those of the justly celebrated Peter Cartwright. If there is anything that he enjoys better than old-fashioned religion, we think it is relating a laughable story.

The following bit of personal experience related by him a few days ago, which has never been published, is too good to lose:

A few years ago while conducting a revival meeting in a small Virginia town located among the Alleghany Mountains, so Brother Vincent says, I met the mayor of the town in a store one day soon after dinner. In the town there was a man named Paul, who ran a tin and plumbing shop, and who was accused by some to be a dealer in "moonshine" on the sly. He was about 45 summers old, considerably bow-legged, not a little pigeon-toed, and had a long Roman nose, a trifle curled to the left. His hair, a sort of dirty brick dust red, stood erect like bristles in a brush; his beard scattering and stained with tobacco juice. Apparently unable to close his lips, his irregular, tobacco stained teeth made him, altogether, about as hideous looking as possible. The one redeeming thing about him was his clothes, which were really quite above the average of the town.

The town authorities had had some difficulty with Mr. Paul about filling up a mud hole in the street in front of his place of business.

He came into the store while the mayor and I were talking and reopened the matter of the grievance referred to. The mayor cut him off pretty short and the tinner-plumber at this proposed to whip the mayor, and started in to do it then and there. I interfered and put a stop to hostilities and made him leave the store. He went away hopping mad, threatening to clean out the town, preachers included. I really feared he would seek an opportunity to chastise me at some unexpected moment and I walked very briskly to church that night, and felt not a little relieved when I reached there without having encountered him.

Upon going into the pulpit and looking over my congregation I was amazed to see him seated in the "Amen" corner looking as solemn as death itself. I felt that he was there for no good purpose, and my sermon was rather briefer than usual, after which I invited penitent persons forward to the "mourner's" seat. To my great surprise Mr. P. was the very first to go forward and kneel. He beckoned me and I went to him. I looked him over very carefully, wondering what was coming next. He looked like a mourner, he acted like a mourner, he prayed like a mourner, he wept like a mourner, but he didn't smell like a mourner. I said to him: "Well, Paul, I am glad to see you here." "Yes," he said, "tell Brother Jackson to come here." I called Brother J., who came at once. Our mourner looked us both straight in the face, as the tears coursed freely down his cheeks, and said: "Brother Vincent, I want you and Brother Jackson to pray for me."

"All right," I responded, "Paul, we will both pray for you." I now began to feel that a great burden was about to be lifted off my mind. Brother Jackson offered a short prayer, in which mourning Paul was specially held up for Divine clemency. Directly the prayer ended Paul, addressing us, said: "Brother Vincent, me or Old White Vinegar (meaning the mayor), the darned old scoundrel, has to die between now and sundown to-morrow. It may be me. If it is I want to go in peace and desire you and Brother Jackson to see my body decently buried; and let me tell you now I don't want any very costly monument put to my grave, but just a plain marble slab with 'Thomas W. Paul, Sanitary Plumber,' on it."

I said: "Paul, if you are through you can rise and take a seat."

"What," he said, "am I through already? Why, darn it, I thought it would take me till the meeting closed and may be another night to get through." He then invited Brother Jackson and myself to come around to his store the next morning and he would "set 'em-up," and, leaning back in his seat, in full view and facing the congregation, commenced singing, "Now I'm glad I've got religion." I did not want him to get too much at one meeting, so I closed the services at once. SWIPED JOINT.

Treasury Decisions.

Drawback on Tin Shingles.

TREASURY DEPARTMENT, January 18, 1893.

SIR: On the exportation of tin shingles manufactured by the Cortright Metal Roofing Company of Philadelphia, Pa., from imported tin plate and paint of domestic production, a drawback will be allowed equal in amount to the duty paid on the tin plate used in the manufacture, less the legal deduction of 1 per cent.

The quantity of the imported material so used shall be determined by allowing 96½ pounds of tin plate for every 100 pounds of the exported shingles. Respectfully yours,

O. L. SPAULDING, Ass't Sec'y.
COLLECTOR OF CUSTOMS, Philadelphia, Pa.

Mottled Enameled Ware.

Before the United States General Appraisers at New York, December 23, 1892. In the matter of the protests, 32,353*a*, &c., of Hermann Aich, against the decision of the Collector of Customs at New York as to the rate and amount of duties chargeable on certain mottled enameled ware, imported per vessels and at dates named in schedule annexed. Opinion by Wilkinson, General Appraiser.

The goods are articles of sheet steel enameled. They were returned by the appraiser as enameled in more than one color, and assessed for duty at 50 per cent., under Paragraph 172, N. T., and are claimed to be dutiable at 45 per cent., under Paragraph 171, N. T. The enamel is of a stone or slate color with a mottled or marbleized appearance. The enamel is laid on in one color and the mottled appearance is caused by the action of acids and heat.

We find that merchandise is not enameled or glazed in more than one color, and sustain the claim that it is dutiable at 45 per cent., under Paragraph 171, N. T.

Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until 2 p.m., March 22, 1893, for all the labor and materials required for a bathhouse, boiler house, &c., at Camp Low, Sandy Hook, N. J.

Sincere regret is caused by the announcement of the financial embarrassment of the New York & Brazil Steamship Company. The opposition of tramp steamers, and losses from the interruption of business when the cholera was virulent in Santos appears to have been at the source of the difficulty. Even the device of chartering foreign-built steamers, which was finally resorted to, was unavailing to avert the impending trouble.

WORLD'S FAIR NOTES.

Description of Machinery Hall.

In exterior design, says the Chicago *Herald*, Machinery Hall is more than merely grand and imposing. It approaches the gorgeous in architecture, and the general effect of the towers and exterior ornamentation is magnificent. The main building is 850 feet long and 350 feet broad. The interior looks like three large railroad train houses side by side, each spanned by arched iron trusses 125 feet long and 50 feet on centers. Outside of the main hall there is an immense annex, opening directly into the main building. In each of the four corners of the main building is a domed pavilion with a grand staircase. The main entrances are on the north and east sides, with many other entrances along the sides and ends of the main hall and annex. The power plant is on the south of the main building, in a one-story structure which runs the whole length of the building. The ornamental work of the exterior shows the purpose of the building, the statues and portraits representing mechanical forces or great inventors.

Exhibits are being daily installed in Machinery Hall. Three avenues or aisles run the entire length of the main building and annexes, the center one 25 feet wide and the sides each 15 feet wide. Tracks of auxiliary railroads are connected with these aisles and heavy machinery is being taken to its allotted space by means of immense traveling cranes. With a knowledge of every detail of the machinery exhibit, Chief L. W. Robinson is rapidly bringing order out of a chaos of incomplete details. Major Robinson brings to his task not only the discipline of a Government naval officer, but the valuable experience gained as assistant chief of the machinery department of the Centennial Exposition.

The Centennial Exposition created an epoch in machinery exhibits at international fairs. Compared with the Centenial Exposition the machinery exhibit of the coming World's Fair will be full of surprises. While the area for exhibits of machinery has been increased—it was about 14 acres at the Centennial and is about 16 acres at the present time—the amount of available space for domestic exhibits is somewhat less. At the centennial there were 337,000 square feet devoted to American exhibits. At the World's Fair this year the space given to American exhibitors is only about 220,000 square feet.

But while domestic exhibits have been curtailed in space, the World's Fair management has been generous to foreign exhibitors. At Philadelphia the various foreign governments occupied, all told, about 83,000 square feet of space. At Jackson Park they will have a gross space of about 175,000 square feet.

Other comparisons with 1876 are still more striking. At the Centennial Machinery Hall the main power plant was a Corliss engine, 50 x 50 feet. At Jackson Park there will be an electric power plant of 20,000 horse power, covering an area of 112,000 square feet. At the Centennial there were a number of annexes outside of the regular machinery exhibit which contained many exhibits of machinery in operation. At Jackson Park the entire machinery exhibit is massed together, and the limited space has made it a more select exhibit than that of any previous fair. Between three and four hundred applicants for space were turned away, although their exhibits would have been more than up to the 1876 standard.

While the area for mechanical exhibits at the World's Fair is limited, the general display, taking all the groups, will show not only an advanced character of machinery, but finer workmanship in details. The number of firms making the same kind of machinery has vastly increased since 1876, and the competition is greater. In 1876 there was only one firm besides Corliss, in America, manufacturing those great engines that were then a marvel. To-day there are nearly 60 firms making them. In 1876 there were only four or five firms making steam pumps, including Worthington, Knowles, Blake and others, and these were mostly east of the Alleghenies. To-day there are hundreds of firms making steam pumps in almost every State and Territory. Chief Robinson had applications from 74 pump builders for space, of which 43 assignments have been made. The comparison of progress is true as to wood-working and machine tools and printing presses. The average space for individual exhibits at the Centennial was 244 square feet. At the World's Fair the assignments of space are less in number, but the space to each exhibitor is greater, nearly an average of 500 square feet. All the leading machines that are entered at the World's Fair are much larger than those made in 1876, and their variety is greater. To make a comparative exhibit between them a much larger space is required. The largest exhibits at Philadelphia occupied from 1200 to 1600 square feet. At the World's Fair Machinery Hall the largest exhibits will take from 2000 to 3000 square feet.

The general plan of the World's Fair machinery exhibit is simple. The whole exhibit will be on the floor of the main building and annexes. The only gallery space will be given up to restaurants, offices and lavatories. Foreign governments have the choicest location on the main floor. The foreign exhibits begin with those of Great Britain and Canada at the east end of the building and extend west nearly its full length.

The details of the foreign exhibits are in some cases yet incomplete, but the various commissioners promise that everything will be ready by May 1. In the German exhibit the Siemens & Halske Company of Berlin will construct a 1000 horse power engine and electric dynamo, which will furnish additional light for the Machinery Building. The countries from which the most prominent foreign exhibits will come are Canada, Belgium, Great Britain, Mexico, Russia, France, Spain, New South Wales, Italy, Sweden, Austria and Brazil.

The domestic exhibits will be from firms or individuals, there being no groupings by States in this department. The domestic exhibits will be located in the annex and in a portion of the west end of the main building. They will be grouped, as far as possible, in classes, so that a visitor in one part of the building may see in a single department the principal devices in which he is interested. Thus the machine tools, the machinery for fabrics and clothing, the wood-working machines, the printing and typesetting machines and all the other special classes of machinery will be located by themselves.

Of the unique exhibits in Machinery Hall it would take a volume to tell the story. There will be a superb display of machines for the manufacture of paper boxes and kindred exhibits. In the manufacture of textile fabrics the cotton, woolen and silk looms will be of wondrous variety and nicety of detail. The leading exhibitors in this department are the Knowles Loom Works, the Lowell Machine Shops and the Crompton Loom Works. These concerns will show the actual process of making cotton and woolen goods. Silk looms in full operation will be shown by the Atwood Machine Company, Schaum & Ullinger and others, the machines being operated by the Phœnix Mfg. Company of Philadelphia. There will be a fine display of Jacquard looms, which will weave intricate designs of the World's Fair buildings and portraits of prominent men on silk.

There will be a vast product from the hundreds of machines in daily operation in Machinery Hall. Quite a number of concessions for the sale of the more unique products have been given. Those firms that have not obtained concessions will remove their product from Machinery Hall at the close of each day during the exposition.

There will be an interesting exhibit of sewing machines by the Singer Mfg. company, the Standard, American and other works. There will also be shown some special machines of this character, such as a carpet-sewing machine, where the operator rides a velocipede for 100 feet and guides an electric motor, which sews the carpet together as he moves along. There are also machines for sewing wood and leather with wire thread, some of the product being fine enough for a kid glove. Devices of this kind will be shown by J. H. Sternbergh & Co. of Reading, Pa. Several exhibitors will show the latest varieties of knitting machines and cloth cutting machines.

In the northwest corner of the building will be a large display of flour machines from the works of E. P. Allis & Co., Milwaukee; Barnhart & Leese, Moline, Ill., and Nordyke & Marmon, Indianapolis. Flour-mill machinery will be shown in full operation. The display of wood-working machinery will include exhibits by J. A. Fay & Egan Company, S. A. Woods Machine Company, Greenlee Bros. and others, and will be the largest display of turning and planing machinery ever shown. There will be carving and molding machines. One machine will carve out from wood intricate designs and statuettes in groups. In ancient times this kind of work was laboriously performed by hand, and months were spent on a single group. A machine exhibited by C. L. Goehring of Allegheny City will turn out four or five groups of wood statuary in the space of a few minutes. There will be a great variety of machines for geometrical moldings, which are now adopted in the manufacture of furniture and house decoration. These machines have only been on the market for two or three years, and some have recently been sold in Europe for $25,000 each. Large exhibits of machine tools will be made by the Pond Machine Tool Works, William Sellers & Co., Niles Tool Works, and many others.

There will be shown a machine for measuring out and weighing coffee. This machine takes coffee from the hopper and fills 1-pound paper bags, seals them, and does this at the rate of several tons of coffee per day. This exhibit is from Arbuckle of New York City. There is another machine that manufactures tags and labels. It takes the paper from the roll, cuts the tags, prints the labels, punches the eyelets and then inserts the wire for fastening. Another machine makes different sizes of nails from wire. In 1876 the wire nail industry had not begun in this country. There were four or five crude machines shown at the Centennial by French exhibitors. These were purchased by Americans, and since 1876 the manufacture of wire nails has become general in the United States.

Among the exhibits will be machines for expanding metal for use in railings and galleries. A bar of steel goes in at one end and comes out a broad network at the other. This material is largely used as lath in the construction of modern buildings. There will be machines for making hooks and eyes, steel fence posts, sections of telegraph poles and chains. There will be an exhibit of machines for polishing lenses, so that persons who wear

eye-glasses may have lenses polished and mounted while they wait. The C. W. B. Sheridan company will make a fine display of wood-embossing machines that will make wooden medals, with impressions of World's Fair buildings, for souvenir purposes.

At the junction of the main hall and annex will be a tank of water 150 x 50 feet. Grouped around this tank will be the pump exhibit. Scores of modern pumps will take the water from the tank and throw it back again. The De La Vergne Refrigerator Company will build an ice grotto over the tank as an ornamental feature, this being one of the most spectacular features of the whole exhibit.

Another popular exhibit will be the large traveling cranes. These are three in number, operated by electric motors and covering a space of 75 feet over each main aisle. Until the opening of the fair they will be used for installing the heavy machinery exhibit. After May 1 platforms will be built on them and they will be used for carrying passengers. A balcony across the west end of the building will be the landing place. This balcony will also be reached by two elevators, which form a portion of the exhibit by the Crane Elevator Company of Chicago.

Some exhibitors will combine to make a collective exhibit. One instance will be on the south side of the annex, where a large paper mill will be in full operation. About 20 individual exhibitors will be included. Wood pulp will be put through all the processes of a complete paper mill. This exhibit is managed by the Paper Trade Club of Chicago, under the personal direction of Chief Robinson.

Another collective exhibit will be the great display of printing presses that will turn out the morning and evening papers for sale on the World's Fair grounds. There may also be an arrangement among the printing-press exhibitors and bookbinders that will allow the official catalogue to be printed in Machinery Hall. Hoe, Scott, Potter, Goss and all the other great press makers will be represented. There will also be a large exhibit of lithograph printing machinery, job printing machinery, bookbinding machines and linotypes.

The great power plant in the South annex will be a stupendous exhibition of mechanical energy. There will be about 43 steam engines, with a total of from 18,000 to 20,000 horse power. These will operate 127 dynamos, which in turn will produce electric light and power for all the other World's Fair buildings. For the power in Machinery Hall alone there will be 10 or 12 engines, representing a total of about 3000 horse-power. One engine alone in this gigantic power plant is nearly a third larger than the famous Corliss engine of 1876. The largest engine in the World's Fair power plant is built by E. P. Allis & Co. of Milwaukee, and is of 2000 horse-power, as against the 1400 horse-power of the Corliss. One thousand horse-power engines in the World's Fair plant are numerous, one being furnished by Fraser & Chalmers of Chicago.

The dynamos in the power plant, including Edison and all the leading makers, are classed in the electricity exhibit. The boilers are a part of the machinery exhibit, all the leading American makers being represented. There will be about 18 or 20 feed pumps in connection with the boilers, and these, with the large circulating pumps, are also classed as exhibits.

Expense of Fair Exhibits.

"It will cost as much to make the exhibits in the World's Fair buildings as the buildings themselves cost," Director-General Davis said last week in talking of the preparations for the opening May 1.

The rivalry of competitive firms in their exhibits is sharp all over the country, and even extends to foreign countries, where they are to meet on common ground. So keen is this feeling in the wine exhibits of France and Germany at the Horticultural Building that only the barest details are divulged, even to the fair officials. Everything is being held until the last day before work must commence Each is afraid the other will get an inkling of what the exhibit is to be, and either imitate or improve on the original plan.

But it is among the big Chicago firms that the rivalry is the sharpest of all. Plans prepared by the architects are kept well secured in the vaults until time compels that they go into the hands of the builder. The same secresy is observed by the builder.

When it is considered that exhibits costing from $20,000 to $30,000 will be numerous, particularly in the great Manufactures Building, all this precaution is not surprising.

"I would give a good deal to see the plans of the other firms in the trade," one prominent exhibitor said last week. "It would be a big help to us in knowing what to do in particular lines. There are three or four fellows I would outdo if it took my last dollar for advertising the next year."

While the fear of imitation is strong, it is not so generally pronounced as the idea that competitors will endeavor to see all bets and go one better in the game. The men who have charge of the exhibits for the big firms are lying awake nights just now to think of new effects and new combinations for their pagodas and material. A good idea is highly prized and no time is lost in getting it materialized. But these good ideas are guarded religiously.

The total expenditures of Chicago people in their private exhibits are estimated by those well situated to know at about $2,000,000. Director-General Davis' figure that the private exhibits in the main buildings will equal the cost of the buildings is not believed by the chiefs to be excessive.

Every design for booths, pagodas, and pavilions must be sent to the fair officials and passed upon before active building begins. The purpose of this rule is to secure congruity in the grouping. Were every exhibiter left to follow his own aim the individual display might be unexceptionable, but strange and wondrous combinations would be made. Some of them would be quite ludicrous.

This same rule was followed with the buildings throughout the grounds. Every design had to run the gauntlet of criticism in the office of Director of Works Burnham. Few passed without material changes. The number of domes which met their fate at the hands of these critics is said to have been astonishing. Had no such paternal scrutiny been exercised, the collection of domes in Jackson Park and along Midway Plaisance would have been unparalleled in the world's history. It would have been also the laughing stock of architects, regardless of nationality or creed.

The perspective view of the fair has never been lost sight of. The buildings were looked upon as component parts of the whole. The picture of Jackson Park was to be without the blemish of incongruity. And it is.

The interiors of the great buildings are now being treated as a whole. Wide diversity is allowed in the structures to be there erected, but every exhibit is regarded as an integral factor of the whole scene. Some complaints have arisen from the exhibitors, but they are neither numerous nor serious. The reasons for changes are made so plain that a ready acquiescence most generally follows.

Just now exhibitors are being hurried up to send in their designs in order that they can be passed upon at once and returned. While work on many of the pagodas is already under way it will be the middle of March before construction will be commenced generally. April will be the busiest month for this kind of work. With most of it everything possible is prepared at the factories in order to minimize the work at the parks. A fortnight will cause a transformation scene in the big buildings, when the structures begin to fly together. The bad weather has not retarded the interior construction alarmingly thus far, and there are no fears about it not being completed in time.

First Broad-Gauge Locomotive.

The "Lord of the Isles" came to Jackson Park last week. Unlike the "Pioneer," that veteran of the Chicago & Galena Railroad that ran into the park the day before under her own steam, the "Lord of the Isles" came on a flat car, in boxes bound with strong iron hoops. The old locomotive is sent by the Great Western Railway of England. It was the first broad gauge locomotive built in England. She ran out of the shops in 1851, and was one of the star attractions of the World's Fair at London in 1851. The Great Western Railway will make an extensive show at the fair. Seven carloads of exhibits came in one day from that road.

A Novel Feat in Engineering.

An unusual feat in engineering was tried at "The MacKaye Spectatorium" one afternoon last week which served to attract the attention of all the mechanical engineers and builders at Jackson Park. The attempt was made to lift into position, from the ground to a hight of 160 feet, an immense steel roof truss which weighed entire about 30 tons. Usually such a truss is placed in position a piece at a time and then riveted together, but this was impossible owing to the peculiar construction of the Spectatorium, and the truss was riveted together on the ground and lifted to its altitude by an immense two-arm derrick. Despite the predictions of failure which were made by the engineers and others the attempt was a success, and all the other trusses, about 150 in number, will be placed in position by this same derrick. The truss thrown into position first is the lightest one that will be used, the heaviest of the series weighing fully 20 tons more than this one.

The Wellington Catering Company, who control the restaurant privileges at the fair grounds, have just closed a contract with the Rogers & Hamilton Company for the entire silver-plate service required. This is probably the largest order ever given for knives, forks, spoons, &c., calling for 100,000 knives and forks, 200,000 spoons, and everything else in proportion.

The German Commission has received 116 cases of exhibits for the German chemical section. The entire lot weighs 50 tons and is valued at $13,000. The Post Office Department of Germany has forwarded 25 packages for the post office exhibit.

A tunnel is being bored through solid rock under the East River at Seventy-first street, as supposed for the admission of gas pipes connected with Long Island City. On Saturday a foreman in charge, who had just passed through the air lock, suddenly died from the effects of atmospheric compression. The pressure was 40 pounds to the square inch.

The Marine Engineers' Association of America is endeavoring to prevent the licensing of British subjects as engineers of the newly Americanized fast steamships "New York" and "Paris."

House Warming.—V.

CONDUCTIVITY OF MATERIALS.

It will also be necessary to know the conductivity of different materials—that is, their capacity for transmitting heat—specifically termed "Thermal Conductivity." In Table XII., arranged by Box from results of experiments by Péclet, we have the thermal conductivity of different materials. The quantities given in right-hand column represent the number of heat units transmitted per hour for each square foot of surface—the thickness of material being 1 inch and the temperatures on the two sides differing by 1°. Though there are some of the materials named which will not be necessary in our calculations, the table is given entire, as enabling us to see the full range of comparison, from highest to lowest:

Table XII.—Heat Conductivity.

Material.	Heat Units.
Copper	515.000
Iron	233.000
Zinc	225.000
Lead	113.000
Marble—Gray, fine grained	28.000
Marble—White, coarse grained	22.400
Stone—Calcareous, fine grained	16.700
Stone—Calcareous, ordinary	13.680
Glass	6.600
Baked clay—Brickwork	4.830
Plaster, ordinary	3.860
Oak — transmission perpendicular to fibers	1.700
Walnut—transmission perpendicular to fibers	0.830
Fir — transmission perpendicular to fibers	0.748
Fir—transmission parallel with fibers	1.370
Walnut — transmission parallel with fibers	1.400
Gutta percha	1.380
India rubber	1.370
Brick dust, sifted	1.330
Coke, pulverized	1.290
Cork	1.150
Chalk, powdered	0.869
Charcoal of wool, powdered	0.636
Straw, chopped	0.563
Coal (Bituminous), small, sifted	0.547
Wood ashes	0.531
Mahogany dust	0.523
Hemp canvas, new	0.418
Calico, new	0.402
White writing paper	0.346
Cotton wool and sheeps' wool—any density	0.323
Eider down	0.314
Blotting paper—Gray	0.274

To use the quantities or conductive values here given we must know the several conditions required, as follows: Total surface (one side only), in square feet; thickness of material, in inches; difference in temperature of the two sides of the material, in degrees F., and duration of time, in hours. For instance, we require to know the total quantity of heat lost in ten hours from a room by conductivity or transmission through one of the walls or partitions, made, say, of glass $\frac{1}{10}$ inch thick, the wall being 12 feet long x 10 feet high, the temperature in room being maintained at 70° and the outside surface being at 40°. We first look in the table for the conductivity of glass, which we find to be 6.6 heat units. This being for 1 inch thick, and our partition but $\frac{1}{10}$ inch, we must multiply the 6.6 heat units by 10, or divide by $\frac{1}{10}$ = 66 units per square foot per hour for 1°. As we have 12 feet × 10 feet = 120 square feet of surface, 66 × 120 = 7920 units per hour for 1°, and for 10 hours, 7920 units × 10 = 79,200 for 1°. The difference between inside temperature, 70°, and that outside, 40°, = 30°; then, 79,200 units × 30° = 2,376,000 units of heat lost from partition under above conditions. Supposing the partition to have been made of 18 inches of ordinary stone, all other conditions remaining the same. By the table we find 13.68 to be the conductivity. Then $\frac{13.68}{18}$ × 120 × 10 × 30 = 27,360 units per hour.

From this we may deduce the formula: Loss of heat = $\frac{\text{conductivity, as per Table XII.}}{\text{thickness of wall, in inches,}}$ × surface of wall in square feet × time in hours × difference in temperatures of the two sides of wall. Or, $(C \div T) \times S \times H \times D$ = loss, wherein C = conductivity, T = thickness of wall, S = surface of wall, H = time and D = difference in temperature.

LOSS BY RADIATION.

Another source of loss of heat is that of radiation. Although somewhat difficult to realize, it may be defined as the direct passage of heat from a body to one of a lower temperature, at a distance from it more or less remote, and regardless of the temperature of the intervening atmosphere. While in such a connection it is very difficult to eliminate from the question the element of distance as interposing between cause and effect, it nevertheless is accepted as a fact that radiation of heat is entirely irrespective of the distance between the source of heat and the body by which it is received. In other words, that the radiant body will give off a certain amount of its total heat to the nearest absorbent body or bodies, no matter how remote the latter may be. This peculiar phenomenon is one with which (or its effect, rather) all are familiar, although from that very fact it fails to excite notice—the more so, as its effect might easily be attributed to other causes.

For instance, if we stand in a cold room—say at a temperature of 30°—within a short distance of a hot stove in which a fire has been freshly kindled, the sensation of heat is very perceptible, notwithstanding that the air in the room is uncomfortably cold. It would be very natural to attribute the feeling of warmth entirely to the increased temperature of the air in contact with and surrounding the stove, which had not yet had time to become diffused and thereby equalize the temperature throughout the room. This is not the fact, however, as we may easily demonstrate by holding the hand extended (with the palm parallel with the heated surface of stove) and carefully noting the effect. The palm will feel the heat very sensibly, while the back of the hand is unquestionably cold, although it is practically at the same distance from the stove, and consequently subjected to the same atmospheric temperature as the palm. If, now, we reverse the position, and turn the back of the hand toward the stove, and the thickness of the hand, say 1 inch, nearer, it will instantly become sensible of the heat, while the palm will feel the contact of the colder air, although it is at exactly the same distance from the source of heat as when it was turned toward the stove and felt warm. This shows very conclusively that the sensation of warmth cannot be due to an increase in temperature of the air immediately surrounding the stove, as in that case both sides of the hand must feel equally warm.

To illustrate this point still further, let us suppose a large bonfire in the open air, and a strong breeze blowing. Standing moderately close, on the windward side of the fire, we feel the heat to be intense, although the cold wind is constantly carrying away from the fire (and the observer) every particle of air which has become heated by contact with it, and therefore there can be no increase of atmospheric temperature on that side, while on the opposite or leeward side it may be felt very sensibly. It would seem clear, therefore, that there must be some direct means of transmission of the heat, irrespective of any conducting medium; and this is what is understood by the term radiant heat. It is stated by some eminent authorities that the heat rays pass directly from a hotter to a colder body, for a moderate distance, without appreciable loss or raising the temperature of the air through which they pass. This, however, can hardly be true, as the closer the recipient or absorbent body may be to the fire or other radiant body, the higher will be the increase of temperature by its absorption of the heat rays. And, *per contra*, if the distance between the two bodies be comparatively great, the absorbent receives a correspondingly less increase in temperature.

It might be argued that the closer the absorbent to the radiant the greater would be the number of heat rays of a definite power absorbed by the former, and that the number would be proportionate to the distance, for the reason that at the longer distance they would diverge, and thereby cover a larger amount of surface. This, of course, would indicate that a given number of rays would be radiated from the hotter body, and all of them be absorbed by the recipient upon an amount of surface proportionate to the distance. In other words, that if, for instance, at 1 foot distance a square foot of surface would have imparted to it by the heat rays 1000 units of heat, the same number would be absorbed by, say, 10 square feet at 10 feet distance, or 100 units per square foot. This deduction, however, while apparently a logical one, is not correct, as may be seen from the following familiar illustration:

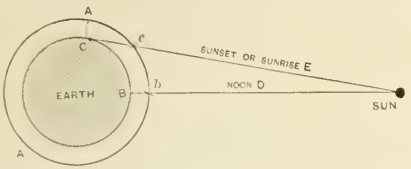
HEATING BY OPEN FIRES.

Take the case of a room heated by an open grate coal fire. It is well known that all of the air heated by actual contact with the fire itself is carried up the flue by the chimney draft. If this were not the case the noxious gases from combustion of the fuel would be disseminated about the room and render it untenable. As the only sources of atmospheric diffusion of the heat are radiation and contact of air, and the latter being rendered *nil* by reason of the necessary draft, we have to depend solely on the radiant heat for warming the room. Now, if it be true that there is no loss of heat by the rays in passing through the air to the walls, furniture, &c., it follows, necessarily, that the only heat available for maintaining the desired temperature in the room will be that which is absorbed by the air from contact with the surfaces receiving the radiant heat of the fire. That this cannot be so, however, is evident from the fact that if the walls of the room, as is usually the case, are exposed to a considerably lower temperature externally they are actually cooler than the air of the room, and consequently, instead of imparting heat to the latter, will absorb from it, notwithstanding that they are supposed to be receiving all of the effective heat from the fire. Under these conditions, then, what is the source from which the air derives its comfortable temperature?

That it is possible to heat a room comfortably by such a fire we know perfectly well from every-day experience; and that the temperature of the air corresponds is shown by the thermometer, by which also we find that the walls are cooler than the air. It would certainly seem that our deductions must be a matter of "Hobson's choice," and that the air is really heated by the diffusion of a considerable portion of the radiant heat in its passage from the fire to walls, &c., by which it is finally absorbed, not only without their contributing to the heat of the room, but actually abstracting from it by reason of their lower temperature. While this hypothesis is directly opposed to the authorities previously alluded to, its correctness may be readily demonstrated by actual thermometrical test; and we may safely accept it for use in our subsequent calculations.

Of course, when the atmospheric temperature is above that of the absorbent

the loss by the heat rays will be very slight, and, were it not for the comparatively high conductivity of the walls, which transmits the heat through them to the outer surface, they would soon become hotter than the air, and in their turn give off heat to the latter by contact, and to any colder body by radiation. This may be illustrated experimentally by placing a screen at say mid-distance between the fire and opposite wall, in which case the air on both sides of it (the screen) will be at the same temperature. The radiant heat from the fire will be absorbed by the material of the screen and transmitted



through its thickness with a rapidity due to its degree of conductivity, until its far side is of nearly the same temperature as that next the fire. Then, by holding a thermometer indicating the atmospheric temperature within a few inches of the far side of screen it will begin to rise and will indicate the temperature due to the radiation from the screen to the colder wall and the heat absorbed by the air from contact.

Of course, the same effect would be produced by perfectly insulating the walls externally with some non-conducting material, and thereby preventing the loss of heat from conduction. Its temperature would then rise and assist in warming the air by contact, and any colder body (the thermometer, for instance) by radiation.

RADIATION AND ABSORPTION.

It is important to note that the power of receiving or absorbing heat by all bodies is invariably the same as their radiating power—that is, they give and receive in the same degree. To illustrate, we may suppose a room located between two others, the temperature of the air and walls of all three being, say, 80°. If one of the outer rooms be then cooled off by admission of cold air, the partition wall will also become colder—say to 79°—and the opposite wall will then radiate its heat until the two temperatures are equalized. If, now, the equilibrium of temperature be restored to 80° and the other wall cooled by the same means as the first, the latter will radiate as rapidly as it had previously absorbed, and the now cooler one will receive exactly the same as it had before radiated. For this reason any nonconducter which will protect against heat is equally efficient against cold. In the first case it keeps the heat out and in the second it keeps it in. The loss of radiant heat by its passage through the atmosphere, from the radiant to the absorbent body, has been the subject of experimental observation, the results of which enable us to know definitely the amount of such loss.

HEAT FROM THE SUN.

For instance, the heat of the sun sensibly felt by us must of necessity be the radiant heat only. This is obvious, from the fact that the sun's distance from the earth (about 92 millions of miles) and the entire absence of any conducting or transmitting medium between the solar and terrestrial bodies prevents the possibility of any effect whatever from either conductivity or contact of air. These two quantities, then, being eliminated from the problem, we may attribute all of the effects of heat perceptible to us to the radiation from the sun as the only other possible source. Now, we know—everybody knows—that the sun is much hotter at noon than when it has just risen or is near setting. Yet there is no apparent reason for this being the case, unless the difference of temperature is due to loss of heat by the sun's rays from absorption by the atmosphere—the thickness of which varies in accordance with the relative positions of the sun and that point on the earth's surface at which the observer is located. The accompanying diagram will illustrate this fact and its cause and effect.

The small black disk represents the sun, the large shaded one the earth, and the circle A A surrounding the latter the boundary or limit of the atmosphere. The latter is known to be about 45 miles in thickness, and outside of its limit the space (called celestial) is boundless or infinite—a fact which is utterly impossible of realization by the human intellect. This space, save for the presence of the planets, stars and their satellites, with their surrounding atmospheres, is absolutely empty. It is devoid of air or gases of any description, and may be considered as a practically perfect vacuum, the effect of which will be alluded to as we progress. In the diagram the points B and C indicate the positions of the observer on the earth's surface, the former at noon and the latter at sunrise or sunset. The two radial lines from the sun to the earth represent that portion of the sun's rays falling on the observer at the two points of observation. Let us suppose now it is high noon, and our position will be at B. The sun's rays at this point, as represented by line D, are exactly vertical, and that portion between the points B and *b* shows that they reach the earth's surface by passing through the least possible extent of the atmospheric space—that is, 45 miles only—and consequently the loss of heat by the rays from absorption by the air must be the minimum at this position. Now, considering line E as the position to which the observer has been carried by the earth's revolution on its axis, or that portion of it between noon and sunset, we see that the rays, instead of falling vertically, as at noon, strike the earth's surface at a tangent, or obliquely, and that the portion of the line between the points C and *c* is several times longer than from B to *b*. The exact difference may easily be calculated, but it is unnecessary in this connection. It will be sufficient for our purpose if we assume the distance to be as 3 to 1, and that instead of traversing but 45 miles of air the sun's rays must pass through three times 45, or 135 miles.

This is the main cause of the difference of the noon and evening (or early morning) temperatures of the "sunshine." Of course the distance from the sun is greater at C than at B by nearly one half the earth's diameter, but as this would be but 4000 miles added to the 92,000,000, it represents so small a percentage as to be inappreciable in its effects. At this point, then, we have the maximum absorption by the air, and at any intermediate position the loss will be relative to that position.

But that atmospheric absorption is not the only source of loss of the radiant heat may be readily appreciated when we compare the highest temperature of the noonday rays in the hottest climates with the intense heat of the sun's mass. This is estimated to be sufficiently high to cause, in radiant heat alone, an effect equal to that of the combustion of 20 tons of coal per day for each square foot of the sun's surface, or 2000 tons for every 10 feet square. This would be equal to a mass of coal about 600 feet deep on the entire surface. Owing to the great distance and comparatively small size of the earth, the proportion of the total amount of the sun's radiant heat received by the former is estimated to be but $\frac{1}{2000000000}$.

NEW PUBLICATIONS.

FOURTEENTH ANNUAL REPORT OF THE BUREAU OF STATISTICS ON LABOR AND INDUSTRIES OF NEW JERSEY. James Bishop, Chief of Bureau, Trenton, N. J.

A voluminous report, covering over 600 pages, conveys some interesting data concerning labor legislation in New Jersey and other matter relating to industrial occupations and associations in that State for the year ending October 31, 1891. The bureau has diligently recorded a considerable mass of labor legislation and the decisions of the higher courts of New Jersey in interpretation of the rights and duties of workmen. The latter is a new feature in the report, and one of considerable interest. Among the legislation of special note recorded in the document are the acts creating a State Board of Arbitration, and a commissioner for the inspection of mines, the law limiting employment in factories to 55 hours per week, the modification of the mechanics' lien law amendment of 1890, and the anti-Pinkerton act, all of which are of some moment in relation to the labor question. More than half the volume is devoted to a consideration of the co-operative building and loan associations of New Jersey, the results of extended inquiry into the operations of these societies being presented in a series of tabulated forms. The reports show 271 co-operative associations of this character to have been in existence in 1891, as compared with 254 in the previous year. The net assets of these State enterprises amounted to over $25,000,000, an increase of $3,500,000. The remainder of the document gives the results of the third year of inquiry into the effect of occupation on the health and working life of those engaged in a number of industrial pursuits. For the year under review the investigation has taken in 13,000 journeymen, employed as carpenters, painters, bricklayers and masons, stonecutters, plumbers, printers, glassblowers, hat finishers, miners of iron ore and potters—a fairly representative selection of industries. Tables annexed to this section give ages when journeymen began to work, present ages, ages of decline, number of years at work and diseases from which incapacitated. Of these trades carpenters and bricklayers come out, as might be expected, on the top, followed by potters and miner, while glassblowers and printers show the most unfavorable results.

A migration of negroes from East Tennessee and other parts of the South has commenced, not unlike that noted a year ago, when many started for Liberia. This time they are going West, some to Oklahoma. The only trouble is in stopping. In several localities vigilance committees have been formed, who order the negroes to "move along."

The American Santo Domingo Improvement Company have entered upon their work of collecting the customs revenues of the Black Republic and will take prompt measures to suppress smuggling and all official crookedness.

ROOFING AND CORNICE.

The Country Cornice Shop.

V.

By Cornice Worker.

OBTAINING WORKING MEASUREMENTS.

Having understood how the snow-guard gutter is to be constructed, the measurement and bevel of roof must now be obtained from the building. Brass and wooden bevels can be purchased from hardware dealers, but a bevel constructed of band iron will answer just as well.

In Fig. 42 is shown what is required to construct a bevel of band iron. Let A represent one of the two pieces of band iron, with a ¼-inch hole punched and countersunk, as shown at D, to receive the rivet, and B the section. C represents a ¼ x ⅝-inch rivet, which is used to rivet the two pieces of band iron together. Care should be taken that when the two arms are riveted together the one is exactly like the other and that the end E is perfectly square.

When the bevel is finished and is in use it will look as shown at L, in Fig. 44.

Fig. 43 is the front elevation of roof and gutter, also showing the method of obtaining the working measurements.

Let the width of the building on which the gutter is required measure 42 feet, as shown, and as the leader P is to be in the center of the building, divide the width by 2, and 21 feet on each side is the result, as shown. The pitch or fall of the gutter will come directly over the leader, as shown by X, Fig. 43.

From the point X, Fig. 43, or the lowest point of gutter, strike a chalk line parallel to the eave line, as shown by the

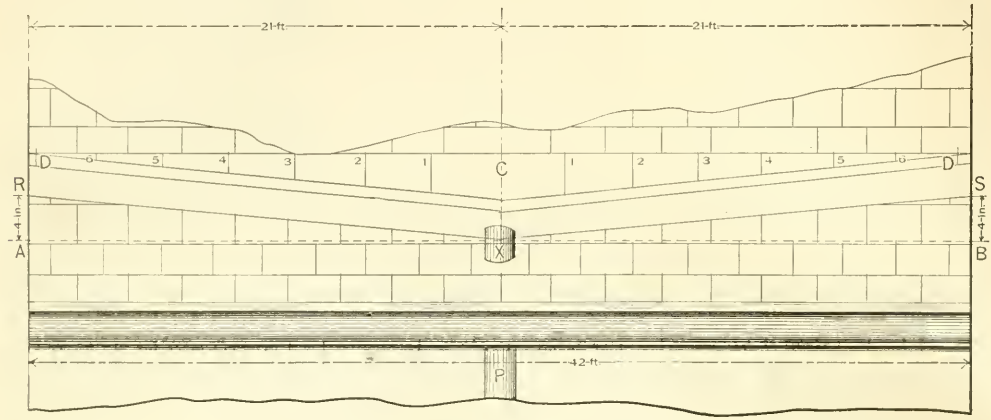


Fig. 43.—Front Elevation of Roof and Gutter.

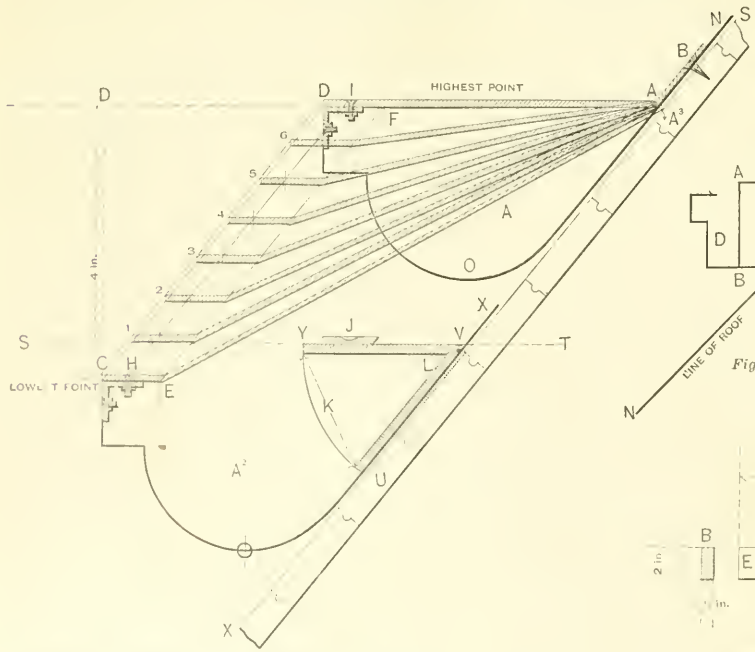


Fig. 44.—Method of Obtaining the Different Lengths and Angles of Top Braces.

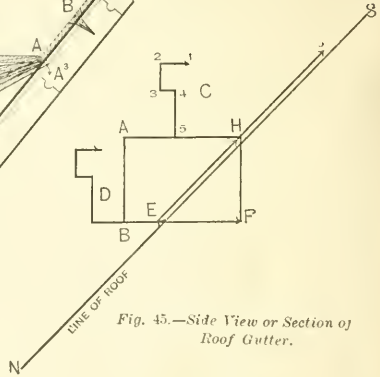


Fig. 45.—Side View or Section of Roof Gutter.

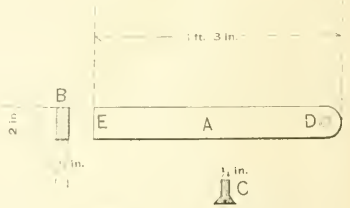


Fig. 42.—Rivet and Band Iron for Bevel.

dotted line A B. At right angles to the line A B, on either side, measure up 4 inches, or the pitch of the gutter, on a perpendicular line, as shown by R and S, Fig. 43. Now strike a chalk line, S X and X R, which gives the bottom line of the gutter, shown on the section in Fig. 44 at O. The line R X and X S would be struck on top of the slates, or whatever the covering of the roof may be, and upon this line the bottom line of the gutter would be placed.

Having now obtained the length of each side of the gutter, the next step is to obtain the bevel of the roof. To do so, place the bevel as shown by U V Y in Fig. 44, the arm U V being placed against the roof and the other arm V Y being raised or lowered until level, which can be proven by screwing a small spirit level on the arm, as shown at J. Now measure the distance between the arrow points K, and the bevel can be closed and opened again when required to the distance before obtained. This bevel forms the basis of measurements required to construct the different braces shown in Fig. 44.

In setting up work of this kind it is well to make a rough diagram, similar to Fig. 43, showing the braces required and their numbers, also the pitch the gutter is to have, for the use of the mechanic who sets up the work. As the braces are of different lengths (to obtain a straight line, as shown from D to D in Fig. 43), each brace will be numbered in the shop to correspond to the numbers shown, on the braces in Fig. 43 by C, 1, 2, 3, 4, &c.

OBTAINING THE DIFFERENT LENGTHS OF BRACES.

In Fig. 44 is shown the method of obtaining the different lengths and angles of braces. Draw any horizontal line, as shown by S T, indefinitely, upon which place one arm of the bevel Y V; now open the bevel to the length obtained between the arrow points K, as before explained, and draw a line parallel to, and against the arm of the bevel U V, as shown by X S. Then X' S' will represent the roof line and S T the horizontal or level line, corresponding to the bevel U V Y. Now draw a section of the gutter, as shown by A, Fig 44; care being taken to have the top of the flange of the gutter, as shown at N, high enough above the top of the front of the gutter, so that in case the leader stops up, causing an overflow, the water will flow over the front of the gutter, and not behind the flange N and into the building.

As the pitch of the gutter is 4 inches on a perpendicular line, as shown in Fig. 43, measure down 4 inches from D to C, Fig. 44, and draw a duplicate of the section of the gutter A', as shown by A^2. Then D will represent the highest point of gutter and C the lowest point, as shown. The sections of angle iron, with bolts through the top braces, are shown at I and H. Draw the brace at the highest point of gutter horizontal, as shown from D to A, with an angle attached to screw to the roof board, as shown from A to B. Then draw the brace for the lowest point of gutter horizontal from C to E, or as much as there is flange on the top of the gutter. Connect the points from E to A^2 and add the thickness of the brace, as shown, which in this case is $\frac{3}{16}$ inch.

Then D A B, Fig. 44, will represent the top brace D, Fig. 43, and C E A^2 B the center or bottom brace C, shown in Fig. 43. As the pitch of the gutter is 4 inches and the projection of the roof on 4 inches as much as shown from D to D', Fig. 44, and as there are eight braces required on the 24 feet of gutter, as shown by C, 1, 2, 3, 4, 5, 6 and D in Fig. 43, it is self-evident that each brace will be of a different length and angle.

To obtain the different lengths and angles proceed as follows: Draw a line from C to D, Fig. 44, as shown, and divide this line into seven spaces or as many spaces as there are shown between the

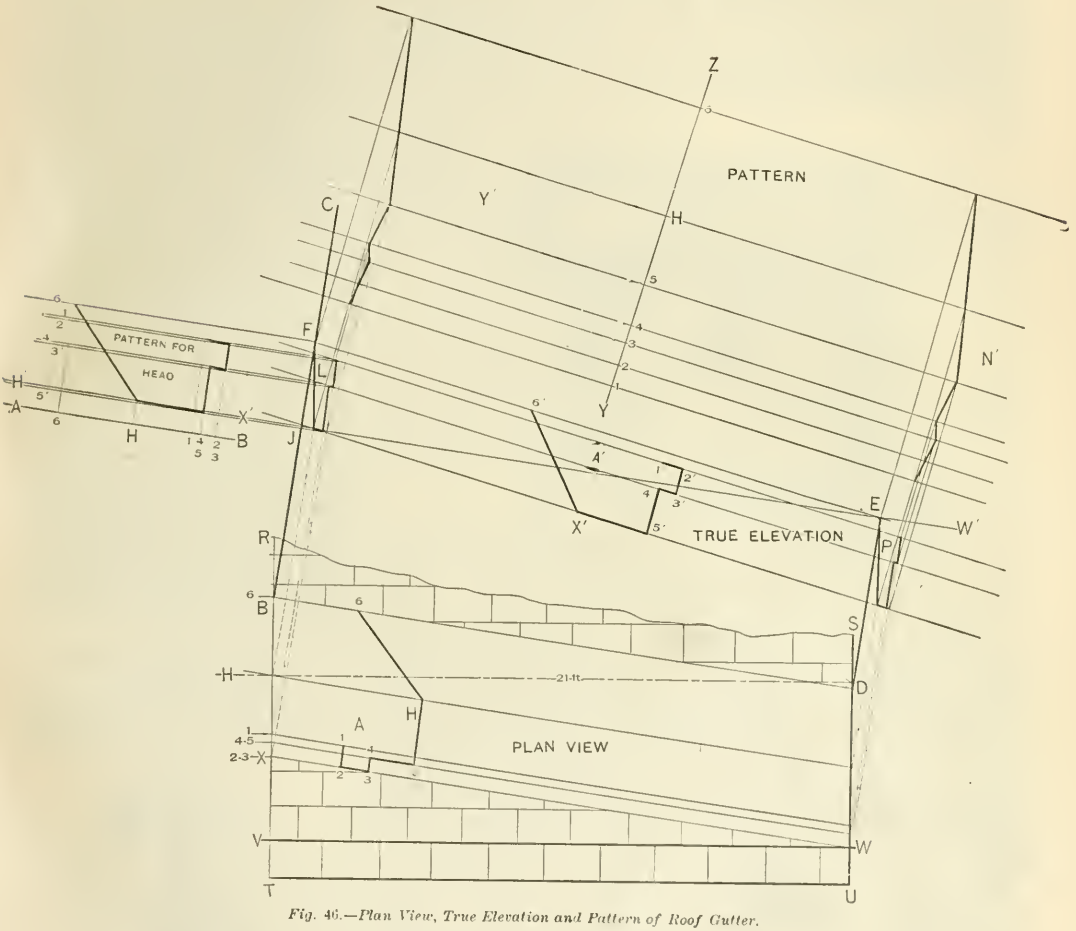


Fig. 46.—Plan View, True Elevation and Pattern of Roof Gutter.

THE COUNTRY CORNICE SHOP.

braces in Fig. 43. Now draw a line from E to F, which intersect with horizontal lines drawn from the small figures on the line C D. From the intersections obtained on the line E F draw lines to the corner A. Now add the thickness of the brace, as shown, and draw lines parallel to the horizontal lines 1, 2, 3, 4, 5 and 6, intersecting the line E F, and from these intersections draw lines to the corner A^3. Then the braces C, 1, 2, 3, 4, 5, 6 and D in Fig. 44 will represent the braces used on each side of the gutter of corresponding figures shown in Fig. 43. A line drawn from H to I, Fig. 44, will give the points where the holes are to be punched for the bolts; the angle A B will be the same length on all the braces.

After the braces are bent to the required angle and numbered, they are usually galvanized to prevent rusting; the angle iron also is usually covered with two coats of metallic paint before it is inserted in the gutter.

OBTAINING THE PATTERNS.

Fig. 45 is a section of a roof or snow-guard gutter, the bends of which have been made square, so as to avoid a confusion of lines in obtaining the patterns; although the principles used are the same no matter what form or shape is taken. To obtain the plan and elevation proceed as follows: Let N S, Fig. 45, represent the line of roof; C, the highest section of gutter, and D the lowest section. Let A B or H F represent the pitch of the gutter on a perpendicular line and E F the projection of same. Let R S U T, Fig. 46, represent one-half of the plan of the roof, the width of same being 21 feet. Now draw any line parallel to the eave line of roof or T U, as shown by V W; take the distance of the projection of the gutter, shown by E F in Fig. 45, and place same at right angles to V W, as shown by V X, Fig. 46. Now draw a line from X to W as shown. At right angles to the line X W place in the proper position, as shown at A, a duplicate of the profile or section of gutter shown at C or D, Fig. 45. Number the bends of the profile A, Fig. 46, as shown by the small figures 1, 2, 3, 4, 5, H and 6. Now parallel to the line X W draw lines through the numbered bends, cutting the lines R T and S U, as shown. Parallel to the line X W draw a line indefinitely, as shown by X' W'. At right angles to the line B D in plan draw lines upward from B and D indefinitely, as shown by B C and D E, cutting the line X' W at the points J and E. Now take the pitch of the gutter, as shown by A B or H F, Fig. 45, and transfer this hight from the point J on the line B C, Fig. 46, as shown by J F, and draw a line from F to E. Then F E will represent the line of the gutter in the true elevation on the point 6 in the profile A in plan view. Now place a duplicate of the profile or section C, Fig. 45, or profile A in plan view, Fig. 46, as shown by A in true elevation, the small figure 1, 2, 3, &c., of profile A, corresponding to the small figures shown in plan view. Through the small figures 1, 2, 3, &c., in profile A in true elevation draw lines parallel to the line F E, which intersect with lines of corresponding numbers drawn at right angles to the line X W from the intersections made on the lines R T and S U, all as shown. A line traced through these intersections, as shown by L and P, will show the true elevation and miter lines of roof gutter.

To obtain the pattern, proceed as follows: At right angles to the line F E lay off the stretchout of the profile A, Fig. 46, as shown by the small figures from Y to Z. At right angles to Y Z, or parallel to F E, draw lines indefinitely through the small figures in the stretchout, as shown, which intersect with lines drawn at right angles to the line F E from the intersections on the miter lines L and P of corresponding numbers. A line traced through the intersections thus made will be the required pattern.

To obtain the pattern for the head of the gutter shown at R and S, Fig. 43, proceed as follows: At right angles to the line B C, Fig. 46, draw lines from the intersections on the miter line L. It will be noticed that these lines are numbered 5', H, 3', 4', 2', 1' and 6', corresponding to the same numbered lines, drawn through the profile A', in the true elevation. At right angles to where the gutter intersects the line X B, plan view, Fig. 46, draw short lines, as shown by 2, 3, 4, 5, 1, H and 6, corresponding to the same numbered lines drawn through the profile A in plan view. Now parallel to the lines drawn at right angles to B C, draw a line, as shown by A B', upon which place the widths, as shown by 2, 3, 4, 5, 1, H and 6, corresponding to the intersections on the line X B, plan view, as shown by 2, 4, 5, 1, H and 6. Then at right angles to A' B' draw lines upward from the small figures, as shown, intersecting lines of corresponding numbers drawn from the miter line L, at right angles to B C. A line traced through these intersections will be the pattern for the head of the gutter required at R and S, Fig. 43.

To avoid any misunderstanding, it is well to remark that the sections shown at C and D, Fig. 45, do not represent the true sections on the lines R T and S U, plan view, Fig. 46, and are only drawn to form a basis from which to obtain the measurements of the pitch and projection of the gutter, and are sections of the gutter at right angles to B D, plan view, and sections at right angles to F E, true elevation. The pattern for the head of the gutter, shown in Fig. 46, is the true section of the gutter on the line R T and S U, in plain view.

SUBDIVIDING THE MEASUREMENTS.

In practice it would be impossible to lay out a drawing of 21 feet on the ordinary drawing board, although the gutter could be laid out on the floor. To avoid this and to make use of the drawing board, the entire measurements could be divided into eight parts or less, according to the length of the drawing board in use.

The following explanation is given to illustrate what is meant by dividing the measurements: By dividing the measurements into eight parts, instead of laying off 21 feet, as shown from V to W, Fig. 46, take one-eighth of same, which is 2 feet 7½ inches, and make V W equal to 2 feet 7½ inches; then instead of making V X, Fig. 46, the projection of gutter, as shown from E to F, Fig. 45, make it one-eighth of E F. And having obtained the line X' W' in true elevation, Fig. 46, instead of making J F equal in hight to A B or H F, Fig. 45, make it one-eighth of the distance. By dividing the length, projection and pitch of the gutter each into the same number of equal parts, the same angles are obtained as in the full-size drawing.

SHORT RULES.

It is also proper to remark in this connection that, if but one gutter was being put up, it would hardly pay to get out the patterns as above described, as the time involved in obtaining the patterns would cost almost as much as the amount a small gutter would bring. In such a case, the gutter would be made a few inches longer than the desired length and placed on the roof in its proper position, and tacked with a few roofing nails. Then take a carpenter's square and place the long arm on the roof parallel with the eave line, and, holding the short arm of the square perpendicular, mark off a perpendicular line on the top and bottom ends of the gutter where required, and trim with the hand-shears or snips. Then the lower cut will represent the miter line on which the second piece of gutter would be joined, and the top cut may be used to obtain the pattern for the flat head, by simply holding a piece of galvanized iron or other metal against same and marking off the shape.

It is, however, a good plan to obtain accurate patterns, as described, which are saved for future use; and when a gutter of this style is required, it can be given the same shape and pitch. Thus the same patterns can be always used, it only being necessary to obtain the amount of pitch required on every gutter of a different length, so that a chalk line indicating the pitch can be struck on the roof on which the bottom line of the gutter is placed.

Now, as above described, if a gutter of 21 feet has 4 inches pitch, then a gutter of 10 feet 6 inches would have but 2 inches pitch, or in other words, the gutter would have a fall of $\frac{4}{21}$ of an inch to the foot. As $\frac{4}{21}$ makes the figuring complicated, ½ inch fall to the foot could be given and the patterns cut accordingly. This would make the pitch on 21 feet equal to 5½ inches. In case a gutter was required measuring 21 feet 5½ inches, it would be necessary to obtain the amount of pitch required for the 5½ inches in length. To obtain this without tedious figuring, construct on a piece of heavy white cardboard, for future reference, a triangle whose base is 12 inches in length (divided into half and quarter inches) and the altitude or perpendicular hight as much as the fall of the gutter is to the foot, which in this case is ½ inch. Connect the altitude and the base by a line called the hypotenuse or slant line, which completes the triangle. From the divisions on the base of the triangle, draw lines at right angles, intersecting the hypotenuse, or slant line. Then place one leg of the dividers on the 5½ inch division on the base, and the other leg of the dividers at the point where the 5½ inch perpendicular line intersects the hypotenuse; then the distance between the points of the dividers will be the amount of pitch required for the 5½ inches of gutter. This rule applies to any measurements whatever.

Berger's Standing Seam Snowshoe.

Berger Brothers of 237 Arch street, Philadelphia, Pa., have just brought out a novel device which is intended to do away with either snowrails or gutters formed on roofs to prevent snow from sliding down. The construction of the device is such as to avoid the necessity of boring holes through the metal or in any way cutting the roof for the purpose of providing suitable fasteners for snowrails. The construction is so clearly illustrated in the accompanying engraving that a lengthy description would appear to be unnecessary. The device is made of malleable iron, and can be clamped directly to the standing seam by the use of an ordinary pair of tongs, the teeth of the side being forced through the seam into corre-

Berger's Standing Seam Snowshoe.

sponding holes on the opposite side. The manufacturers state that when no suitable tongs are conveniently at hand, an ordinary hammer can be employed to bend the clamps into proper position. The manufacturers refer to the standing seam snowshoe as being convenient and economical. The statement is made that if the snowshoes are placed reasonably close together no rails will be necessary.

FLASHINGS.

THE AMERICAN ROOFING COMPANY of St. Louis, Mo., and Cincinnati, Ohio, have just issued from the press a catalogue of something over 60 pages, printed on calendered paper and bound in colored paper covers. This, we understand, is the company's fourteenth series of publications, and within its covers are presented illustrations of a variety of products showing the different uses to which sheet metal has been applied in the construction and adornment of all kinds of buildings. The statement is made that during the past ten years the company have filled many orders for sheet metal made into such forms as steel pressed brick, corrugated siding and ceilings, sheet metal clapboards, iron and steel roofing, galvanized iron cornices and curved awnings. The descriptive letterpress is ample for the purpose, while the illustrations are of a character to show very clearly the special features claimed for the goods turned out by the company. Several diagrams are given to facilitate the ordering of roofing and siding, while a comprehensive index renders reference easy.

AMONG the many patents issued by the Patent Office on February 28, 1893, was No. 492,513, granted to Alvin C. Kanneberg of the Kanneberg Roofing Company, Canton, Ohio, for an improvement in sheet metal roofing. The issuance of this patent, we understand, has been strenuously contested in the Patent Office, there having been two interferences and five hearings, all of which were decided in favor of Mr. Kanneberg. The Kanneberg Roofing Company have recently enlarged their plant and now occupy the entire block between Oak street and the electric light station on East Seventh street, and have now a factory fully equipped with modern machinery for the manufacture of all kinds of steel and iron roofing, siding, ceiling, metallic shingles, eave trough, conductor pipe, &c.

Travelers' Samples Not Baggage.

A decision of very general interest to manufacturers and others affected was recently handed down by the Supreme Court of New York, in connection with the responsibility of railway companies in the matter of samples carried by commercial travelers. The gist of the decision is that the ordinary contract of a railroad company or other common carrier of persons is to transport them and a certain amount of their personal baggage, and not the merchandise of other people. Samples of merchandise contained in the trunks of commercial travelers, and belonging to their employers, do not constitute a part of their legitimate baggage. Consequently where such samples are checked as baggage over lines on which passage is taken, and especially as the baggage of the commercial agents, no recovery can be had for their loss. Nor does the mere fact that an excess baggage charge on extra weight is demanded and paid and the fact that the baggage agents are informed that the trunks checked contain samples change this. Though if the carrier undertakes, by express or implied contract, to carry other people's merchandise as freight, they are liable as any common carrier of freight would be, and that is all; and such facts must appear from which it can be reasonably inferred that this contract of affreightment was entered into with knowledge of all the facts.

In commenting upon the case, a leading railway journal remarks:

"If, as it appears by the decision, a railroad is not responsible for commercial travelers' samples as baggage, there will be an immediate and urgent need of providing for some arrangement under which these samples may be carried. There is no doubt but that our system of baggage transportation has been so misused by commercial travelers as to amount to a veritable abuse, and it is just possible that in view of the decision railways may find it to their advantage to refuse to longer engage in what actually amounts to express business, and refer commercial travelers to such companies for the transportation of their sample cases which, in many instances, exceed a thousand pounds per traveler."

That there is much justice in these remarks will be acknowledged. At the same time it is their obvious duty to make such arrangments that a commercial traveler may be able to accompany his sample cases, which it is often undesirable to consign to the care of express companies on account of delays, not to speak of the heavy charges imposed by those carriers.

The Stover Power Hack Saw.

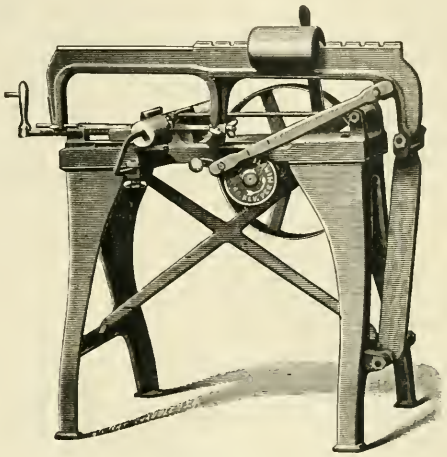
The power hack saw here illustrated is made by the Stover Novelty Works of Freeport, Ill. The machine cuts any size or shape of metal up to 4½ inches, and is provided with a vise for holding the work to be cut. The frame carrying the saw is pivoted at one end to a bar journaled in the lower part of the frame. The upper bar of the saw frame is notched and adapted to receive the weight by which the pressure of the saw on the work is adjusted. It will be observed that, owing to the point at which the upper end of the pitman joins the saw frame, the pressure during the forward or cutting stroke is much greater than on the return. When the bar has been cut off the machine automatically lifts the saw from the work and stops.

Manitoba farmers demand that American agricultural machinery and barbed wire shall be admitted free of duty.

Position of British Gas Companies.

On the subject of gas lighting in Great Britain, the London *Times* says:

Judging from the annual Parliamentary returns just issued relating to gas undertakings in the United Kingdom, the companies have not yet been seriously affected by the adoption of the electric light. Indeed, the gas companies still continue to be steadily progressive and fairly remunerative. The number of public companies last year was 410, as compared with 405 the previous year and 394 in 1889, and the total capital sunk in gas undertakings has risen from £59,878,000 in 1889 to £63,620,000 in 1891. About two-thirds of this large total, or £41,144,000, represents the capital belonging to public companies, the remainder being the capitalized value of the undertakings belonging to local authorities. Both classes of undertakings exhibit an increase in business. The number of cubic feet produced by the companies last year was upward of 70,000,000, as compared with 67,000,000 the previous year and 61,500,000 in 1889. There was even a larger increase in proportion in the number of cubic feet produced by local authorities. Customers do not increase in a like degree, although in 1891 there was an addition of 55,759 to the number of consumers supplied by the two classes of undertakings. An addition of 14,700 was made to the number of lamps erected for the illumination of public roads. The gross receipts of the companies increased during the year by rather more than £1,000,000, and the quantity of coal carbonized by 977,000 tons. Owing to the growth of expenditure, net profits have fallen from an average of 11.71 pence per 1000 cubic feet in 1888 to 9.15 pence in 1891. The average dividend has consequently fallen from £8 11/0¾ in 1889 to £8 7/10¾ per £100 in 1891.



THE STOVER POWER HACK SAW.

A bill has been introduced into the British House of Commons to compel the marking of files to show distinctly whether they are hand-cut or machine-cut. This measure has been brought forward in consequence of a fraud recently imposed upon the Admiralty Department. A contract for 11,000 dozen of files was placed by that department on the condition that they should all be hand-cut. It was afterward discovered that nearly 3000 dozen, or over one-fourth, were machine cut.

"The Metal Worker" Competition in Skylight Pattern Cutting.

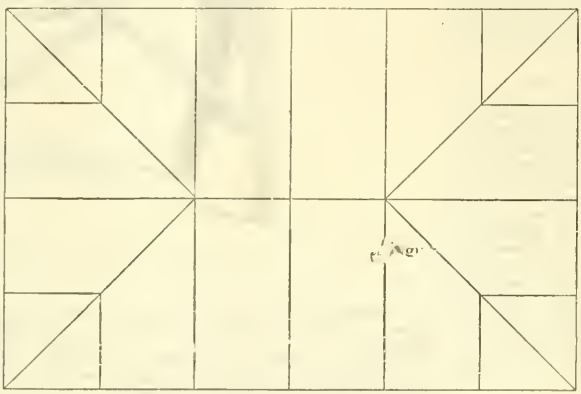
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

The Foundrymen's Association.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club, in Philadelphia, on Wednesday evening, March 1, with a large attendance of members.

The Executive Committee reported that the subject of coke for foundry use was an important one, and it was their wish to continue the discussion and invite representatives from different sections of the country to instruct the foundrymen regarding the adaptability of coke for fuel in the cupola in comparison with coal. The address by Jones Wister has been largely appreciated, and a number of letters received by the Secretary asking further information. Nine new firms were elected to membership in the association.

A discussion then took place in regard to the forming of sections in the association, according to the kind of casting made. There are seven or eight branches of the foundry trade, and a committee representative of each branch has been appointed for the purpose of reporting the current prices for castings, in order that members of the association may know the actual market price. The committee are also to endeavor to get the respective foundries making the same class of castings together to talk over the possibilities of improving their condition, in the hope of effecting an ultimate arrangement for procuring better prices. The cutting of prices and the ill feeling existing in consequence was a serious bar to legitimate business.

P. D. Wanner of the Mellert Foundry & Machine Company, Reading, Pa., cast-iron pipe manufacturers, in the course of the discussion, said that cast iron pipe was being sold at ruinously low prices; lower than it had ever been sold before. During the panic of the '70's the cast-iron pipe trade held its own exceedingly well until 1877. In 1877 the prices broke, and in 1878 particularly so. Then came the rise in pig iron, and the pipe trade was interfered with; but during that depression, lasting two or three years, part of 1876, 1877 and 1878, it swamped or seriously embarrassed nearly all the pipe founders then in business, and the pipe was sold at the lowest prices then ever approached. The regular class of pig iron was sold at the same price as now quoted, and Northern iron was to-day very close to the price of 1877 and 1878. He drew attention to the depression in the pipe trade experienced for nearly five years, since 1877, and referred to the prices as being so very low that everybody in the trade should cease selling. He believed that during the last five years of depression there had been almost enough work to go around. If some of the other pipe manufacturers had taken the course he did (he had three pipe foundries and closed two of them) they all would have been able to get good prices; but he considered that some in the trade were simply running the business for the love of it. There was a letting recently in which there were four bidders. He was informed that three of them struck as low as they dared—probably the danger line—and the one taking the job went from $3000 to $3500 below that. He was of the opinion that the appointment of a trustee was in order for a man putting in such a wild bid; any person in any trade committing such an act was incompetent for business. Sometimes a man running in a special line might bid low as it was necessary for him to keep one or more of his shops running. In emergencies like these a man could to some extent be excused. But there was no emergency in the case he had mentioned. He admitted that every one in this country who was down to cost, and had been selling at cost for some years, should stop. A concern could not live by selling at cost. A profit must be made in a business if a living was to be taken out of it. There were emergencies which would occasionally occur, such as awards of damages to workmen, fires, bad debts, and others. These could not be met if business men figured to sell at cost.

George P. Smyser of E. G. Smyser's Sons of York, Pa., said that in his opinion it was best not to get reports on prices at present, but to get the different lines represented in the association together. Personally, he would first attach himself to the section covering architectural work, and afterwards to any other section in which he was at all interested. As an example of the low prices of accepted contracts he instanced the offer to him of a contract for iron columns if he would take it at $1.60, but he promptly refused. He afterwards learned that the contract was given out at $1.47½ for delivery alongside building. In his opinion the sooner an understanding between manufacturers was arrived at the better for the whole trade. He did not mean that, in making up the sections for committees, they should become separated from the association, but that the sections should act as committees and report to the association as a body.

S. C. Flagg, Jr., of Stanley G. Flagg & Co. of Philadelphia, thought it would be in vain for any one to attempt to give, for the purposes of the association, any prices, except on castings in specified classes of work. He had hoped to get from the committee an expression of the different prices at which certain castings could be sold. He considered that if a foundryman had no method of calculating his cost an unsatisfactory price could only be the result. Everybody must have an idea as to the amount of profit desired to be gained, and if costs were known it was easy to put the profit on them, and thus make a basis on which to compare prices with costs. When a man in the jobbing business mentioned what he got for his castings the information was valueless. In the matter of car work he found he could not compete with the prices in the West. He had asked a concern in Detroit what they would make castings for, and was quoted 3.25, delivered in Philadelphia. He had seen quotations on iron pipe and had been surprised at the difference in them, from $\frac{1}{10}$ cent to ½ cent. He thought that for association purposes prices of certain kinds of work might be of use, as he did not believe that two foundrymen in the same town and on the same class of work could differ much in costs. It was his opinion that many quotations showed an utter ignorance of costs.

The president, C. Schuman, was of the opinion that if iron pipe is made for 1 cent and other regular goods for nearly 1 cent less than in Philadelphia, it seemed high time for concerted action in the different branches of the trade. He thought each member should unite with the other members in his particular line and form a section, and promised that as regards his own line it would be done within 48 hours. He urged that mutual push would accomplish much, and expressed his belief that no one would get excessive prices at this day, for if they did other foundries would go into the business.

Justice Cox, Jr., stated that history generally repeats itself. He had no doubt some of the gentlemen present remembered the association of wrought iron pipe men in this country, especially in this city and in Pittsburg. A few years ago it was the most profitable business in the United States. Theirs was an association that fixed prices, and it held together for 10 years, and represented the most successful people in the iron business in the country. To day they were the most unsuccessful. They were selling lap-welded and butt-welded pipe at prices that would astonish any man in the same business 10 years ago. These people were at the present time cutting each other's throats, and they numbered only 21 concerns in the whole country. He drew attention to the manufacturers of rails as representing the most successful iron and steel workers of the day because they had an association. All knew that if they wished to buy rails in Chicago they were $29 for 50-pound rails and heavier, and if in Baltimore, the same price, as also in Steelton or Johnstown. He considered that the foundrymen were doing right in forming this association. As was well known, there were only a few concerns making columns, and comparatively few making pipe, and it would be a simple thing, with a little push and determination, to make an association a success and a means of material help to all. He belonged also to the Plate Association of Pennsylvania, which had had several meetings and had succeeded in getting prices to a fair profit until one of the large concerns in the vicinity went into a special kind of steel manufacture and lost a great deal of money, the result of which he thought all knew. That business is now in the same condition as the lap-welded pipe business. Everything in this country pointed to associations or to understandings that they should all make a little money. Through the Foundrymen's Association he believed better prices could be arranged, as there would be just as much business at higher prices as at lower. For purposes of information he would instance the method adopted by the wrought-iron people a few years ago. When an inquiry was out for a lot of iron pipe for a pipe line, the different concerns would ascertain when it was out and would all bid. The tonnage would then be divided among them, equitably, according to capacity for small and large work, thus holding prices and giving all concerns work enough to keep them busy. He explained the application of similar methods to the foundry business. He said that the association of the wrought-iron people collapsed through greed. They advanced their prices to such an extent that a concern went into the business at Catasauqua, and when the factory was half built the association bought him out at a ridiculous price. Another concern started at Chester, but the association this time decided to close it out, and this proceeding kept others out of the business and proved that low prices were their best protection. In spite of all they grew from 10 to 15 concerns, until to-day we find 21, which number accounts for the position they are found in to-day. In conclusion, he advocated the formation of sections in the association and the adoption of a plan for the division of work.

Thos. Devlin of Thos. Devlin & Co.; Mr. Rebman of G. Rebman & Co.; Mr. Whitney of A. Whitney & Sons, and others also joined in the discussion.

It was finally resolved that the price committee should be empowered to call upon other members to form sections in the different lines of the foundry business and report to the next meeting.

Manager Hughes of the Ward Line of steamships is not in the least discomfited by the financial difficulties of the Brazil Mail Steamship Company. He does not find in the fact any evidence that American steamship lines cannot succeed.

The ships of Admiral Gherardi's squadron, in returning from the Pacific, were retarded 2 knots an hour compared with the start, by the accumulation of barnacles on their bottom. Believers in sheathing know of only one remedy for this difficulty. The cost of fuel to bring these ships around from San Francisco is said to have been $200,000.

PLUMBING AND GAS FITTING.

New York State Master Plumbers.

THURSDAY'S SESSION.

The Master Plumbers' Association of the State of New York opened its fifth annual convention at the City Hall, Albany, N. Y., March 2, at 10.30 a.m. President John A. Rossman of New York called the delegates to order.

The president's address was quite an informal one, but delivered to the point. He said that the organization was in a prosperous condition and that success was attending its efforts toward the betterment of all things pertaining to the plumbers' trade. He said the society is always ready to receive new ideas and suggestions in regard to sanitary improvements in plumbing. The health of great communities depends upon the skillful work of the plumber. He referred to the excellent sanitary condition throughout the State of New York, and added that a great part of it was due to the plumbers' handiwork.

The delegates, 75 in number, wore handsome satin badges with neat *boutonnières*. The officers in attendance were: President, J. A. Rossman of New York; vice-president, J. Edward James of Albany; secretary, William J. McDermott of New York; financial secretary, G. Alfred Smith of Brooklyn. Treasurer J. H. Bradish of Batavia was absent.

President Rossman next announced the Committee on Credentials, composed of 15 delegates selected from local associations for that purpose. After some discussion the convention decided to continue in session, instead of adjourning pending the report of the Committee on Credentials. The resignation of J. H. Bradish of Batavia as treasurer, on account of sickness in his family, was announced by the president.

After a short recess the convention was again called to order, when the Credential Committee through its chairman, Henry E. Weber, reported. Having gained the consent of the Executive Committee, President Rossman announced as Treasurer Bradish's successor James B. Lewis, and the appointment was ratified.

Messrs. Collins of New York, Stahl of Albany and Murphy of Troy were named as an Auditing Committee and an adjournment was taken until 2 p.m.

At 2.35 p.m. the convention again assembled, and several new delegates reported. A communication was received from Jeremiah Sheehan of St. Louis, president of the National Association of Master Plumbers, requesting the affiliation and representation in the National Association of State associations. After a few remarks by President Rossman on the need of conducting business systematically, the meeting went into executive session.

In his annual address President Rossman thanked those who had helped the association get its bill through the Legislature. He earnestly urged the adoption of a plan for establishing training schools for apprentices. The members were requested to do what they were able as individuals to make the annual meetings interesting and profitable. The president said he would like to hear debates at future sessions on topics for the good of the craft.

In the evening the delegates, with a number of guests, held their annual dinner. The tables were attractively arranged and loaded with good things. There was enjoyable music, and a merry spirit among them all. Horace F. Westcott of Albany made a graceful toastmaster, and all of the speeches were informal, but none the less witty and enjoyable. Among those who responded were: John Creelman of Rochester, W. N. Tobin of Saratoga, H. G. Gabay of New York, Thomas H. Radcliff of Brooklyn, William McDermott of New York, Edwin Haywood of Brooklyn, J. A. Rossman of New York, Herman H. Russ of Albany.

FRIDAY'S SESSION.

It was nearly 11 o'clock Friday morning when the convention reconvened. J. F. O'Neil of Oneonta presented his credentials and was admitted. Several communications were received, among which was one from Hon. John K. Alden of Chicago, congratulating the association on securing the enactment of the new Plumbing law.

A number of claims were next considered, among which was the expense attending the passage of the new State Plumbing law.

State Superintendent of Buildings Delehanty was presented to the convention by Herman H. Russ of Albany, and was welcomed. Superintendent Delehanty invited the association to visit the Capitol, the grandest building in the country, which the delegates did later. Mr. McDermott moved that a plumber having passed an examination and secured a certificate, need not undergo another examination upon his taking up his residence in another city. It was decided to refer this matter to Attorney-General Rosendale to determine whether the motion, if adopted, would conflict with the State law. A resolution was made and adopted that any effort to secure change or amendment of the State law must be made through the State association.

The secretary reported that the dues recived from 18 associations amounted to $164.55, and from individual members, $12. Four associations joined during the year: Schenectady, Yonkers, Auburn and Poughkeepsie. The individual members who had joined were from Mount Vernon, Shelter Island, Middletown, Johnstown, Gloversville, Ilion, Flushing and Cold Spring.

An executive session was held and a recess then taken until 3 o'clock p.m. Several amendments were made to the constitution and by-laws when they reconvened. The Committee on Apprenticeship reported that it favored individual action on the part of the various organizations on the apprenticeship question. The report was adopted. In secret session the Protection Committee reported and their report was adopted. The secretary read a report of the expenses incurred by the drafting and passage of the plumbers' bill amounting to $3715. It was decided to levy a *per capita* tax of $1.78 on the members of the organization to defray this expense. The report was adopted.

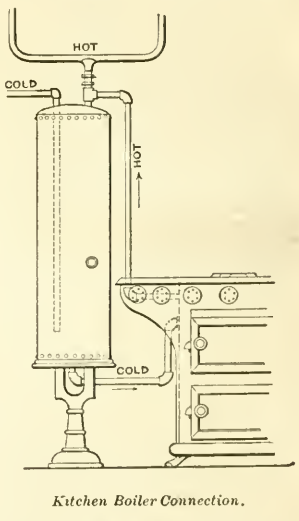
The convention concluded its business by the election of officers, Messrs. Reed, Hyde and Dwyer acting as tellers. J. A. Rossman of New York withdrew from the renomination for the presidency which was tendered him, and Charles Geiger of Buffalo, nominated by Mr. Radcliff of Brooklyn, was elected chief executive for the ensuing year.

The other officers elected were as follows: Vice-president, J. Edward James of Albany; secretary, E. L. Cooke of Buffalo; treasurer, William Ferguson of Troy; financial secretary, G. A. Smith of Brooklyn; delegates-at-large, Messrs. Vrooman of Schnectady, Viggars of Binghamton and Clatfield of Jamestown. Messrs. Rossman and McDermott were appointed a committee to institute a search for plumbing relics for exhibition at the World's Fair. The convention decided that the next annual meeting should be held at the city of Buffalo. They then adjourned *sine die*.

Ex-President Rossman took occasion to praise in the highest terms the Albany Plumbers' Examining Board. He says it is made up of good men, and that it starts about its work in an intelligent manner, using methods calculated to redound to the benefit of the trade and the public.

Kitchen Boiler Connection.

From Milwaukee Gas Stove Company, *Milwaukee, Wis.*—We have before us your answer to "C. C.," published on page 43



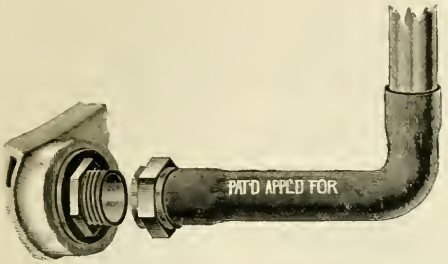
Kitchen Boiler Connection.

of *The Metal Worker* of February 25, and knowing that you are open to information and criticism we feel it our duty to set you right in this matter of boiler connections, basing our exception on actual and exact experiments. We have met with the same complaint as your correspondent in adapting gas to the work of heating water, and about three years ago hit upon the plan illustrated in the accompanying cut, being, so far as we know, the originators of this method. The experiments were made with a 40-gallon tank, first with the ordinary side and then with the top connection. Comparative tests were made for 10, 20, 30, 60 and 90 minutes, all conditions being the same for each. The temperature of the water was taken before each trial and at the end of the specified number of minutes the entire 40 gallons were drawn off into a bathtub and the mean temperature recorded. In every instance the top connection showed the better result. That we obtained a higher mean temperature was a surprise to us, and we can only account for it by the fact of the heated

area being less, and the radiation thus proportionately decreased. However, the fact remains as stated, and should these tests be doubted we respectfully advise that they be repeated by others and the result, we are sure, would be that never again, under any circumstances, would the "good (?) old way" be advocated.

Rubber Closet Connection.

The A. Y. McDonald Company, manufacturers of plumbers' supplies and sanitary specialties, 168 Lake street, Chicago, are putting on the market Morrison's



Rubber Closet Connection.—Fig. 1.—*General View.*

rubber closet connection. The device, as shown in Fig. 1, is designed to slip over the closet coupling, also the supply pipe. Being made of rubber, and accordingly flexible, all danger of cracking or breaking of closet caused by a rigid pipe is avoided. The fixture is made for $1\frac{1}{4}$-inch pipe, and is 8 inches in length. In

Fig. 2.—*Sectional View.*

Fig. 2 is presented a sectional view which clearly indicates the manner in which the device slips over the closet coupling.

A Vent Pipe Question.

From P. S. J., *Cambridgeport, Mass.*—I was recently asked to estimate for the plumbing work of a factory four stories in hight, all of the fixtures being on the first floor and consisting of two automatic long range closets for male and female employees, two sinks for same and a water closet and wash basin for the use of the clerks in office. I figured on a 3-inch vent pipe being necessary as well as a line of 5-inch soil pipe, there being no plumbing plans prepared. Another plumber figured on the job with one 5-inch line of pipe and without the 3-inch vent pipe and got the contract. Does the omission of the vent pipe line under the circumstances constitute a job executed "in accordance with established sanitary requirements," as set forth in the conditions?

Answer.—The successful plumber was evidently more "wide-awake" than our correspondent and seemed to have understood the situation more thoroughly. We have no other particulars than what are given above, but it is not difficult to perceive how the work could be done with only one vertical line of 5-inch pipe and yet conform to all ideas of modern sanitary progress. A single line of 5-inch pipe extending through and above the roof is all that would be necessary, as all of the fixtures could discharge into it through Y branches at or below the first floor, while the several traps could be vented into it in the usual manner. There would be no danger of syphonage with a 5-inch line of vent pipe with no fixtures above the lower floor. If there were fixtures called for on any of the upper floors the vent pipe should be used, but when there is but one group on one floor only the second line of pipe would be superfluous.

Modifications of New York Plumbing Regulations.

The outline for a plumbing system, which would be entirely satisfactory and meet the demands of modern sanitary practice, which we published recently in connection with the plumbing of a New York City house, has evoked a considerable amount of inquiry as to whether the system, as sketched, was intended as an ideal one, or if it actually represents the work in every detail, as executed at the present time in New York.

In reply, we desire to state that the article embodied nothing that was not called for in the regulations of the Health Department, in force for many years. These regulations are always subject to modifications, and it is but proper that we draw attention to some changes made within recent date, by which the mandatory character of certain features of the work has been removed and the option of the builder or owner substituted.

The modifications to which we allude affect only the vertical lines of pipe which extend above the roof. For some years past it was required by the health regulations that the diameters of the extension should be increased in the small bore pipes (2-inch and 3-inch) to 4 inches above roof, while the 4-inch and 5-inch should be enlarged to 5 inches and 6 inches respectively. This rule has been modified in so far that while the minimum diameter of the pipe above the roof is fixed at 4 inches there is no need of enlargement where the pipe within the building is not less than that diameter.

It was also compulsory within the period already specified to carry each line of pipe independently above the roof instead of branching the vent pipe into the soil pipe above the highest fixture, according to old custom. A modification of this plan is permitted now and it is no longer a requirement of the plumbing code. A return to the old plan is permitted, and, where a few years ago two pipes were extended, only one pipe now opens above the roof.

One other feature of the vertical vent pipe deserves some comment. By reference to the diagram, published in *The Metal Worker* of February 25, it will be seen that the pipe, instead of starting from above the trap of the lowest fixture, is carried below and connected by means of a Y branch into the soil pipe. The adoption of this method was due to the fact that the foreman of a prominent master plumber of this city (John Byrns of Grand street) in setting up his lines of pipe made this connection, which appeared to the inspector to be so marked an improvement that on his report it was adopted as a feature of the plumbing regulations.

The Weight of Mercury, and Other Questions.

The following letter was received from an apprentice in New York City, or rather what we call nowadays a boy or helper. It is the sort of letter that we like to get, not that the particular question involved is of such great interest, but because it shows that the boys and younger members of the craft are keeping their eyes open and endeavor to learn all about their trade. It furthermore shows that they are growing critical, and when they see a statement they want to have it proved. This spirit is a promising one for the trade at large. We shall be glad to do what we can to assist these younger members by answering questions or promoting discussions for their benefit. The letter from our correspondent reads as follows:

In the article on the plumbing of a house in *The Metal Worker* of February 21, you say that every inch of mercury is equal to $\frac{1}{2}$-pound pressure to the square inch. My boss says you are way off and that an inch of mercury is more than that. The foreman says you are right and is willing to bet on it. They both think they are right, but cannot prove to us boys whether they are or not. As we can't find out from them, it would be a good thing to settle the matter. The Board of Health inspector makes us bring the mercury up to 10 inches, and he says that is 5 pounds to the square inch. We don't often get a chance to read up on plumbing work, and if you would ask your subscribers to let the boys have a show at the paper it would help us.

The statement that we made in *The Metal Worker* about the weight of mercury is practically correct and we think it is the "boss" who is "way off" in saying that the mercury weighs more than $\frac{1}{2}$ pound to the inch. As a matter of fact the inch in the gauge shows a fraction less than $\frac{1}{2}$ pound pressure, or to put it exactly, 0.491 pound. As the difference between this and $\frac{1}{2}$ pound, however, is only about $\frac{1}{8}$ ounce, we think it is perfectly proper to speak of an inch of mercury as weighing $\frac{1}{2}$ pound.

What our correspondent says in conclusion about the advantage to be derived by reading trade papers is the strongest sort of testimony that can be offered in favor of this class of publication. The fact that the boys do not have the opportunity to read them is to be deplored and we earnestly second the suggestion that our subscribers give their boys a chance to see the papers. However, we fear, in many, if not the majority of cases, it is not the employers' fault, for it often is the case that when the boys are given every opportunity to improve themselves by means of papers and books they do not care to avail themselves of the chance. A curious illustration of this was a letter we received not long ago from an employer in the West who was interested in sheet-metal work and took

every occasion to let the apprentices in his shop read and study in their trade. He went so far as to subscribe for *The Metal Worker* especially for the boys, so that they could each have a copy. As long as the novelty lasted the boys were interested in their papers, but the employer found to his sorrow that in a very little while they were all left unopened and he came to the conclusion that the experiment was a failure. The letter above referred to and the letter printed herewith from the correspondent represent the two extremes. It is our firm belief, however, that each year the younger members in all the mechanical trades are more and more realizing the value of education in their calling and are taking every opportunity to improve themselves. We believe that a special paper in their line is of very great assistance, as it keeps up with the current matters, gives instruction in primary work and at the same time contains articles of a more advanced character to interest those who are nearer the top of their trade. It is sometimes impossible to persuade old or middle-aged men to read and study, but where a young man shows a liking for acquiring information, the chances are all in favor of this liking lasting all through his life.

Cellar Surface Drainage.

From G. F. R., *New York.*—Your article on "Plumbing for a City House" in *The Metal Worker* of February 25 covers every point except as to the carrying off of surface water from the cellar floor and on this point I desire information. It frequently occurs that a natural spring is in the cellar of a carefully built house, which, in a greater or less degree, tends to impair its healthfulness. The difficulty is to drain it into the house drain without the danger of allowing the entrance of sewer gas. The Board of Health requirements allowed a drain pipe to be run under the surface of the cellar floor, provided it had a running trap below the perforated grating in the floor, and that between the trap and the point where the drain enters the house drain there should be placed a "cut-off valve" as a protection against sewer gas in the event of the trap seal being destroyed by evaporation. The "cut-off valve" intended by the Health Board was either the gate or the globe valve, either of which I should say is not suitable. Will *The Metal Worker* suggest some practical ideas in cellar surface drainage?

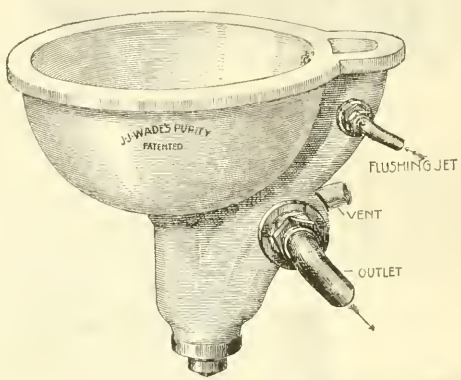
Answer.—The requirements of the Board of Health prior to June 1, 1892, and we presume of the Building Department since that date, call for such a valve as our correspondent refers to, but the question is, How will it work? Water which accumulates on a cellar floor is never free from dust and gritty substances, and these cannot get through a gate valve without depositing some of the aforesaid gritty matter in the valve. This naturally prevents the closing of the valve against the inflow of sewer gas, and it is therefore of no use whatever as a cut-off valve. The globe valve is open to the same objection; so that where surface cellar drainage becomes necessary the main point is to devise a plan by which the subsoil drain trap will be kept water sealed, and at the same time protected against the backing up of sewage on the cellar floor, in the event of the house drain becoming obstructed. The following plan has been tried in this city, and found to answer every requirement: A 2-inch drain pipe is laid from a depressed point in the floor and carried under the floor surface to a 2-inch Y branch opening set in the house drain at its lowest point on inlet side of front wall trap. The opening to this drain should be a small sink set in the floor, the flanged sides flush with the concrete surface. Under this sink a 2-inch running trap should be placed, and between such trap and the 2-inch Y-branch opening in the house drain a flap valve (or tide-water valve) should be set. Into this floor sink the safe wastes from fixtures in house and overflow pipe from house tank should empty, while the sink should be water supplied and the water pipe furnished with a draw cock. This arrangement would work as follows: The surface water from cellar floor, charged with its usual supply of ashes, dirt, &c., would flow into the depressed floor sink, the grating of which would prevent the dirt being carried into the pipe. Whatever discharge would come from the safe wastes would enter in the same manner. Both sink and drain pipe could be readily flushed by means of the draw cock, and the running trap underneath should consequently always have an abundant water seal.

The flap valve set on the 2-inch drain between the trap and the main house-drain opening would effectually prevent any house sewage from backing up on cellar floor in the event of house-drain obstruction. In this manner the surface water can be carried away without any trouble, the trap under the floor kept water sealed and all danger from the backing up of sewage from the house drain averted.

To accomplish this result, however, the main house-drain trap should be a sufficient depth below the cellar floor to enable the 2-inch subsoil drain to be set at the proper incline to carry off the surface and other water entering it through the depressed floor sink. The 2-inch drain trap should also be provided with handhole cover and a manhole constructed in the floor above the trap and the flap valve to make either or both accessible should they require attention. This arrangement would cover every requirement, and with proper attention the cellar would be both clean and healthy.

Wade's Combined Washbowl and Trap.

J. J. Wade of Chicago, has invented a wash-bowl and trap combination which has many ingenious and practical features. An illustration of it is herewith given. The basin is manufactured in commercial sizes—round or oval. The trap is molded on the bowl and is the usual S form. The overflow leads down dipped into the seal of the trap and thus completely emerges in a large body of fresh water the house side, the overflow itself, and the sewer side of the trap. Since by this arrangement the water in the trap is brought close to the bottom of the bowl, there is no space left for the gathering of filth. The fixture is made of the finest quality of porcelain, its interior being as finely and as smoothly glazed as its exterior, and thus a safeguard is placed against the possibility of a collection of filth on the sides of pipes. The overflow opens with an enlargement even with the top of bowl, in order that a soap or toilet cup and strainer may be attached and the drippings find a direct outlet. This precaution guards against disorder and the accumulation of suds and dirt on the slab. A flushing jet is placed near the crown of overflow, by means of which a live jet pressure of water may be introduced, thus flushing the interior of the overflow and the waste pipe attachments when desired. This flushing jet is so constructed that it penetrates into the bottom and sides of overflow and trap, thus leaving them thoroughly flushed and clean at all times and preventing the settling of foul matter.



Wade's Combined Washbowl and Trap.

This fixture is an especially desirable sanitary appliance for bedrooms, since it is distinctively an anti-sewer gas appliance. The brass connections are so constructed that they may be reversed to suit position when joined to waste or vent pipes, so that one may be used for waste pipe and the other for the vent pipe, or *vice versa*, as the plumber may desire. The couplings are bent or straight to meet any requirement. The fixture is claimed by the inventor to be the most simple, the easiest connected, the cleanest bowl that has ever been introduced.

Mr. Wade has won prominence in the invention of sanitary appliances of recognized merit, and has perhaps done as much as, if not more than, any other single individual in the country to bring about reforms in sanitary work. His specialties are supplied to the trade through J. J. Wade & Son, 298 Dearborn street, Chicago.

Plumbing in New Jersey.

We extract the following remarks from the lately issued annual report of the Bureau of Labor Statistics of New Jersey. Dealing with the question of health and trade life of workmen in various industries, it is said, as regards the plumber of New Jersey:

A plumber is rarely found who has worked at the trade for 30 years. They generally become rheumatic and stiff, or too feeble to do a full day's work. They must be in full vigor, and after becoming stiff in their joints they are obliged to quit the trade.

The plumbing shops are all rather untidy, but there is nothing in them in the matter of material that is dangerous to health. The only serious cause of complaint is in repairing old work. Very much of the work of plumbers consists in repairing what has been imperfectly done, and has given out much sooner than would have been the case had it been honestly finished in the first place. In repairing, there are more or less bad odors from which the workmen are liable to get sick. The water closets, privies and waste pipes that have been poorly constructed are very bad in this respect. Nearly all the work is inclosed in the walls of houses, and many people wait until the smells become unendurable, and often until some disease, like malaria, typhoid or diphtheria, attacks some member of the family before calling in the service of the plumber. The larger part of house building is let out by contract to the lowest bidder, and the sharp competition of contractors causes them to engage to do work for a price below which it can be honestly and properly performed. The result is that in a few months or years it has to be done over again, after having caused sickness or endangered the lives of those who are subjected to its effects.

In my judgment, there should be a law compelling the use of the most perfect traps, and establishing an inspectorship of plumbing, with authority to condemn all work not up to a standard necessary to the protection of health. I am sure, from my experience, that if this suggestion were adopted it would prove advantageous to both house owners and honest employing plumbers. It would protect the former from being swindled and the latter from the competition of those who take a job for too low a price and depend for their profits upon slighting the work. It would also have the effect to raise the standard of work required and cause an advance in wages.

The practice of contract work, and especially of subletting it, has a tendency to lower the quality of the work, and is a disadvantage to the trade in general, while in the end there is no saving to those who pay for it. The contractor expects a profit, and he secures it by slighting the work, so what is saved in the original cost is more than counterbalanced by repairing and patching that has to be done in a short time.

Return and Flow Pipes.

From L. V. C., *Albany, N. Y.*—I wish to know what rhyme or reason there is in calling the hot-water pipe pipe between range boiler and water back the return pipe. To do it is directly contrary to ordinary practice in the heating trade. The hot-water pipe leading from the water back to the boiler is, whatever you may call it, the flow pipe and the lower or colder pipe is the return pipe. The water back is the boiler, properly speaking, and the water is brought back to it through a "return" pipe.

Answer.—As a general thing, custom and precedent are responsible for much that may not be strictly correct in nomenclature, and in this way we might answer our correspondent's inquiry. But his communication does not convey any convincing proof that he is correct in the erms he applies to the pipes leading from the range boiler to the water back and return. He presents merely the views entertained by the heating trade and it is a fit subject of inquiry whether the plumbing or heating trade adopt the better term for the pipes in question. Let us consider the matter impartially. The plumber presumably maintains that the terms he uses are correct in their application. The object to be accomplished in the setting up of the kitchen boiler, the supply of water and the connection with the water back is to provide a hot-water service through the house. To do this we must first provide the body of cold water and the receptacle in which to hold it; next, to convert the cold water into hot water. In pursuance of recognized plans we have to create a passage for the transmission of the cold water to the water back to be heated and then returned to the boiler in the condition which was needed. The water back is not the receptacle where the body of water preparatory to its undergoing the change of temperature is stored. The boiler is that receptacle, and consequently the water which passes in given quantities into the water back in order to be heated must be returned to the boiler when that result is accomplished. The boiler is not supplied with water from the water back; on the contrary, the latter is simply utilized to produce the necessary change in the temperature, and when that is effected it is "returned" to the boiler by means of what seems to be properly designated the hot-water "return" pipe. If the word "flow pipe" is to be substituted for either of the pipes, it seems as though it should apply to the lower or cold-water supply pipe, because the water flows through it to the water back and is thence returned through the higher pipe to the proper receptacle. We agree with our correspondent that the water back is, properly speaking, the boiler, but we do not agree with him when he states that the water is brought back to it through a "return pipe," for the reasons above stated.

Noise in a Range Boiler.

From R. J., *Pulaski, Va.*—Some time ago I connected a boiler to the water back of a range. At times it makes a thumping noise, but more so when the fire is first started. Please explain to me how to remedy this.

Answer.—The trouble with this job is probably caused by defective circulation. To just what particular defect the fault may be ascribed we are unable to state, owing to the rather limited description sent us. The following are some of the principal causes to which such a trouble may be traced. It may be that the pipes between the water back and boiler are not of sufficient capacity to allow a free circulation. Then the pipes, even if of the proper size, may have become partially filled and obstructed with sediment and scale. The same cause may be present in the water back. If the heated water cannot circulate and flow from the water back to the boiler as fast as it becomes heated, it will become too hot and be converted into steam, and the sudden condensation of this steam by cold water will give rise to the noises complained of. In some cases the cause may be traced to faulty workmanship, such as almost solid wiped joints, traps in the arrangement of the piping, &c. Then the internal cold water pipe in the boiler may not be of the proper length. It should extend down some distance below the point where the hot-water from the water back enters the boiler. Finally, the supply of water to the whole system must be ample and of sufficient pressure to meet all demands that may be made on it.

TRAPS AND VENTS.

THE W. S. EDWARDS MFG. COMPANY, makers of fine gas and electric light fixtures, 86-88 West Lake street, Chicago, have secured more central and commodious quarters in the five-story and basement building at 21 East Lake street. They have removed the offices to the new location, and will in a short time have their factory in operation there. The machinery will be driven by electric power.

THE ANNUAL MEETING of the Haydenville Mfg. Company was held at the office of the company, Haydenville, Mass., February 25. The old Board of Directors were re-elected, viz., Arad T. Foster, Henry F. Peck, John M. Peck, Homan H. Beals and Cuyler K. Sanborn. They report having had a good year's business, with an increased production of $60,000 at the Haydenville mill over the preceding year. They have recently put in some new and improved machinery and 50 additional hands to the force already employed. The mill is in charge of C. B. Hosford.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until 2 o'clock p. m., March 23, 1893, for all labor and materials required for plumbing and gas piping for the United States Court-House, Post-Office and Custom-House Building at Bay City, Mich.

HUGH WATT, plumber and gas fitter, 300 Dearborn street, Chicago, has secured the plumbing contract for the woman's dormitory at the World's Fair, also for the 84 Gerald flats at Twenty-sixth and State streets.

S. DAVIDSON, 56 Beekman street, New York, selling agent of the Steel Bath Mfg. Company, Detroit, Mich., is much pleased with the results of the "missionary work" to which his attention has been given since establishing himself in this city last November. His efforts have been among architects, builders, jobbers and others having to do with the selection of bathtubs. These tubs are put in competition with higher-priced goods of earthenware or iron, only obtainable by the rich. They can be sold at a moderate price and many advantages are claimed for them. They weigh but 95 to 100 pounds, an item not to be ignored when considering the weight on floors and expense in handling. The tubs are supported by ornamental iron feet, gold bronzed. They are detached and every part readily got at, there being no casing. The outside shell is of steel painted light blue, with a lining of planished copper. The wood rims are of polished cherry, oak or other ornamental wood, so attached and leaded that moisture or vermin find no lodgement. They are made in two patterns, French and Roman, in three and two sizes respectively, both being supplied in 12-ounce, 14-ounce and 16-ounce copper.

The output of pig tin of the world for the year 1891 was 57,551 tons. Of this amount 36,061 tons were produced by the tia mines of the Straits Settlements on the Malay Peninsula, while a further 12,106 tons were the output of Netherlands, India, whose tin-bearing islands are within a short distance of Malaya. This leaves but 9,384 tons for the rest of the world. It is stated that the supply of the tin mines on the Malay Peninsula is practically inexhaustible.

Lining Tanks with Copper.

A correspondent in Norwich, Conn., sends us this inquiry: Please inform me through *The Metal Worker* how to line tanks with copper? How are they wiped, and what is the process of wiping seams on copper? The author of the series of articles on coppersmithing, John Fuller, Sr., to whom we submitted these questions, has furnished us the following reply:

Our correspondent's question is a little vague and indefinite, seeing tanks are constructed of various kinds of wood, slate or other stone and brick work, and yet it may be desirable to have them lined with copper. It will be readily seen, therefore, that the lining would have to conform to an inch wide on both sides and at the two ends for soldering. When washed clean they are seamed together similar to continuous roofing and made the length required. Now examine Fig. 1 and suppose the sheet A B C D shown there to represent the lining of the tank. Find the middle, N K. Now mark off with a slate pencil or a chalk line the end F G, making it from F to G 2 feet 11¾ inches; then the two sides E F and H G, making them 3 feet 11¾ inches, thus allowing ½ inch for the thickness of the sheet and the turn of the corner, which cannot be turned sharp enough to go quite close up into the corner. Mark off the two halves of the other end, A E and C H, each one-half of F G, and leave on enough for the seam; then notch the side you intend for the bottom, as at B and D, and fold the ends ready for the seam. Next strike the line M O, making while the work of making the seam is going on. When completed make the return here to correspond with the other end and two sides, and knock the corners smooth and a little round so they will not catch in the angle of the wooden side as you slide it down into its place. Put the sides into the tank, and when it is down in its place and properly fitted, nail through the under lap at the corners with copper nails if at hand; if not, with the next most suitable for the purpose.

Now to prepare the bottom. If you wish to seam it in, turn up an edge on the return about ¾ inch deep with a pair of roofing tongs and then a similar edge on the bottom ½ inch wide and make it fit snug in and up to the edge of the return edge. Examine the work now closely, and if the bottom fits suitably to proceed turn the return edge (which is ¼ inch wide) down

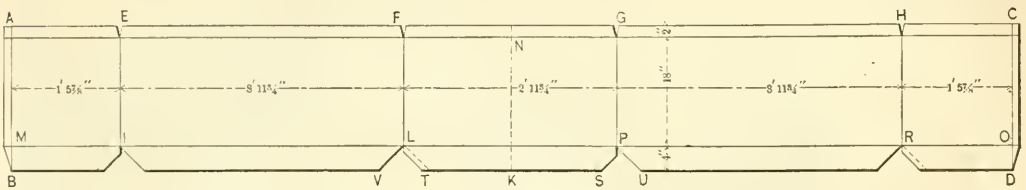


Fig. 1.—Pattern for Lining Prepared by First Method.

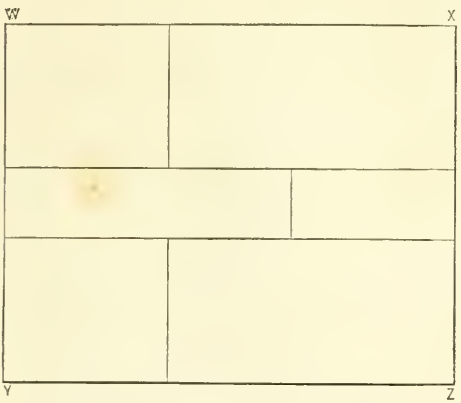


Fig. 2.—Showing Way Sheets Lie Together.

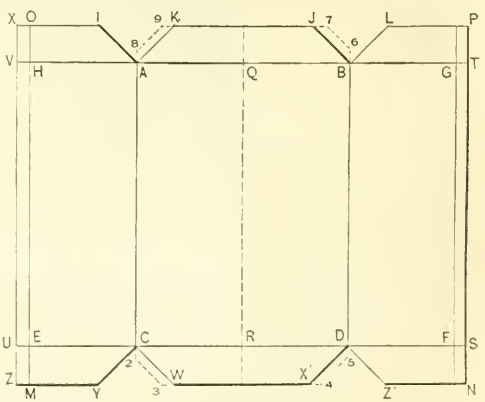


Fig. 3.—Pattern for Lining Prepared by Second Method.

LINING TANKS WITH COPPER.

circumstances and would require good judgment to be used. We will take it for granted, however, that in the case before us the inquiry means the lining of wood cisterns. Here again we must assume that the lining is to be of light copper sheathing similar to sheet zinc, and we must suppose some size (as none is given). Let it be required, then, to line a cistern or tank 1 foot 6 inches deep, 3 feet wide and 4 feet long, inside measure, and let the wood backing be ordinary 2-inch plank.

FIRST METHOD.

Copper sheets such as I have been in the habit of using measured 24 inches wide by 48 inches long, and so we have two ways open to us by which we may execute the work required. In Fig. 1 is illustrated the pattern of the lining prepared for the sides in the first method. In Fig. 1 the sheets have been first squared up and cut the necessary width, which in this case means only trimming, and the edges of the sheet tinned about the distance O D and M B 4⅛ inches. Take a level set at an angle of 45° and lay it on the line M O at the points L and P and mark the lines P U, P S, L V, L T, leaving on the sides S P and L T, say, 1¼ inches for under lap at the corners, and the same at I and R. Clean and tin the return or bottom edge, both sides, with a suitable soldering copper, and when cool enough wash off the acid used with a wet wisp and clean water, and then dry it. Now, if a suitable pair of roofing tongs are at hand, lay the metal on the floor and with the tongs turn up the return for the two sides and the middle end. If you have no tongs, lay of piece of studding or any suitable piece of timber at hand on it at the line, and pull sides and end up square and dress them true with a mallet. Bend the corners square, lock the seam and knock it down close; then solder it down within 2 inches of the bottom edge, keeping the sides in shape with two crosses (×) made of 6 inch board nailed together in such a way as to hold the sides in shape over the edge of the bottom similar to the standing seam of a roof and close the edge smooth all round and notch the corners. Now take a hatchet stake and lay the blade flat on the bottom, and with a mallet bring the seam over on the blade all round, after which the seam may be closed down on the bottom and smoothed for soldering. The soldering may be done with the ordinary tinner's soldering coppers of sufficient capacity. If it is not desirable to seam the bottom in, then nail the return edge at suitable intervals so that there be no buckle, and lay the bottom in place, nailing between the under nails and letting the bottom lap, say, 1 inch all round. This also may be soldered in the ordinary way.

SECOND METHOD.

In Figs. 2 and 3 is illustrated a second method of preparing the sheets, in which the lining is finished at the two ends of the tank. Examine Fig. 2 and notice the way the sheets lie together. I have allowed

nothing for seams. W X Z Y is the same size as M N P O in Fig. 3. Now having all the sheets seamed together and made the size required, as in M N P O, Fig. 3, we will line out the pattern and proceed as follows: First square the metal, and draw the center line Q R, and from Q and R measure off each way Q A and Q B, 1 foot 5 ¾ inches, thus deducting ½ inch each side for the thickness of the sheet and the turn of the corner, and making the distance, A B and C D 2 feet 11¼ inches. Now mark off H A and B G, and E C and D F, making them 17⅞ inches, and from F S and G T 2 inches, and at E U and H V 2 inches. From M and N mark off 6 inches, N S and M E, on N T and M H, and draw the line E S. From O and P mark off 6 inches, P T and O H, on P S and O E, and draw the line T H. Then take a bevel set at an angle of 45° and lay it on the line E S at the points C and D, and mark the lines Y C, and C W, and X' D, D Z', leaving on C W and D X' about 1¼ inches, as shown by the dotted lines 2 3 and 4 5 for under lap at the corners (for soldering). Next line off the corners I A K, J B L, at the other end O P the same way, and cut out with the hand shears the gusset pieces Y 23, Z' 54, I 89 and L 67. We are now ready to form up the sheet, which may be done in a similar way as before directed, and the ends seamed in the same manner as described for the bottom in the first method, the tank being turned on its side, and soldered with soldering coppers in the usual way.

In the foregoing I have supposed the work was to be done in the shop, where the tanks could be manipulated as required to suit the work. But we will now suppose the cistern to be a fixture. If there be room adjacent to the cistern, prepare the metal on the floor in a similar way as before described; if there is no room, then proceed as circumstances dictate, using the best judgment to save time and labor. When the lining is all in proceed to solder the upright seams as follows: Take some good soldering acid, and with a brush apply the acid to the joint to be soldered. Be particular and have your soldering copper nice and clean by frequently dipping the point in a jar of sal-ammoniac and water, and have the nose nicely tinned on all four sides. Now with a stick of good fine solder begin at the bottom, placing the solder against the seam, and with the copper bite off a drop of solder, which will hang to the soldering bit and transfer it to the seam; then bite off another drop of solder and carry it to the seam in the same way just above the other, and proceed in this way little by little until you get to the top, doing an ½ to a ¼-inch at the time until by practice you can do better. The perfection in soldering upright seams can only be acquired by patience and practice. The ability to do this kind of soldering work lies in being able to carry the solder from the stick to the seam in such a manner that it will look like Fig. 4 when finished, which can soon be attained by the proper effort and perseverance. When all the upright seams are done proceed with the bottom. Take time now and see that the seam is soldered strong, and examine closely to see that every part of the joint has been tinned properly and covered with solder. When the joint is finished, always wash it off with a clean wisp and clean water, then dry it.

WIPING SEAMS.

Wiping seams requires practice. If our correspondent has had no practice and never saw this work performed, perhaps he had better not attempt it until he has, at least outside of his own shop, where he may make the attempt until proficiency is attained. But I will do as much as I can in this brief article to assist him with a few hints as a guide to the wiping of joints of this kind. If then the tank be a fixture and large, say 18 inches deep, as in the first case, the side and bottom of the tank must be grooved or channeled out where the seams come, say about ½ inch deep and 1½ inches wide. Now look at Fig. 5. First lay the bottom, and let the channel be at least 6 inches from the side (never get the seams in a corner closer than 6 inches if you can avoid it), and contrive, if you can, to get the upright seams where they can be got at easily. Lay one edge of the seam right over the channel and sink it in and tack it at the two ends and in the middle, and then lay the edge of the next sheet in the middle of the channel and tack it to its place with copper tacks, as in K and M. N O shows a section of the bottom and K and M shows how the bottom and sides come together; B E F D shows the bottom seam, and H G a side seam.

We will assume the above instruction is sufficient, and we have the lining all in and ready for soldering. It is of course supposed that there have been two persons at this work, one, the tinner or coppersmith, and the other a helper. The main thing in our next step is to get ready for wiping the joints. To do this we want a few things which I will enumerate: The first thing is a splash stick. This may be made of wood or sheet iron and about 7 inches long and 1½ inches wide; and if of wood, about ¼ inch thick. Next a cloth. Some men use good stout bed ticking, others good fustian or moleskin cloth. I have done good work with ticking, and it is easier to be had. Take a piece of good ticking, about 9 x 12 inches, and fold it up 4 inches one side, then again 4 inches, then double it again, making it 4 x 4½ inches, and six thicknesses thick; then sew up the ends to keep it compact. Now melt a little tallow until it is just liquid, and soak the cloth in it on one side, and it is ready for use. The tallow (or touch) is to prevent the solder from sticking to the cloth; it is best to use one side of the cloth and keep it smooth. Next we want a solder pot and ladle; both of a suitable size for the job in hand; and last, two or three plumbers' irons, Fig. 6. If none are at hand the work may be done by using in their place soldering coppers of a suitable size. We also need a fire pot Besides these tools, have also handy a little powdered rosin and a little tallow. Now lay a piece

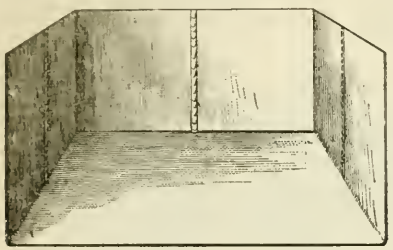


Fig. 4.—Showing Soldered Seams.

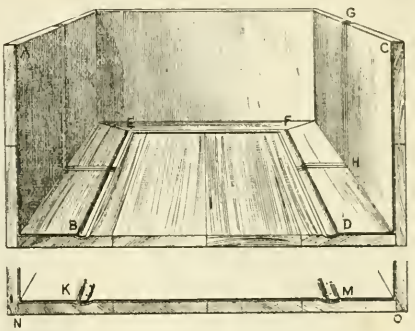


Fig. 5.—Tank Lined for Wiping.

Fig. 7.—Wiping Card.

Fig. 6.—A Plumber's Iron.

LINING TANKS WITH COPPER.

of board at the bottom of the upright seam at H, Fig. 5, to catch the solder, and have another to stand the metal pot on, and see that you have enough solder. Having now a good fire, the irons hot, and the cloth warm, also the splash stick, we are ready for the metal. Take a ladle full of solder in your left hand and with the splash stick in your right begin at the top, splashing the solder down the seam, and keep at this until you have on enough, testing the condition of the solder and bringing it up occasionally off the board, still splashing until you feel it work like soft putty. When you have enough on put the ladle quickly into the pot, and let the helper hand you an iron by the tail end, and you catch hold of it with a piece of cloth or felt in your left hand; and, taking a warm cloth in your right, with the ball of the iron touch over the solder some 5 or 6 inches until it is about running, and then with the cloth lightly wipe the top smooth. Now warm the solder up again with the iron and wipe another 6 inches, and so on down the seam. Do not try to wipe if the metal is not soft and will move easily, for it will be too cold, and you may break the seam, although too fine for you to see, and the result will be a leaky joint; keep the metal well alive with the iron at the end of every spell. When you have completed the seam and before the bottom portion has had time to set, soften the solder at the bottom with an iron and clear away all surplus metal and remove the board and finish out to the channel of the bottom seam. When all the side seams are completed proceed with the bottom one. If it is preferred, the bottom seam may be made without the aid of the cloth thus: Prepare a card of thin wood, about the size of the cloth, $\frac{1}{4}$ inch thick on the front edge and about $\frac{3}{8}$ inch at the back, as in Fig. 7. When ready again pour enough metal into the channel, having it well alive, and then strike the overplus of solder level with the card, keeping the card greased with tallow. Continue on through the job, being careful not to upset or break the joint as you proceed along with each spell.

With careful attention and study of the foregoing instructions, and a little patient endeavor, I hope our correspondent will be able to handle the lining of tanks with sheet copper, placing the seams and wiping them where most convenient, and soldering them by that method good judgment dictates as the best under the circumstances.

A Pretty Kettle of Fish.

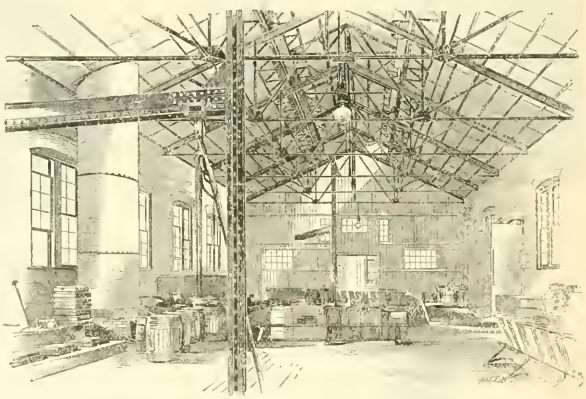
Looking over our Eastern exchange we observe a statement of the achievements of the Gloucester fishing fleet during the past year, indicating that a period of unusual prosperity has been enjoyed. The following shows the number of cod that have been ensnared by the seductive hook and net, three consecutive seasons being compared:

	1890.	1891.	1892.
Western Bank	1,294,000	622,000	1,481,000
Grand Bank	18,712,000	20,475,000	24,544,000
Banquereau	330,000	107,000	2,400,000
Flemish Cape	695,000	1,280,000	562,000
Cape Shore	2,569,000	2,595,000	1,092,000
Cape North	2,058,000	671,000	2,080,000
Georges	13,481,200	10,477,788	11,980,700
Shore	1,037,195	1,841,935	1,180,706
Bay of Fundy	127,000	153,300	11,000
Brown's Bank	141,000	376,000	164,000
Le Hare Bank	251,000	248,000	350,000
Ripe	1,408,000	2,653,000	1,156,500
Seal Island	16,000	39,000	.....
Scatterie	2,074,000	1,464,000	120,000
Bank Bradley	55,000	25,000	517,000
Newfoundland	860,000	270,000	.....
Cashes	49,000	1,541,300	700,900
Iceland	.....	.....	115,000
Belle Isnud	.....	.....	145,000
Labrador	.....	.....	105,000
Nova Scotia	.....	.....	90,000
Totals	45,568,695	43,997,123	49,749,406

Here is a record of 50,000,000 victims, not to speak of the catch of halibut, mackerel, herring, &c., which almost double the aggregate. To all who are skilled in the culinary art these figures are significant, since every individual fish before it is considered edible must be subjected to some one of the various processes of boiling, frying or baking, at once bringing into requisition all the appliances found in a first-class kitchen. Therefore the piscatory tribe sustain very close relations, in a pecuniary sense, to all who are concerned in perfecting the kitchen and of our domiciles, whether reference be had to the plumber's work, to stoves and ranges or the innumerable utensils connected therewith; and hence the propriety of giving our fisheries at least a moment's consideration in connection with the important interests represented by these various lines of manufacture.

A New Brass Foundry.

The construction of foundry buildings is receiving at the present time a great deal of attention from manufacturers. It is especially the case in brass foundries, where the cost of producing the finished metal is considerable. The accompanying illustration shows the interior of a new brass foundry just completed for Randolph & Clowes, at Waterbury, Conn., which was designed and built by the Berlin Iron Bridge Company of East Berlin, Conn. The building is 42 feet in width by 85 feet in length, the side walls being of brick and the roof being of iron covered with the Berlin Company's patent anti-condensation corrugated iron roof covering. A drop of water in a brass foundry would be fatal, and for this reason manufacturers have not been able to use corrugated iron roofs in the past, owing to the drip from the under side of the corrugated iron. The Berlin Company's patent anti-condensation corrugated iron material has met this trouble, and they are now able to produce a corrugated iron roof which they guarantee will not condense moisture on the under side, and at the same time will be fire proof. They have furnished a large number of these for electric light stations, brass foundries, &c, some having been in use for several years. The building as shown is ventilated on the ridge by one of the Berlin Company's ventilators with corrugated iron shutters on the sides, which open and close separately and independently, and thus affording ample ventilation in all kinds of wind and weather. The interior arrangements of this casting shop are only indicated in the engraving, the idea being to show more particularly the roof trusses and the general construction of the building.



THE RANDOLPH & CLOWES BRASS FOUNDRY.

A Garbage Destroyer.

A crematory for the destruction of the city's garbage has recently been erected in Boston by order of the municipal authorities, which appears to do its work most efficiently. The following extract from a local journal gives a description of the operation at the crematory, as witnessed on the day of its inauguration: The crematory is about 23 feet long, 10 feet wide and 10 feet high, and has fire brick walls a foot thick, covered with boiler steel, braced with great iron rods to keep them from being forced apart from the heat. The receptacle for the garbage has a capacity of several tons, and is fed through openings in the top with iron covers. The furnace in which the fire is started is a part of the structure, and is fed with crude petroleum conducted by means of pipes from a large tank a considerable distance away. A wood fire is first started and then the oil is turned on and, with other devices for generating inflammable gases, an intense heat is soon produced. A blower, run by a six-power steam engine, forces this fiery mass into the receptacle for the garbage, which is slowly fed in until it becomes a burning mass. After that the combustion is very rapid, the garbage disappearing almost as rapidly as it can be shoveled in. There are two chambers for its reception and there is a system of drafts by which all the smoke and gases go from one to the other, making a complete circuit of the crematory, and then what is left escaping to the air through a high chimney. In the test all kinds of stuff were fed into the furnace just as they came from the places where they were collected, tin cans, bottles, bones and similar matter being disposed of. From 25 to 30 gallons of oil, costing about three cents a gallon, were used each hour, consuming from four to five tons of offal an hour. Scarcely any ashes are made. The amount of garbage collected by the city each day is 200 tons, and it is estimated that this can all be consumed by four furnaces at a cost of about 25 cents a ton. The whole operation is remarkably free from odor and scarcely an offensive smell is noticeable as coming from the furnace.

The American Consul at Singapore suggests that a wholesale importing and exporting firm of known reputation might do a successful business among the 1,000,000 inhabitants of the Straits Settlements. The trade with the United States amounts to $12,000,000, and is altogether in the hands of English and German merchants.

Prize Competitions

$25.00.

FOR MORE THAN six months Weekly Prize Competitions ($10) have been an interesting and useful feature of the *Pharmaceutical Record*, a journal issued from this office and devoted to the interests of the drug trade. These weekly competitions have related to a variety of technical and business questions of interest to druggists, and have brought out a large amount of information of much service to the readers of that enterprising journal. In view of the success of this feature we have decided to announce a similar series of Weekly Prize Competitions on questions of interest to our readers, and invite a general participation on the part of the trade. As the object of these competitions is to obtain information which will be of practical service to our readers, and to discuss questions in which they are interested, we shall esteem it a special favor if any in the trade will suggest subjects for such competitions, which, if deemed suitable, we shall take pleasure in using.

In each competition there will be three prizes—a first prize of $12.50, a second prize of $7.50 and a third prize of $5. The prizes will be awarded for the answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Prize Competition No. 15.

SUBJECT:

Suggestions in Regard to the Sale of Athletic and Sporting Goods.

In this competition athletic and sporting goods are regarded as including Baseball, Tennis, Football and Gymnastic Goods, Fishing Tackle, Bicycles, Guns, Revolvers, &c.

The object of the competition is to draw out from the trade information or suggestions in regard to the sale of this class of goods—how it may be increased and made profitable—especially in the smaller villages and towns.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

Those discussing the subject are of course free to treat it as they think best, but the following points are suggested as deserving attention:

To what extent business in this line can be satisfactorily connected with general Hardware;
The kind of goods that can most advantageously be sold;
How the sale of these goods is to be increased;
Method of displaying in show windows or store;
What it is feasible to do in this line without carrying the goods in stock, sales being made from samples or catalogues.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

Replies are to be received not later than April 1, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Prize Competition No. 15.

The committee to whom the contributions in Prize Competition No. 1 were referred have awarded the prizes as follows:

First Prize to H. P. TOWNLEY, Terre Haute, Ind.

Second Prize to H. C. WISEMAN, Springfield, Ohio.

Third Prize to W. T. WARSOP, Fairport, N. Y.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 12. Closing March 11.
Arrangement of Pocket Cutlery.

No. 13. Closing March 18.
The Best Method of Changing a Credit into a Cash Business.

No. 14. Closing March 25.
Suggestions Regarding the Sale of Spring and Summer Goods.

No. 15. Closing April 1.
Suggestions in Regard to the Sale of Athletic and Sporting Goods.

Another subject will be announced in our next issue.

Separating Tin.

A patent has been obtained in Great Britain by T. Twynam of Chiswick, England, for a method of extracting tin from tin plate or tin sheet scrap. It is based on the fact that when the tin scrap is heated a film forms on the surface, which consists chiefly of tin in an oxidized state. This cannot be readily removed by mechanical means, but the inventor has found that when the scrap is heated along with some fusible salt, or plunged into a bath of such salt in a fused state, the film formed is in such a condition that it can be readily separated from the surface by boiling in water or by agitating by mechanical means. The salt which it is preferred to use, and which gives the best results, is chloride of calcium, but other salts may be employed, such as the chlorides of sodium, potassium, iron and magnesium. The scrap should be well covered with the salt and heated to a red heat until the film forms, and on being boiled in water the tin will fall off in a heavy insoluble powder.

The Antiquity of Some Modern Appliances.

Exploration among the ruined and buried cities of the old and new worlds, which is so marked a feature of modern scientific and historical research, is constantly bringing to light startling proofs of the fact that, in many respects, the ancients were not, by any means, as far behind us in the applied arts as has been generally and complacently assumed. Especially has this been the case in recent excavations carried out in those Eastern lands which are believed to have witnessed the dawn of civilization. Nineveh, Babylon, Troy, Memphis, city after city famed in remote times as a center of light, power or wealth, has had its exact location fixed by patient explorers, and its ruins overhauled and sifted, with splended historical results, as well as adding greatly to our knowledge of the arts and sciences as they existed in the earlier periods of the world's history. A very interesting instance of the fact that some of the most modern appliances were really anticipated thousands of years ago in Egypt, was recently established through the discoveries of W. M. Flinders Petrie. During a residence of two years in Gizeh, we learn from a contemporary, Mr. Flinders Petrie collected evidence showing that the tools used in working stone 4000 years ago were made with jeweled cutting edges, as is the modern custom. He has stated his reasons for coming to these conclusions and proves in a very satisfactory manner that the pyramid builders used solid and tubular drills, straight and circular saws, and many other supposed modern tools in erecting that greatest of buildings. He also shows that their lathe tools were set with jewels and that they did work with them that would puzzle the modern artisan. In one place he found where the lines of cutting on a granite core made by a tubular drill form a uniform depth throughout, showing that the cutting point was not worn as the work advanced. The regular taper of the core would also go to prove that the drill was set with jewels on the inside and on the outside alike, thereby facilitating its removal. In some specimens of granite he found that the drill had sunk one tenth of an inch at each revolution, the pressure necessary to accomplish this having been at least two tons. The capacity of the tools and the skill of the workmen are illustrated by the clean cut they made through soft and hard materials alike, there being no difference in the width of the groove when it passes through soft sandstone and granite hard as iron. Nothing is known concerning the material of which their tools were made, nor how the jewels were set. The diamond was very scarce at that time, therefore the only logical conclusion is that they used corundum.

A new metal, says *Iron* of London, has been discovered by Dr. Purcell Taylor. It possesses a beautiful violet color, having a brilliant appearance; is hard and crystalline, and has a high melting point. The specific gravity of the new metal is 8.2, and it is said that its cost will be high. Dr. Taylor has named the substance "farmanium."

Just now the fad in Mexico is growing coffee, for coffee raised in Mexico is proving superior in quality to that of Brazil or Java. Many Englishmen and Germans are buying coffee farms, which are now very cheap.

TIN PLATES.

American Tin-Plate Brands.

IV.

We present this week a further installment of brands, &c., adopted by makers of American tin and terne plates, which are actually being produced and placed on the market at the present time. It should be understood that the list does not include a number of private brands which are being made for various dealers who are not themselves manufacturers.

Aliquippa Tin Plate Company,

Pittsburgh, Pa., whose works are located at Aliquippa, Pa., inform us that they are now producing two brands of American terne plates and two of bright tin, in 14 x 20 and 20 x 28 sheets, IC and IX.

The roofing plates are:

1. "*Aliquippa.*"—Made from finest steel, heavily and uniformly coated by palm-oil process. All sheets are carefully assorted before boxing, wasters being taken out and sold only as "wasters." Each sheet is stamped with name and gauge, as illustrated in Fig. 1. Boxes are marked with brand name and gauge, and also with makers' name.

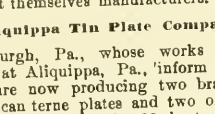


Fig. 1.—"Aliquippa" Stamp. Aliquippa Tin Plate Company.

2. "*Beaver.*"—Heavy coated palm-oil process terne plate. Sheets assorted and stamped, as in the case of "Aliquippa" plates, with name and gauge; see Fig. 2. Marks on boxes are on the same order as those previously noted.

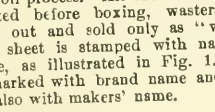


Fig. 2.—"Beaver" Stamp. Aliquippa Tin Plate Company.

Of bright tin plates are produced the following:

3. "*Aliquippa.*"—A guaranteed charcoal plate of high grade.

4. "*Beaver.*"—A coke-finish bright plate of superior quality.

Cincinnati Corrugating Company,

Piqua, Ohio, are now manufacturing two grades of American roofing plates, namely:

1. "*Piqua.*"—A heavily coated terne plate, made IC and IX, 14 x 20 and 20 x 28. Plates are not stamped. Boxes are stenciled on the lid:

MADE BY
THE CINCINNATI
CORRUGATING CO.,
PIQUA, O.

The name "PIQUA" and gauge are marked on one end of the box, and the words "PIQUA ROOFING PLATES" on the other end.

2. "*Piqua Hand Dipped.*"—A very heavily coated hand-dipped plate, to which the company are paying special attention and which comprises the great part of their output. Made in standard sizes, IC and IX. Each sheet is guaranteed perfect, squared, and stamped as shown in Fig. 3. Boxes are marked similarly to those containing "Piqua" plates, except that the words "HAND DIPPED" are added to the name.

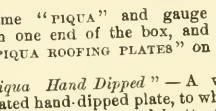


Fig. 3.—"Piqua Hand-Dipped" Stamp. Cincinnati Corrugating Company.

All the terne plates made by the Cincinnati Corrugating Company are coated by palm-oil process.

Marshall Bros. & Co.,

Philadelphia, are turning out several brands of American tin and terne plates, made from black sheets of their own rolling. Of bright plates the two following qualities are made by them:

1. "*Penn Treaty Best Charcoal.*"—Guaranteed 6 pounds of tin to the box. These plates are made IC and IX, 14 x 20, 20 x 28.

2. "*Penn Treaty Second Charcoal.*"—A lighter coated plate, 4 pounds of tin to the box, made I C and IX, 10 x 14, 12 x 12, 14 x 20 and 20 x 28. Boxes containing these plates are stenciled "A A."

Of roofing plates the concern are now putting out five qualities, as follows:

3. "*Marshall's Hand-Dipped.*"—An old style, hand-dipped plate, made by the palm-oil process. The sheets are resquared but not stamped; and special care is stated to be given to their finish and coating. Stock very carefully selected, and written guarantee is given.

4. "*Marshall Best Roofing.*"—Very heavily coated plate; coated by palm-oil process, and guaranteed. Said to be equal to "M. F." All sheets are resquared and stamped with the name "MARSHALL," as shown in Fig. 4.

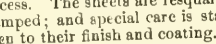


Fig. 4.—"Marshall Best Roofing" Stamp. Marshall Bros. & Co.

5. "*Penn Treaty.*"—Same quality as "Marshall," but with less coating. Sheets are thoroughly and evenly coated, resquared and stamped with brand name, as illustrated in Fig. 5. These plates are claimed to be equal to "Melyn" brand.

Fig. 5.—"Penn Treaty" Stamp. Marshall Bros. & Co.

6. "*Girard.*"—A fourth grade of roofing plate, having a greater percentage of lead in the coating, and specially recommended for use where sulphur gases exist. Each sheet is stamped as in Fig. 6.

Fig. 6.—"Girard" Stamp. Marshall Bros. & Co.

Special sizes of this grade, suitable for gutters and special work, can be supplied.

7. "*M. C. B. Standard.*"—A special grade recently introduced, bearing a coating peculiar to the firm, which is recommended as a heavy coated plate, with a mixture which is guaranteed to resist sulphur gases and acids. All sheets are resquared and stamped in the manner illustrated in Fig. 7.

Fig. 7.—"M. C. B. Standard" Stamp. Marshall Bros. & Co.

All Messrs. Marshall's roofing plates are made IC and IX, 14 x 20 and 20 x 28.

The boxes for all brands of tin and terne plates are stenciled on the ends with name of brand and gauge, &c., together with makers' name.

Marshall Bros. & Co.'s trade-mark is an eagle and lion, illustrated in Fig. 8.

Fig. 8.—Trade-Mark of Marshall Bros. & Co.

Apollo Iron & Steel Company.

In the second list of tin-plate brands printed in *The Metal Worker* of February 4 it was stated, under the heading of

Fig. 9.—"Apollo Best Roofing" Stamp. Apollo Iron & Steel Company.

"APOLLO STEEL & IRON COMPANY," that their terne plates were unstamped. That firm inform us that each plate is stamped with the name of brand, as shown in Fig. 9.

SCRAP.

THE OFFICERS of the United States Iron & Tin Plate Mfg. Company, Demmler, Pa., are much pleased with the success and development of the American tin plate industry, as shown by the last report of the Government statistician, Col. Ira D. Ayer. This company is the pioneer tin-plate plant in the United States, and its officers have for 20 years worked for the establishment of the industry. The United States Iron & Tin Plate Mfg. Company issue a little pamphlet containing valuable information to the trade, which is sent free by mail to any one who will ask for a copy.

THE NEW sheet iron and tin mills now being erected by the Falcon Iron & Nail Company, Niles, Ohio, will soon be completed and ready for operation. The entire plant is being equipped with the best appliances and the mills will be modern ones throughout. The plant covers about 5 acres of ground, and the concern expect to be making sheets in their new works before this month is out and black plates for tinning purposes early in April.

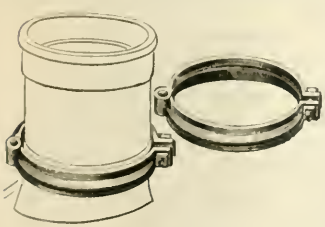
N. & G. TAYLOR COMPANY of Philadelphia, manufacturers of tin and terne plates, in addition to other goods dealt in, are now producing an average of 800 boxes a day, and a member of the firm said recently at their new distributing headquarters, 231 Water street, New York, that before the end of March they would be turning out 1000 boxes a day.

THE NEW WORKS now under erection by the New Castle Steel & Tin Plate Company of New Castle, Pa., are being pushed to completion and the concern expect to be ready for the spring trade. Their plant throughout will be equipped with the best machinery in the market, and the new firm will have every facility for the manufacture of tin and terne plates. The general manager is Geo. Greer, under whose supervision the new plant is being erected.

THE TOTAL EXPORTS of tin plates from Great Britain during the month of January last were 31,379 tons, being an increase of 2270 tons over the corresponding period of 1892. At the same time the shipments of black sheets to the United States for tinning purposes were, according to Griffith's report, of the value of $125,000 over those of January, 1892. *The Industrial World* of Swansea, Wales, says: "Tin platers are not pleased to see so much black plates leaving their shores to be coated on the other side of the Atlantic."

Berger's Pipe-Collar Clamp.

The device presented in the accompanying illustration is known as Berger's Pipe-Collar Clamp, and is intended for use in forming an air-tight joint in metal collars



Berger's Pipe-Collar Clamp.

around vent or other pipe extended above roofs of buildings. Berger Brothers of 237 Arch street, Philadelphia, Pa., who manufacture this device, state that in order to overcome the objections urged against pipe collars as ordinarily constructed, they place their hinged clamp at the top edge of the collar and draw the nut perfectly tight, after which the upper edge of the collar is calked down into the bell-shaped recess in the same manner as with other joints. In soil pipe, where stiff metal collars are used, the clamp is placed slightly above the top edge and calked with lead solder, making, it is claimed, a quick, inexpensive and perfectly air-tight joint.

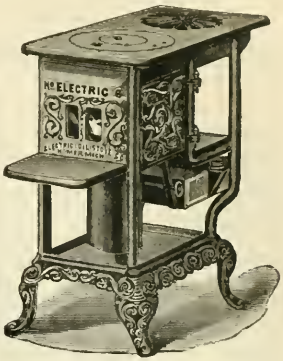
Labor in Japan.

One feature of the new civilization of Japan cannot but be regretted by those interested in the progress of that rising nation. The development of its foreign trade appears to bear very heavily upon the condition of labor, judging by a recent report of the American Board of Missions, on the work of its agents in that country. From this source we learn that the rapid growth of this trade has brought about a distressing increase in the working hours of the operatives in many of the factories where goods for export are made. Men, women, and even children, employed in the various manufacturies of silk, for instance, labor from early dawn to 10 o'clock at night, with but slight intermission. In the match factories, too, children are employed from 3 a.m. to 7 p.m. in incessant toil. And this excessive labor is not confined to the factories alone. In thousands of homes throughout Japan, we are told, the same condition prevails, especially where the industry of embroidering and hemming silk handkerchiefs for the export trade is carried on. Moreover, with all this toil, it is stated that, in many provinces, able-bodied women can earn but a pittance of 3 cents a day. A Japanese statistican places the average working hours throughout the country at 17 daily. We are not surprised, then, to learn that, in the manufscturing towns, it is rare to find operatives, either men or women, over 30 years of age. They become incapacitated for work by various nervous disorders, even if death does not intervene.

The Japanese Government is ready, it is believed, to do all that public opinion will allow them to do for the relief of these overburdened toilers. But public opinion does not yet appear to be awake in this matter, and the workers themselves have made no audible remonstrance. The Japanese is a patient toiler, with a spirit of endurance which takes everything uncomplainingly that fate may send.

The Electric Oil Stoves.

The Electric Oil Stove Company of Homer, Mich., have improved their line of oil-burning constructions for the season of 1893, embodying features which cannot fail to interest the trade. The oil range which is illustrated in Fig. 1 of the cuts is known as the Electric No. 6, and has been brought out to meet the demands for a medium-priced oil cooking stove possessing efficiency, capacity and perfect working qualities. This stove, the manufacturers claim, retains the valuable features of their No. 8 range, illustrated in these columns some time since, it being constructed on the same principle. The stove has a single 10-inch round wick burner and two griddle holes. The arrangement of parts is such that cooking and baking may be done at the same time. In connection with this and the larger size of ranges, the manufacturers offer a steel oven 12 x 13½ x 19 inches in size. It is intended to be placed over the rear griddle holes, leaving the front of the stove available for other purposes. The oil reservoir is made of galvanized iron, and is so arranged, it is claimed, that it can safely be filled while the stove is in operation, as it is separated from the flame and the oil is maintained at a low temperature, thus obviating, it is said, all danger of explosion. The end swing door affords easy access to the burner for lighting, and the burner plate can be drawn out for the purpose of cleaning and trimming wicks. The griddle, as may be seen from an in-



The Electric Oil Stoves.—Fig. 1.—Electric Oil Range No. 6.

spection of the cut, has a removable center for the purpose of heating cups, teapots, &c.

The manufacturers refer to the care and attention which have been bestowed upon the arrangement of the burners, flue, fire chambers, &c., for the purpose of giving proper ventilation and completely controlling the combustion. The company

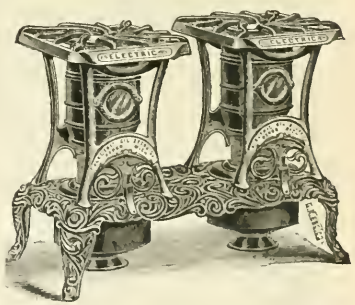


Fig. 2.—Electric Lamp Stove No. 2.

are also making a very attractive line of Electric lamp stoves, that shown in Fig. 2 of the engravings being provided with double burners. Reference is made to the improved wick raisers and rewicking attachment combined as a very simple and complete device for the purpose. The stoves are made of the very best material and are guaranteed not to leak. The oil reservoir, burner and wick raiser are entirely of brass, while the base and top castings are highly polished and nickel plated, giving to the stove a neat and attractive appearance. The No. 1 stove has a single burner, while the No. 2 which is illustrated in Fig. 2, has two burners, or what is practically the same thing, is made up of two No. 1 stoves combined in the manner shown. These lamp stoves, the manufacturers state, are invaluable to housekeepers, milliners, barbers, dressmakers, students and in fact to all who have cooking to do in a comparatively small way.

STEAM AND HOT WATER.

English Practice in Hot-Water Heating—XXII.*

COILS AND RADIATORS.

The distinction between a coil and a radiator is not at all clearly defined, unless we rely upon the fact that the former usually has its pipes fixed horizontally and the latter vertically. At the same time, if we fixed a coil on one of its ends, as is done sometimes, it would scarcely constitute it a radiator. For the information of those who have not used these latter articles it may be explained that they are, to all intents and purposes, coils, but with pipes of an ornamental character, always having the pipes fixed vertically; and, by ordinary decoration, they can be made of sufficiently good appearance to need no casing. They are also cast of such a section as to hold but little water, so that results are more rapidly obtained, but of course they just as rapidly cool as the fire goes down.

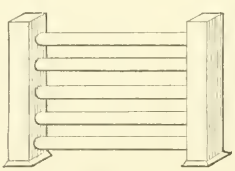
Radiators are practically the outcome of experience gained with the ordinary horizontal pipe coils. In the first place, these latter appliances are at the best of times ugly; this necessitates their being surrounded by a case, solely with the idea of hiding them, unless in an unimportant position. The case, however inexpensive, generally costs more than the coil; sometimes, when well finished, four or five times as much. Then the case goes a good way toward neutralizing the effect of the coil, as it will be understood that more heat is obtained from exposed pipes than those incased in any way. The coil case also introduces another bad feature by usually making it an impossible matter to dust and keep the pipes clean, and the horizontal pipes lend themselves to the collecting of dust more readily than vertical ones. The difference in heat diffusion between a clean pipe and one coated with dust is sufficient to surprise some people; but if it be remembered that dust is wholly composed of poor heat-conducting materials, as fiber, wool, cotton, grit (silica), &c., no wonder need be felt. Dust is almost as effective as silicate cotton in preventing the dispersion of heat.

The fact that horizontal pipes collect dust and vertical ones do not has led to the general adoption of the latter arrangement with the tubes of radiators. Horizontal coils in cases, as just mentioned, are great sufferers in this respect, and so are pipes in channels, &c., and even exposed coils and pipes are sometimes allowed to get covered with dust, and the results are lessened accordingly.

With nearly all the present radiators the necessity of a case is supposed to be obviated by their being cast of a design equal in appearance to a casing itself, and if additional finish is needed, they can be fitted with marble tops. Nearly all the makers' lists show them also made in pedestal or columnar form as well as flat, and other shapes to meet different requirements. As regards appearance, they can always be picked out in two or more colors if desired, and it has been already explained that the ordinary decorative paints and colors have no prejudicial effect upon heat diffusion. Bronze powders and gold leaf are not, however, to be recommended, except to a very limited extent.

The last point in particular to be mentioned respecting radiators is that they hold but little water. By this is meant that a certain superficial area of radiating surface has less water in it than the same area of a round pipe. It can be seen that the less water an apparatus contains the quicker it will become heated up, and it is quite possible to get the same area of radiating or heat-giving surface (capable of furnishing the required temperature) by radiators with one-half or almost one-third the water that would be held if the radiating media consisted of the ordinary 4-inch pipes. It is, however, necessary to again mention that, although the small amount of water is heated the quickest, it is also the quickest to become cool as the fire goes down. The small amount of water also shows any irregular stoking, as the degree of heat radiated is rendered irregular also; when the body of water is large these effects are not noticeable, the water acting as a reservoir or medium for the storage of heat.

With glass house works the 4 inch pipe is decidedly the best; the results are rendered as equable as it is possible to get them. The same applies to any of those places where heat is required night and day regularly. When, however, quick results for just a matter of a few hours are needed, smaller pipes are used, as, for example, a 2 inch pipe, although it has much less superficial surface than a 4 inch pipe, does not hold more than about a fourth of



English Practice in Hot-Water Heating.—Fig. 90.—Common Form of Heating Coil.

the water, and the results are quicker in proportion. Where quick results and also good appearance are needed, nothing can excel some of the forms of radiators.

The common form of coil is as Fig. 90, being a pair of cast ends, with pipes inserted as shown. The joints between the pipes and box ends are either made with yarn and lead, or more commonly, perhaps, with borings (the rust joint). A good coil can be made up by using one of the different forms of patented joints, in which an India rubber collar is the jointing material. These joints are not expensive, and the saving of time is considerable. They also have a good appearance, and are expansive (this will be referred to again). Space will not permit of giving details of all the different forms of radiators introduced; reference to the advertisement columns of this and other papers will furnish all the details required in this respect; but to illustrate the difference between the ordinary box-end coil just shown and the more modern appliances referred to, Fig. 91 will make it plain what an improvement has been made.

There are several radiators made and arranged so that fresh air can be introduced and caused to pass over the heated surfaces and so be warmed. These are generally termed ventilating radiators, but they have no particularly active effect in causing ventilation. If outlet or exhaust ventilation exists (either by ventilating flues or the ordinary fire place opening), then the inflowing fresh air will enter by way of these openings, and it will be warmed by contact with the hot surfaces.

There is one point in connection with these ventilating radiators that needs dis-

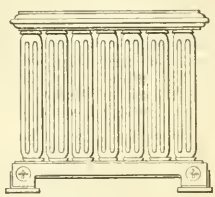


Fig. 91.—Common Form of Radiator.

cussion, which is their effect upon the moistness of the air. This subject was dealt with somewhat fully when speaking of the necessary saturation of the atmosphere in glass houses, but it may be mentioned here that when provision is made to increase the temperature of inflowing air we ought, at the same time, to provide for the increase of moisture that it needs and should have, in ratio with the heat it attains. This is provided for by some makers, who make the top castings of a trough shape to hold water, with an ornamental cover over. The temperature air attains by contact with these pipes, however, is not so great as to demand this provision of moisture in every case; the engineer must use his judgment in this respect. In hot-air works, where air is heated by contact with stoves and flue pipes, the moisture question is very important.

Among hot-water fitters there exists a considerable difference of opinion as to how coils, &c., should be connected; that is, at what point in the coil the pipes

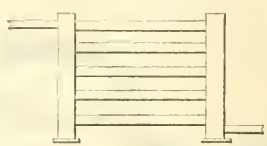


Fig. 92.—Showing One Method of Connecting Heating Coils.

should be inserted. Many seek to get one pipe at the top and one at the bottom, as Fig. 92, but there is no occasion for this; if both pipes are connected at the bottom the coil will heat just as effectively. It must not be supposed that because both pipes are at a low point the hot water will

* Reprinted from the London *Builder*.

pass in and then out without the top portion of the coil getting hot. The coil will heat just as well as one pipe at the top and one at the bottom, which is supposed to possess the advantage of causing the water to circulate right through, as it certainly does. There is one advantage this

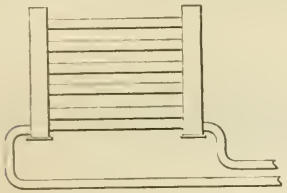


Fig. 93.—Connection Employed When a Single Coil or Radiator is on a Branch Flow and Return.

latter method has, in the fact that if the top pipe is carried from the extreme top, probably no air cock will be needed.

If a single coil or radiator is on a branch flow and return, the connection may be made as Fig. 93. It it should be one of a series on a branch service, then Fig. 94 is a good method. This latter way gives all the radiators, from the first to the last, a chance of getting hot without much interval in their times of heating. If we had, say, four radiators, and caused the water to circulate through the first one before it had any opportunity of getting to the second, and through the second before affecting the third, we should cause very irregular results indeed.

Seeing what advantage radiators have under certain conditions, it is to be expected that a hot-water pipe with full area of surface, but holding less water, will be introduced for those works needing rapid

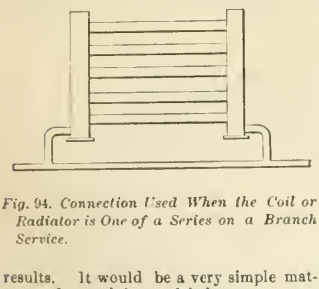


Fig. 94. Connection Used When the Coil or Radiator is One of a Series on a Branch Service.

results. It would be a very simple matter, and certainly useful in many cases where pipes have necessarily to be used, yet where heat is required at the shortest notice. It could be made of a section that would the least readily collect dust.

HEATING NOTES.

Foskett & Bishop, New Haven, Conn., issued a circular letter under date of March 1 announcing that their business in hot-water boilers was successful and satisfactory during the season of 1892. They then mention the special features of their boilers, beginning with the material. They refer to the use of steel pipe of high tensile strength and consequent safety from danger of explosion or breakage. The construction of the boiler with upright pipes, they furthermore state, promotes rapid circulation of water. The fire-box, lined with asbestos, is said to give efficient combustion. Reference is also made to the construction of the grate and the damper arrangements.

The American Boiler Company issue a tasteful advertising card entitled "Schoolhouse heating and Ventilation." The card refers to the excellent results that have attended the use of steam and hot-water systems for heating and ventilation when properly planned and erected. The further statement is made that local steam fitters are in a position to execute all contracts for this class of work which should be given them in such cases. With a view to assisting the trade in securing work of this kind, planned to give the best results, the American Boiler Company have organized the Department of Schoolhouse Heating and Ventilation, under the management of W. M. Mackay, who will furnish plans and specifications. The American Boiler Company invite the trade to advise them when such contracts are to be estimated upon in their vicinity, and they will give all the assistance in their power in enabling them to secure the work.

The Capitol Heater Company of Detroit, Mich., send us still another postal traveler, directing attention to the successful record of the Capitol heater during the past winter. They print on the back of the card a number of signed testimonial letters of very recent date.

Wanted—Good Country Roads.

When the Roman legions set out to conquer a fresh country their first care was to make a good road in their rear. And when the country was subjugated, the most important thing to be looked after by the conqueror was the establishment of a complete system of highways throughout the land so that every part of it might be accessible to the officers of the State. But they were not content with making the good roads. They saw that the condition of them was maintained. Through this means they were able to quickly plant in the conquered country—probably barbarous and rugged before—a civilization and prosperity which could never have flourished without such excellent means of intercommunication.

It is not too late in the day for us to learn a lesson in this respect from "the wisdom of the ancients." The necessity for better country roads has been brought to our minds very favorably in a pamphlet lately published by Col. Albert A. Pope, entitled "Wagon Roads as Feeders to Railways."

The book contains a collection of letters and opinions on the subject from presidents, general managers and other railroad officers in different parts of the country. As the majority of these authorities speak from personal knowledge and experience, and not from any theoretical standpoint, their opinions are entitled to careful consideration; and their aggregated opinion amounts to this: That the condition of the country roads on this continent — for Canada is represented in the list of reports — is a blot on our boasted civilization. The before-mentioned Romans were, 2000 years ago, away ahead of us in their highways.

In our Western States the average farmer, owing to the wretched roads—or want of roads—is to day unable to haul his product to market during bad weather. As that is the very time he has most leisure to do the work—which he is now obliged to do when he should be attending to his farm—the economical loss and delay caused by the want of decent roads is obvious in his one case. And this is the tale told all over the country. When bad weather arrives, country highways, as now constituted, become impassable, and railroad freights decrease enormously. Then when roads again become passable there is such a glut of merchandise at the depots as is difficult to handle, and in attempting to cope with it trains are delayed and accidents increased. Good wagon roads, which would be open for traffic, winter and summer alike, would obviate this danger and inconvenience by equalizing the amount of freight to be carried the year round, and so enable railroads to handle it safely and expeditiously. This is, of course, the main standpoint from which the matter is regarded in the pamphlet, as bearing more directly upon the interests of railroad companies. And it is an argument which affects all classes of the community.

But there are other lights in which the urgent need of better country roads may present itself to different minds. The cause of civilization, the opening up of new districts and sources of supply, the promotion of the comfort and happiness of the people, by facilities of intercommunication and consequent promotion of social relations, especially in the winter season, when under present conditions so many country dwellers, particularly in the West and South, are practically isolated for long periods by reason of the bad means of communication. All these are causes which affect the prosperity and well-being of the country in general.

Any movement which may work for the betterment of the highways of this country should therefore be most heartily indorsed, and it is to be hoped that public opinion in the matter may be sufficiently aroused to cause the inhabitants of the rural districts and sparsely settled country to awake to their true interests, and, individually, to take action to this end.

The railway companies have very generally declared their willingness to assist in the construction of good roads, by hauling the necessary material free of expense or by contributing to the work or cost in other ways. In this matter their interests are identical with those of the country settler; and if the latter would do his part, we should soon see a gratifying improvement in the country highways.

The entire establishment of the Fred. J. Meyers Mfg. Company, Covington, Ky., manufacturers of Architectural Iron Work, Wire Goods, Hardware specialties, &c., a large six-story brick structure, was completely destroyed by fire on March 5, the loss aggregating upward of $220,000, upon which insurance was carried amounting to $83,000, the greater proportion of the loss being sustained in the Architectural Iron Work department, as the material for several large Government contracts had been just completed and was ready for shipment. The fire at this time was particularly inopportune, as the company had sufficient contracts for Architectural Iron Work on hand to keep them busy the entire year and were full of orders for their specialties, to say nothing of large stock finished on hand in Wire Goods, Flour Sifters, &c. Immediate steps have been taken to secure temporary quarters for the company's different departments, and it is hoped that within a week or two they will be enabled to fill orders promptly. In the interval work will be commenced upon the ruins and new and larger buildings erected thereon as soon as possible.

The investigations undertaken by the Belgian Government into the industrial condition of the country show that in Brussels wages have risen on the average from a little over 40 cents a day in 1846 to 85 cents in 1891. At the same time the purchasing power of money has increased by nearly one-twentieth. This shows distinct improvement in the condition in that miniature kingdom.

What is said to be the largest gasholder in the world has just been completed for a gas company at East Greenwich, England. It is 300 feet in diameter, and when fully inflated is 180 feet high. The floating vessel of the holder weighs 1300 tons, and its capacity is 12,000,000 cubic feet.

THE TIN SHOP.

Templet for Elbow Miter Lines.

From J. E. B., *Troy, N. Y.*—In Fig. 1 is shown a convenient method for constructing a templet to be used in drawing the miter lines for elbows of any number of pieces. For a 90° elbow draw the right angle A B C and from B strike the arc E D C. Bisect E C and draw D B. E D then represents one-eighth of a circle. Divide E D into one less number of parts than there are to be pieces in the elbow. Thus, for a three-pieced elbow divide E D into two parts, as shown at 3'. For a four-pieced elbow divide E D into three equal parts and from E set off one of the divisions, as shown by E 4'. For a five-piece elbow divide E D into four equal parts and from E set off one of the divisions, as shown by E 5'. Other divisions can be obtained in a similar manner. Draw A F at right angles to A B and from B draw lines through the points in E D, extending them to A F. Then F B is the miter line for a three-pieced, G B for a four pieced and H B for a five-pieced elbow.

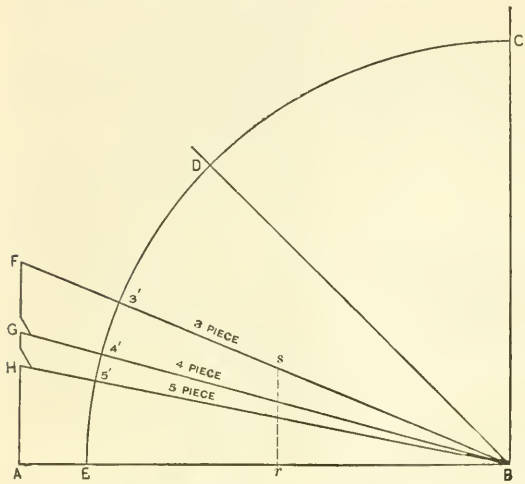


Fig. 1.—Method of Obtaining Templet.

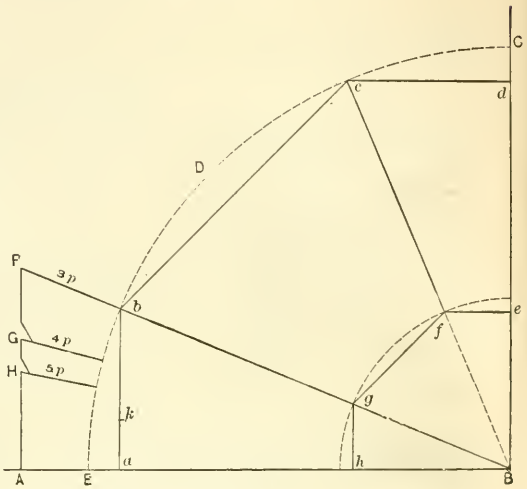
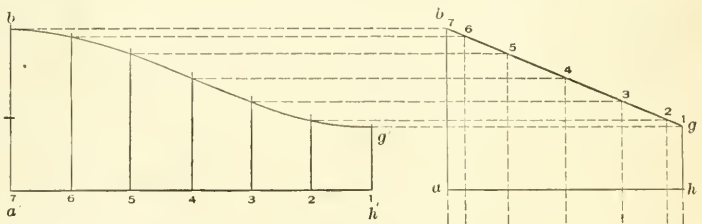
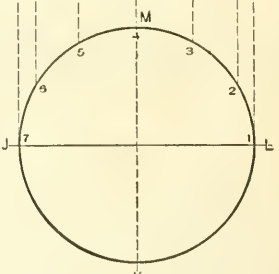


Fig. 2.—Templet Used in Obtaining Miter Line for Three-Pieced Elbow.





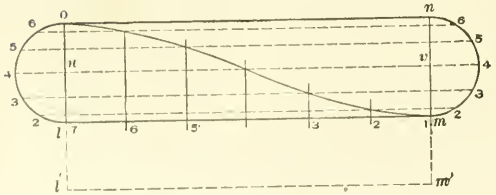


Fig. 4.—Method Suggested by "J. E. B."

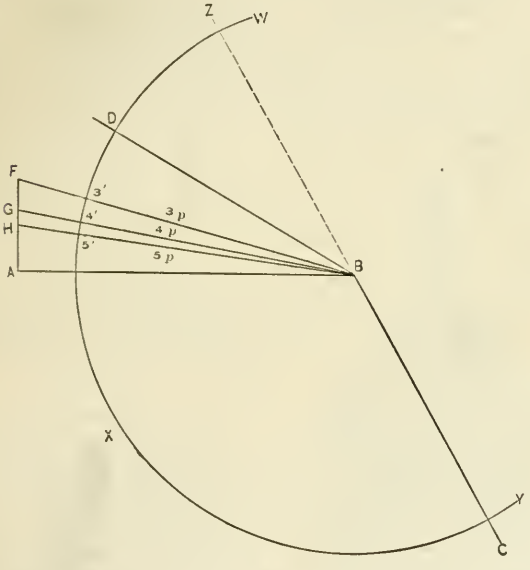
Fig. 3.—Usual Method of Obtaining Pattern of Three-Pieced Elbow.

TEMPLET FOR ELBOW MITER LINES.

The manner in which the templet A B F can be used in drawing the miter line of an elbow is shown In Fig. 2. A three-pieced elbow is represented by *a b c d e f g h*. To obtain the miter line *g b*, draw any line, as A B. From *a* set off the diameter of

elbow, as $a\ h$, and erect the perpendiculars $a\ b$, $h\ g$. The templet is then to be placed as shown, and the miter line $g\ b$ drawn. It is not necessary to draw the entire elevation of elbow as represented in the figure, as the pattern can be obtained from the miter line $b\ g$.

In Fig 3 is shown the usual method for obtaining an elbow pattern. In this figure, $a\ b\ g\ h$ is similar to the part in Fig. 2, having the same letters. In Fig. 3, J M L K represents the profile of pipe of which $a\ b\ g\ h$ is a section. Divide J M L into any convenient number of parts, and from the points thus obtained carry lines cutting the miter line $b\ g$, as shown. On $a\ h$ extended, as $a'\ h'$, lay off a stretchout of J M L, through the points in which draw the usual measuring lines. From the points in $b\ g$ draw lines parallel with $a\ h$, cutting measuring lines of similar number drawn from the stretchout line $a'\ h'$. Trace a line through the points thus obtained, as shown by $b'\ g'$. Then $a'\ b'\ g'\ h'$ is the pattern of part of elbow shown by $a\ b\ g\ h$.



Templet for Elbow Miter Lines.—Fig. 5.—Method of Obtaining Templet for Beveling Elbows.

In Fig. 4 is shown a convenient method of obtaining the whole or half pattern of elbow. In Fig. 2, $a\ b\ g\ h$, having been drawn as previously described from a on $a\ b$, set off the distance $h\ g$, or from B, in Fig. 1, set off the diameter of elbow, as shown by B r, and from r erect the perpendicular $r\ s$, cutting F B. The line $r\ s$ gives the depth of miter the same as $k\ b$ in Fig. 2. On any line, as $l\ m$, in Fig. 4, set off the half circumference of elbow, which divide into any convenient number of parts. From l and m erect perpendiculars in length equal to $k\ b$ of Fig. 2, or $r\ s$ of Fig. 1. Bisect $l\ o$ at u, and with u as center and $u\ l$ as radius, strike the arc $l\ q\ o$. Also bisect $m\ n$ at v, and with the same radius and with v as center, strike the arc $m\ p\ n$. Divide the arcs into the same number of parts as was the stretchout line $l\ m$, and from the points thus obtained, draw lines parallel with $l\ m$. From the points in the stretchout line, $l\ m$, draw the usual measuring lines, cutting lines of similar number, drawn from the arcs l, q, o and $m\ p\ n$. Trace a line through these points of intersection, as shown by $o\ m$. Any desired width can be given to the pattern, as indicated by $l\ l'\ m'\ m$. It will be observed that the half pattern, $l'\ o\ m\ m'$, in Fig. 4, is similar in all respects to $a'\ b'\ g'\ h'$, in Fig. 3.

In Fig. 5 is shown a method for obtaining the miter lines for elbows of any angle and for any number of pieces, also for constructing templet giving the miter lines. Let A B C represent the angle of elbow, which can be drawn as desired. From B as center strike the arc W X Y. Extend C B to Z and bisect E Z at D. Divide E D into one less number of parts than there are to be pieces in the elbow. Thus for a three-pieced elbow divide E D into two parts, as E 3'. For a four-pieced elbow E D is to be divided into three parts, and one of the divisions set off from E, as E 4'. For a five pieced E D is to be divided into four parts and one of the divisions set off from E, as E 5'. Draw A F perpendicular to A B, and from B draw lines through the points in E D, cutting A F as shown. If the elbow was to be in two pieces, B D would be the miter line. The templet A F B having thus been obtained, F B is the miter line for a three-pieced, G B for a four-pieced, and H B for a five-pieced elbow having the angle indicated by A B C. To employ the templet for obtaining the pattern of elbow by method shown in Fig. 4, set off from B on templet the diameter of elbow and erect perpendicular cutting desired miter line. The length of line thus obtained is to be used for perpendiculars $l\ o$, $m\ n$, in connection with the half circumference of elbow, as indicated by $l\ m$. In Fig. 5 the arc W X Y is drawn, and the arc E Z divided for obtaining the miter lines as a matter of convenience. Lines drawn perpendicular to A B and B Z would produce an angle similar to A B C.

On February 4 there was opened at Liverpool, England, the first elevated railroad in that country. The Liverpool Overhead Electric Railway is said to be the largest line in the world operated by electricity. The overhead structure is composed almost entirely of wrought iron, and is carried on columns, the total length being 7 miles, and the total cost something over £600,000, or £85,000 a mile. Nearly 25,000 tons of wrought iron have been used in the construction. Each train is to be made up of two or more carriages, each to seat 56 passengers, and is provided with a motor at each end. The motors are so connected together as to be controlled at either end by the driver, who will carry a key, without which the motors cannot be operated. The quantity of energy can be regulated by the man in charge of the motor, and, although any practical speed can be attained, the trains as at present arranged cannot travel at a greater speed than 35 miles per hour. There are 13 stations, built upon iron girders and columns, the platforms being about 115 feet in length by 12 feet wide, and 3 feet above the level of the rail.

The Condition of the Treasury.

The money in circulation on March 1 was $1,599,655,542, against $1,609,558,892 on March 1, 1892, a decrease of $9,903,350, or $0.67 per capita. The principal changes have been an absorption by the public of gold coin to the extent of $2,000,000, of silver dollars to the extent of over $1,000,000, of subsidiary silver to the extent of nearly $1,750,000, of Treasury notes to the extent of $50,750,000, and of national bank notes to the extent of $2,000,000. On the other hand, gold certificates in circulation have diminished over $45,500,000, silver certificates over $3,750,000, United States notes almost $8,000,000 and currency certificates over $10,000,000.

The following is a comparative statement:

	March 1, 1893.	March 1, 1892.	Changes.
Gold coin..	$409,817,138	$407,813,501	Inc. $2,003,637
Standard silver dollar...	60,432,090	59,264,520	Inc. 1,167,570
Subsidiary silver.....	64,021,838	62,308,717	Inc. 1,713,121
Gold certificates...	114,388,729	160,001,279	Dec. 45,612,550
Silver certificates.	321,279,132	325,141,186	Dec. 3,862,054
Treasury notes ...	126,447,613	75,718,553	Inc. 50,729,060
United States notes ...	314,174,742	322,131,688	Dec. 7,956,946
Currency certificates	19,250,000	29,350,000	Dec. 10,100,000
National Bank notes...	169,844,260	167,829,448	Inc. 2,014,812
Total..	$1,599,655,542	$1,609,558,892	Dec. $9,903,350

From this table we see that there is a loss of about $62,506,000 in gold coin and bullion, which has been partly replaced by $42,750,000 of silver coin and bullion. The decrease in holdings of subsidiary silver and Treasury notes is about offset by an increase in United States notes. The total cash in the Treasury is $16,500,000 less than a year ago.

There are outstanding $440,622,355 of obligations demanding repayment in gold (exclusive of gold certificates) against which the Treasury holds $103,284,219 in free gold. This is 23 4 per cent. of the liabilities, as against 30.1 per cent. on March 1 last year and 24 38 per cent. on February 1.

Following is a comparative statement:

	March 1, 1893.	March 1, 1892.	Changes.
Gold coin	$137,857,000	$198,847,863	Dec. $61,009,963
Standard silver dollar..	358,474,895	352,920,220	Inc. 5,554,675
Subsidiary silver....	10,971,878	14,787,882	Dec. 3,816,956
Treasury notes....	5,420,240	9,517,659	Dec. 4,097,419
U. S. notes	32,500,274	24,549,328	Inc. 7,956,946
Nat'l bank notes....	5,578,128	4,792,427	Inc. 785,701
Total.	$550,789,313	$605,415,329	Dec. $54,626,016
Gold bullion.....	$79,835,048	$81,194,377	Dec. $1,359,329
Silv. bullion.....	102,973,771	65,720,466	Inc. 37,253,305
Total.	$733,598,132	$750,092,315	Dec. $16,494,183

THE RETAIL STORE.

The Stove and Tin Business. II.

BY VETERAN.

The competition of dry goods and furniture dealers is a matter of importance to every retail dealer in large cities where these establishments handle stoves and house-furnishing goods. So far as the sale of stoves by furniture dealers, on the installment plan, is concerned, they are welcome to it, for it never has and never will pay any stove dealer to sell stoves to irresponsible parties on what is called the installment plan. I make a distinction between that and the ordinary credit given to people who are known to the dealer and want a short credit. The furniture dealer sells a bill of goods amounting to enough to pay for the papers giving him a lien on the goods and to send his collector as often as need be, and he is comparatively secure, and he usually charges 25 per cent. over cash prices for the stoves. So far as my personal experience goes, this kind of competition is a help to me, for people who have visited these stores find my full cash prices so much below theirs that it advertises me as a low-priced dealer, and I think there are many cases where the furniture dealer relieves me from running after the pay by doing it himself.

The credit system is an unmitigated curse to trade, as a rule. If people cannot pay for goods they had best go without them. If any one will notice the successful merchants around them they will see that they are men who were very careful about giving credit, while it is a fact that among bankrupt concerns a large part of the assets are worthless accounts that no creditor would take in settlement at 25 cents on a dollar. Not only is the dealer who trusts out his goods doing an injustice to himself and his creditor, but he also commits a moral wrong by encouraging others to burden themselves with debts.

The case with house-furnishing goods sold by the dry goods dealer is different. This trade is a cash transaction strictly, and when the wonderful prices they claim to make are investigated it is seen that they are not so low after all. As a rule they charge round prices for all heavy tinware and other goods that have no second qualities. They purchase agate ware at auction, but it is only seconds that are sold that way. When they really do put a low price on these goods the retail dealer can buy them in small quantities from them at 10 per cent., which is better than nothing, and is the only way he can compete, as the auctions only sell full cases.

There is only harm in making complaints. What sense is there in a man telling every body that the dry goods stores are ruining his business? We live in a day of sharp competition, and a few dollars made from tin ware, agate ware, hollow ware, and notions is a help, and the palatial dry goods establishment will not send any men out to clean furnaces or put up smoke jacks, and such work must be made to pay, and no one will find fault, but to charge 5 cents too much for a tin pan will drive away customers.

I suppose it would sound like nonsense to advise every stove dealer to do the best he can when he meets obstacles, but it is really one of the most difficult things imaginable to do the best one can. It means that the dealer shall keep his head clear, give his whole time to his business, see to his workshop that it is kept well supplied with tools and stock, that work is done when it is promised, that his prices are as low as other reliable dealers are, that he makes and holds a good share of his trade by personal effort, sociability, and pleasant manners, and that he is not carried along by the tide, but has the stuff in him that can run against the tide, and that when he spends money it shall be money that belongs to him.

Peck, Stow & Wilcox Company.

In the Columbian edition of the catalogue of Peck, Stow & Wilcox Company, of tinsmiths' tools and machines, just from the press, while many new goods have been added in different parts of the book, suited to many branches of sheet-metal industries, our attention is especially attracted to several leading lines that have been largely increased. In forming machines a great number have been added which while not new in principle, perhaps, are now offered for a number of uses not before obtainable from this source. A feature that has received much attention is the adaptation of the slip roll method and many formers permitting work to be slipped off the end instead of sprung over the roll, which often impaired the quality of the work. There are a great many large formers for heavy work to be operated by steam power, while a number of rolls for short lengths can now be furnished. The line of corrugating and crimping machines, 30 in number, for hand and steam power, ranging from 3-inch rolls 8 inches long to rolls 8 inches in diameter and 72 inches long, are new with them. The collection of squaring shears now offered should satisfy the most exacting and are made to meet any reasonable requirement in this department.

W. J. GOFF AND FRED. J. TAYLOR of Malone, N. Y., have formed a copartnership and will carry on a general tin, stove, and plumbing business on East Main street in the store occupied by Mr. Goff. Mr. Taylor has been mail clerk on the Central Vermont Railroad. Mr. Goff has for many years carried on an extensive stove and plumbing business and has been prosperous. The new and energetic firm have an auspicious start.

How to Avoid the Accumulation of Dead Stock.

FIRST ARTICLE.

By H. P. TOWNLEY.

We have been 20 years in business wrestling with dead stock, and we are pleased to give you an account of the numerous plans and schemes whereby it was made to go. During these years we have bought four stocks of goods from assignees and have thus gotten more of the stuff than we would otherwise have had. Our experience has been that it is not desirable to buy goods in large quantities in order to obtain low prices. The greater advantage lies in having the goods come to the shelves fresh, in having less capital invested and in being able to take the cash discounts.

CARE IN BUYING.

We endeavor to buy carefully and judiciously (especially if the article is new to us and no demand yet established) and thus feel the trade. Should it prove a seller the order can easily be duplicated.

ANNUAL INVENTORY.

We take an annual inventory, which we consider very important, as it brings into view all stock both good and bad. From this inventory we make list of all dead stock. The list with its quantity and cost price is put on heavy cardboard and tacked up in our office, reversing the maxim "Out of sight, out of mind." Thus we have the dead stock in daily view and by keeping everlastingly at it we succeed in getting well rid of it.

SLAUGHTER SALES.

We have on several occasions advertised "Slaughter sales—great reduction in prices at close of the season." This has never been successful with us. We prefer to carry such goods over to another season and yet get the profit on them when they are sold. Slaughtering prices will demoralize the trade of other dealers as well as our own.

INTRODUCING GOODS.

Small articles are put in the most conspicuous place in the store, namely, on the showcase or on a table near the door, with plain tags on them and our clerks instructed to call the attention of every one who enters the store to them whether customers or not.

JOB LOTS.

We frequently make up job lots for second-hand dealers. We will lay on the floor a pile of goods of which one-half is dead stock and one-half good—the good being put in for a bait. We then call in

our two-handed brethren and work them for $3 or $5 for the lot, as the case may be. One year we sold a gross or more old, old lanterns which would hardly pay their own drayage.

PREMIUMS.

We have used the "PM" system (PM being abbreviation for premium). Each article is marked with a peculiar tag. As the article is sold the clerk keeps the tag till the end of the month, when the cashier will redeem it at the agreed price, the PM money being over and above his salary. We have known clerks to earn $3 to $4 per week extra in premiums.

PRIZES.

To crowd the sales of Stoves we have offered three prizes—viz., $20, $10 and $5—to the clerks who would sell the greatest number, up to January 1.

CONSIGNMENT.

One year we were carrying 13 hard-coal Base Burners which we had taken back on trades. As this is a great soft-coal country these Base Burners were likely to become stickers. We shipped them to a commission auction house in Chicago. After paying freight and liberal commission we came out ahead.

DAILY REDUCTIONS.

Another year we used the 50-cent reduction plan.

The following placard was put on a Stove on the sidewalk.

GREAT SCOTT!!

This Stove will be reduced

fifty cents each day

until sold.

Price to-day, $12.50.

The cost price on the first Stove experimented on was $8. A customer was ready for it bright and early on the day it was marked to be sold for $8.50. The record of 20 of these sales shows that we came out a little above cost. With each Stove extra pipe, tinware, &c., was sold.

COUNTY FAIR PREMIUMS.

Our county fair has helped us to run off some Patent Bread Cutters and Patent Washing Machines by offering them as special premiums for the best layer cake or the largest pumpkin, the cake to go to the dealer. We considered this scheme successful on account of the advertisement there was in it.

Leggett's Liquid White Glue.

Leggett & Brother, 301 Pearl street, New York, are putting liquid white glue upon the market, illustrations of the styles of the packages being shown herewith. The glue is put up in 1 and 2 ounce bottles as in Fig. 1; and in 4 ounce, ½ pint and 1 pint cans, Fig. 2, with brush attached in all cases. The manufacturers remark that the glue as put up is ready for use and may be thinned with water without injury, that it will keep in all climates without spoiling and with no unpleasant odor, and that it does not thicken or freeze in cold weather or become thin in warm weather, and is not affected by changes in the atmosphere. It is recommended by the manufacturers for wood work, carriages, emery wheels, belting, &c., and may also be used for mending crockery and glass. It is stated that the glue does not crimp or crinkle paper, may be used for labeling on tin or glass, and that articles

Fig. 1.—Liquid White Glue in Glass.

upon which it is used do not fall apart in damp, sultry weather. The corks, with brush attached, are prepared to obviate their sticking to the glass or tin. The glue

Fig. 2.—Liquid White Glue in Tin.

is also put up in tin cans with double cover, in 1 quart, ½ gallon and 1 gallon sizes.

Hyatt Cabinet Locks.

Brass Goods Mfg. Company, 92 Third street, Brooklyn, for whom J. H. Walbridge & Co., 43 Leonard street, New York, are sole agents, are introducing locks as shown herewith. The feature of these locks is the entire absence of springs and the thinness of the working parts—the bolt being thrown by an eccentrical shaped thin piece of metal, into which the key fits. The wardrobe lock, Fig. 1, is made in three sizes: 1½ x 2¼, 1¾ x 3 and 2 x 3½ inches; also in sizes 1 inch wide, longer and narrower than the foregoing, suitable for library doors, &c. The locks represented by Fig. 1 have broad bolts, which shoot both right and left, and are provided with combination union key, having a round bit and flat shank, thus giving additional security to the lock. The locks have a self-centering keyhole, boring for which simply requires a $\frac{7}{16}$ bit.

Fig. 1.—Hyatt Wardrobe Lock.

The locks are made entirely of steel, finished both in natural steel color and in bronze, with one key for each lock. The lock, including bolt and casing, meas-

Fig. 2.—Key for Wardrobe Lock.

ures $\frac{3}{16}$ inch in thickness. The cylinder drawer lock, Fig. 3, is finished in steel and bronze, and is made in two sizes, 1¾ inch and 2½ inch wide. The escutcheon fits a hole bored with a $\frac{7}{16}$-inch bit, is self-finishing and is adapted for drawers

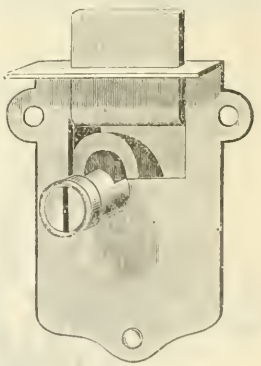


Fig. 3.—Hyatt Cylinder Drawer Lock.

having ¾-inch fronts. The amount of cutting out required to accommodate this lock is very small, being less than $\frac{3}{16}$ inch. The locks are provided with flat steel keys—one key to each lock of steel finish

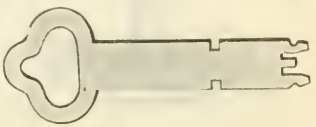


Fig. 4.—Key for Cylinder Lock.

and two keys to each bronze-finished lock, with 12 changes to a dozen.

The cuts shown are full size representations of the locks and keys. German drawer locks of similar construction are also made by the company.

Meat Choppers.

The Enterprise Mfg. Company, Philadelphia, Pa., have placed upon the market a new No. 3 Enterprise meat chopper, as

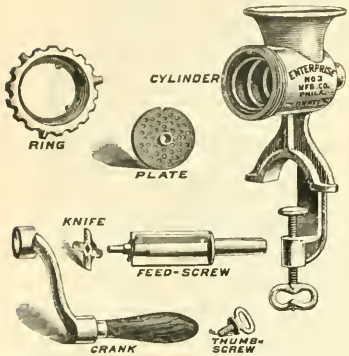


Fig. 1.—No. 3 Enterprise Meat Chopper.

shown in Fig. 1. While the outward appearance of the chopper resembles their old pattern, the principle of forcing the

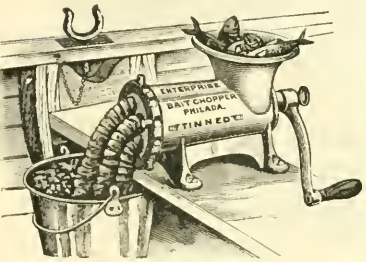


Fig. 2.—Bait Chopper.

meat to the perforated plate is practically a reversal of that formerly used. The cut shows the interior of the cylinder or

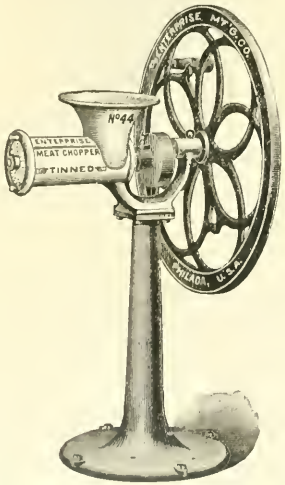


Fig. 3.—No. 44 Meat Chopper.

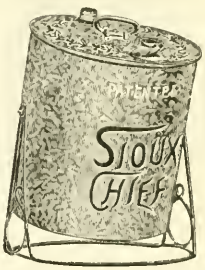
casing, grooved after the style used on the feed screw in the old pattern, while the feed screw used in the new pattern has straight edges. It is claimed that the new principle in this chopper will better adapt it to household uses.

To meet a special demand, the same company have ready for the market a bait chopper, Fig. 2, which is of the same size as their No. 32 meat chopper, but is fitted with a short crank, and a plate with large holes. It is intended for use by fishermen, and is especially useful in "chumming" or "baiting" up any particular spot by spreading over the waters chopped menhaden, hardhead and other bait.

As a third novelty, the company are introducing a chopper mounted on a column, Fig. 3, and adapted to the uses of butchers and hotels. It is to be catalogued as No. 44, and is their No. 42 in a new form, provided with reversible gearing, capable of adjustment for driving the feed screw faster or slower than the crank wheel, as may be desired.

Sioux Chief Oil and Gasoline Can.

The can illustrated herewith is manufactured by F. C. Wilson & Co., 239-241 Lake street, Chicago, Ill., and is being



Sioux Chief Oil and Gasoline Can.

introduced by them. It is made of galvanized iron, neatly finished and ornamented, and is provided with a faucet and a tin cork lined filling screw. The stand in which the can is hung is made of No. 6 wire, japanned black. The point is made that the stand is very strong and that it may be utilized for hanging the can upon the wall, so that a child can handle it. The cans are papered and packed in quarter dozen crates.

John Lapp, Rochester, N. Y., has patented an improvement in steam boilers and heaters. The boilers consist of vertical two-piece sections, the water space being within the sections and communicating through suitable heads.

Home Tacks.

The accompanying illustrations represent the packages containing home tacks as put on the market by the Atlas Tack Corporation, Boston, Mass., and 116 Chambers street, New York. Fig. 1 shows the case containing 12 cartons of tacks, the case

Fig. 1.—Case of Home Tacks.

being about 8 x 12 inches in size and 2 inches deep. The cover of the case is held open by tapes, and the inside and outside of the cover are handsomely lithographed in colors, making an attractive display upon counters, shelves, and in showcases, show windows and sample rooms. The front of the cover is the same depth as the box, lithographed in colors, and presenting a pleasing appearance when the cover is closed. The 12 cartons, one of which is shown in Fig. 2, are an exact reproduction in miniature of the case, including colored lithographing, and each contains two boxes 8-ounce, one box 10-ounce, one box 12-ounce carpet tacks,

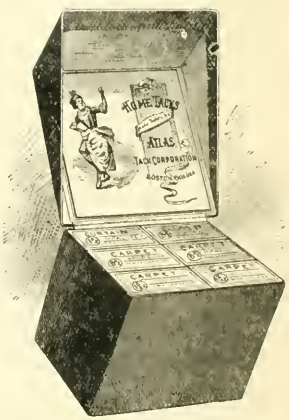


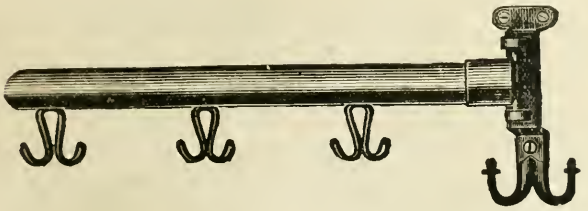
Fig. 2.—Carton Taken from the Case.

one box gimp tacks and one box curtain tacks. The tacks are especially assorted for home uses, and the cartons containing the six boxes are designed to retail for 25 cents each, or single boxes of tacks may be sold for 5 cents each. The point is made that the sales of tacks can be increased, as customers may be induced to buy a carton of six boxes instead of purchasing only one box.

The Champion Hinged Clothes Bar.

The illustration here shown is of a hinged clothes bar put upon the market by the Besel Patents Company, 133 South Second street, Philadelphia.

The bar swings in a hinge which is easily affixed by three screws to the back of a wardrobe or closet. There are double hooks on the bar, so arranged as to allow of garments being hung quite closely.



The Champion Hinged Clothes Bar.

The novel feature of the bar is that it allows of the garments on each hook being readily viewed or examined without removal. The capacity of the wardrobe, too, is more than doubled.

The cut shows the bar ready for adjustment. Bars are made in a variety of sizes, and are therefore adapted to any wardrobe or closet.

A Cash System.

In the Retail Hardware establishment of R. B. Owen & Sons, Detroit, Mich., signs are hung on the gas fixtures, the object being to clearly inform customers of their system of doing business. The signs are as follows:

We sell for cash only.

Goods cheap for cash.

Do not ask for credit.

We prefer our goods to credit.

Before starting business, nearly a year ago, the above firm decided to do a strictly cash business, and have carried out their intention to the letter. In a communication from them they refer to the matter as follows:

Relating to the "cash system," we were led to decide to adopt the same exclusively from the great majority of builders and contractors being very slow pay, even if worthy of credit at all. In this city we have over 700 boss builders, and not to exceed seven, if over five, are worthy of credit. From the fact that a new business would be very anxious to open trade we recognized the fact that we would be overwhelmed with people desiring credit, to whom we would be very apt to extend the same. We were counseled by a number of our friends that our decision was impracticable, but after the trial given the experiment we are more convinced than ever that we are right. We are aware that we could sell a much larger quantity of goods on the credit basis, but we find we sell a great many goods to people simply because they do not owe us, as it is human nature to shun a store to which we are indebted. We compel all bills to be paid for either at the time of purchase or upon delivery to the buildings. Our builders are fast becoming educated that it is the wisest thing for them to do to pay cash, as they buy their goods cheaper and buy only what they absolutely require. We shall strictly adhere to the "cash system," and unequivocally pronounce same a success.

The fact that a retail Hardware business is being successfully carried on upon a strictly cash basis, and that goods are not delivered until paid for, is of especial interest to the Hardware trade. That such a business is being done in a city where other Hardware stores are offering credit lends additional interest to the undertaking. The reasons given why it was decided not to do a part credit and part cash business exist in every community, and we suggest that any merchants who are dissatisfied with credit business consider the advisability of making a change to cash on or before January 1, 1893. Limiting credits first to 60 days, and then to 30 days, customers may gradually be prepared for the change to a cash basis.

Bradley Shelf Bracket.

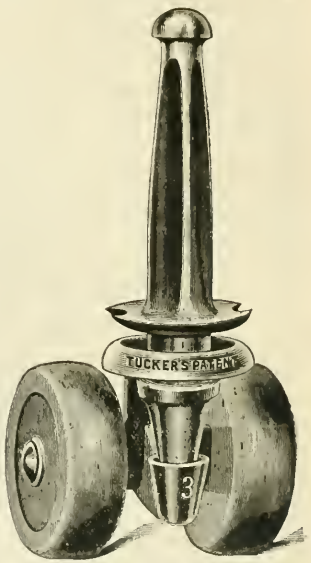
Atlas Mfg. Company, 71 Hamilton street, New Haven, Conn., are putting on the market an improved form of their Bradley bracket, as herewith illustrated. In the improved form the screw holes on the long side of the bracket are side by side, instead of one over the other, as formerly. This is referred to by the makers as an advantage, as the holding power of both screws is now fully utilized, and the convenience in handling and driving the screws is much greater than in

Bradley Shelf Bracket.

the first form, where the holes come directly behind the brace. The point is made that the present form also secures a much wider bearing sideways, and adds to the symmetry and correct proportions of the bracket. The bracket is described as light and artistic in design, finely finished, having more strength than the same size cast-iron bracket; as not being brittle, and not breaking in shipping or in driving the screws from the warping of a shelf or from a sudden blow, and as saving 75 per cent. in the cost of freight. The brackets are made in 4 x 5, 5 x 7, 6 x 8, 7 x 9 and 8 x 10-inch sizes, and have a tin finish.

Tucker's Improved Furniture Caster.

The caster represented in the accompanying cut shows an improved construction, introduced by the Tucker & Dorsey Mfg. Company, Indianapolis, Ind. In the improved construction all washers and screws have been done away with, and the caster consists of but two pieces of malleable



Tucker's Improved Furniture Caster.

iron, besides the wheels and axle. The loop in the housing is simply pressed around the stem, so it is stated that while there is freedom of movement and perfect oscillation, yet the stem is held securely in place. Attention is also called to the new fluted Fox stem, which, it is claimed, makes a perfect drive stem, in addition to being expressly designed for use with the Fox socket and track plate. The point is made that the caster is extremely simple and of the most desirable design and finish.

MEMORANDA.

THE HARDWARE FIRM OF CASH & BRADFORD, Hyannis, Mass., have been dissolved Mr. Cash retiring after having been in business since 1866. Mr. Bradford, who has been associated with Mr. Cash for the past seven years, will continue the business in a part of the new block soon to be erected on the site of the one which was recently destroyed by fire. The new block will be four stories high on Main street and will cover 8000 feet of land. Mr. Cash will for the present devote his attention to building matters.

F. H. EWALT, J. E. COOPER AND C. C. EWALT have organized at Manhattan, Kan., the firm of Ewalt, Cooper & Co. The new firm will commence business about March 15, and will carry a line of Builders' Hardware, Cutlery and general Hardware. Plumbing will also be a part of their business. The new firm will be pleased to receive catalogues and other printed matter issued by manufacturers and jobbers in their line.

THE BUSINESS formerly conducted by Murphy, Cole & Bain, retailers of Hardware, Tinware, Stoves, &c., Bethany, Mo., is now carried on under the style of J. L. Cole & Son.

STOVE TRADE NOTES.

Claims for Castings Broken in Shipment.

The question of unjust claims for breakages of stove castings in shipment is one which has from time to time received more or less attention in these columns, but from the numerous letters received from members of the trade, suggesting a discussion of the subject in *The Metal Worker*, it is probable that much more might be said to the advantage of all concerned. We trust, therefore, our readers will consider this an invitation as applying to them individually, and will send us letters expressing their views of the questions raised. One writer under recent date urges a discussion of the subject of unjust claims for breakages in shipment, and says:

"When a dealer writes us, as one of ours did, for a set of coal fixtures for a range, claiming that he bought the stove for wood only and the wood fixtures cracked all to pieces, his customer concluded he would burn coal, and now wants coal fixtures at a reduced price, or free—I think it is about time some articles from the trade papers were turned in that direction."

Another correspondent gives extracts from letters recently received by his firm relative to the same subject. Among them are the following:

"The deductions made for castings was for bottom of —— broken. Although it was only a small piece my customer refused to pay unless I put on a new bottom."

"I received last evening the No. 7 —— stove, but found there was an apparent crack in the front door near the hinge. Not thinking you would want me to have that, I send it back for examination."

It is probable that nearly every stove manufacturer in the trade could furnish innumerable instances of this general character, and also that he has pretty well defined ideas as to who should bear the loss in cases of this kind. A writer, well informed by reason of his long connection with the stove trade, and who is qualified to speak authoritatively, expresses views concerning the justice of claims of this character made upon the stove manufacturer, which are full of interest to all in the business. It is his belief that if claims of this kind are allowed it is simply on the score of policy, and that the wholesaler will pocket the loss for fear that by entering into a controversy over the matter he might lose a customer. He continues as follows:

"It is, nevertheless true that such claims are becoming more and more frequent and causing much loss to the wholesalers. Firm ground should be taken by them to resist such claims, for their own protection and preservation of profits. One large house some months ago published a circular, which was sent broadcast throughout the trade, and which, we understand, has been generally accepted and respected by their customers. It reads as follows:

SPECIAL NOTICE.

As questions are always arising relative to breakage and damage to goods in transit, and as there seems to be a feeling more or less that the shipper and not the carrier should be responsible for the safe delivery of goods at their destination, we find it necessary to notify our customers and the trade generally that, while we are willing to assist them all we can in adjusting claims or recovering damages, we must positively decline to entertain or allow any such claims if made upon ourselves, as our responsibility ceases as soon as goods are delivered in good order at railroad depot or wharf, and a receipt taken for the same.

Our goods are not only carefully packed by experienced packers, but must be all passed by a competent examiner, thereby insuring that goods are in perfect condition when sent out; consequently we cannot admit the claim so often raised, that they have been damaged in transportation because not properly packed or boxed, when the damage is the result of improper or careless handling on the part of the carriers.

In the absence of any special instructions, goods are shipped released, thereby the lowest freight rates are procured. Parties desiring their goods shipped not released or packed or shipped in any particular manner, should send instructions with each order.

Goods will not be received by us unless returned by our permission; and unless it has been otherwise arranged, party returning goods must in all cases pay freight and expenses, and be responsible for any damage to the goods until the same are received by us.

If other manufacturers would adopt a similar course it would undoubtedly go far toward establishing a fixed rule which the dealers would understand to be inviolable, and one by which they must abide—or it may be more correct to say it would revive or re establish a very old rule which, by the weakness of stove manufacturers, has lost its force; and, if unjust claims continue to be allowed by them, will drop into innocuous desuetude in a few years more.

The loss of money by allowing such claims is not the only ground of injustice felt by the manufacturer, but the case is aggravated by the fact that he pays what the Transportation Company should pay—for it frequently happens that a dealer will write to the wholesaler, when a stove arrives broken, that he refused to receive it and ordered the transportation agent to send it back; that he did not propose to fight the railroad company, so thought the best way out of it was to let it go back. There are others who do not even deem the manufacturer as entitled to the courtesy of a written notification of its return, and the shipper—perhaps two or three weeks after the original shipment—is notified by the carrying company that a stove is at the freight house marked for him. The original shipping tag may be absent, and much difficulty is often experienced in ascertaining from whom it comes; and sometimes the sender is not known until the monthly statement of account is returned by some dealer who is highly indignant at being asked to pay for a stove he never received. He is occasionally mad enough, at the outrageous conduct of the manufacturer, to close accounts and never buy another dollar's worth of goods. Letters of explanation to men of this class amount to nothing but wasted time and money.

As a matter of fact there is no other established rule of business or relationship between buyer and seller that is so often ignored or abused as the responsibility for damage in transit. Prices, discounts and terms of sale, though sometimes the subject of dispute, do not come up to disturbe the business intercourse or friendly relations between buyer and seller once where the matter of breakage comes up a dozen times. Of course prices and terms are generally fixed by written quotation or written in manifold books by travelling salesmen, and duplicate of sale and terms left with the customer, but the conditions of shipment, or in other words, the responsibility in case of loss or damage in transit is frequently as explicit and plain, as many firms have printed on their invoices the following expression: "After obtaining a receipt for goods shipped in good order our responsibility ceases. If loss or damage occurs in transit the consignee must look to the Transportation Company for redress."

Every case of indifference on the part of the consignee, or shifting the responsibility upon the shipper, encourages future carelessness and independence of the carriers; for the shipper, on whom the burden is thrown, is without proper proof of the true condition of goods on arrival when refused by the consignee, and too often he is obliged to stand it all, because the claim would be weak from lack of assistance from or indifference of the one who really should have made the claim.

DEALERS SHOULD EXAMINE GOODS.

If dealers would examine goods carefully on arrival before removing them or receipting for them and give a conditional receipt or note in signing the number of stoves or other articles broken, thus laying a good foundation for their claim, they would not experience much disappointment in having it allowed. If they would all do this regularly, taking care to find even the smallest break and render a claim therefor, it would not be long before an improvement in the service of every carrying company would be noticeable, for it would be cheaper to get better freight handlers and otherwise improve the service than to look after accumulating claims.

It seems a pity they should so often be assisted to go scott free of all responsibility.

If the printed notice on bill heads goes for naught—and it often does, as the buyer claims that all the conditions of the sale should be known to him in advance of, not subsequent to delivery—then it would be advisable for the wholesale houses to have shipping conditions or conditions of responsibility printed on their letter heads, catalogues, price lists, circulars, and all literature that circulates to the dealer prior to his giving his order.

In this way no dealer could put forth the same excuse that he supposed the goods were to be delivered in perfect condition to his station or wharf, and the rule of the wholesale merchant would be so well advertised that such a contention would have no leg to stand on if made, and the custom of any dealer making it could well be dispensed with.

(*To be continued.*)

Thomas A. Westcott.

At a meeting of the stove manufacturers of Boston, held on Saturday, February 25, at the office of the Magee Furnace Company, a series of resolutions were adopted in memory of the late Thomas A. Westcott, who, until the day of his death at the age of 70, was actively engaged in the stove business. The resolutions adopted read as follows:

WHEREAS, Death has removed from our midst our valued friend and business associate, Thomas A. Westcott,

Resolved, That we, stove manufacturers and jobbers of Boston, recognize in his death a loss sustained by the business and social interests of the community where he lived, and where he was everywhere esteemed as an honorable business man and useful citizen.

Resolved, That we close our places of business during the funeral hour.

Resolved, That a committee of our number be appointed to attend the funeral.

Resolved, That we tender to his family our condolences in this their bereavement, and transmit to them a copy of these resolutions, and publish same in the daily press.

D. W. Cushing, S. M. Howes, J. R. Prescott, Committee on Resolutions.

Courtesy in Letter Writing.

Not the least difficult work of the man of business is to write letters to disgruntled customers and explain away disagreeable occurrences. Where the customer is in the right it is an easy matter to acknowledge it and make the proper restitution. But the hard work comes when the customer is manifestly in the wrong, but yet has to be treated judiciously, and, we may say, tenderly, lest his feelings be so hurt that he transfer his trade elsewhere. The amount of self control shown in correspondence of this nature, where moneyed interest is at stake, is incredible did not every one's own experience prove it to exist. Not a few business men of naturally hasty temper make a practice of writing, or, at least, of outlining a letter first that expresses exactly the state of their minds without any regard to the amenities of correspondence. This first draft, being kept for 24 hours and destroyed, is replaced by a second polite and carefully-worded letter that accomplishes the purpose that the first would have frustrated. The result of these courteous notes, where the occasion would seem to warrant anything but gentleness, is so uniformly of advantage, that we should think more expediency would prevail and keep every business note free from any trace of ungoverned temper. This trait of courtesy in correspondence, verbal and written, is like the quality of mercy, a blessing to both parties to the intercourse. It becomes the business monarch, and is an invaluable possession to his lowest clerk; it is a factor of economy in the conduct of busines that cannot be overestimated. And the wisdom of this good rule is never so clearly emphasized as when a fit of sudden passion shakes seasoned business men out of their well tried manner and drags them into correspondence of invective and personalities.

THE BUCKS STOVE & RANGE COMPANY of St. Louis, Mo., send us a four-page circular in which the history of the Bucks stove is briefly presented. It is stated that "46 years have passed since the first Bucks stove was made, and, looking back to that day and comparing the stoves then made to the Bucks brilliant stoves of the present day, we more than realize that this is an age of marvelous progress." Reference is made to the fact that many of the practical ideas to be found in Bucks stoves and ranges are the result of years of practical experience, investigation, and the expenditure of large sums of money. In conclusion the circular, which is signed for the company by J. W. Van Cleave, manager and treasurer, extends an invitation to all dealers to examine into the merits of the company's goods and to write them for any and all information that may be desired.

Robert Schueler & Co.,

manufacturers of American gas stoves, 615 Ogden avenue, Chicago, have issued a new catalogue and price list. Their leading product is the American gas range, which is shown in a variety of styles and sizes. It is a full cabinet range, the body being made of cold rolled heavy refined steel, with cast iron front, top and doors. The oven is heated by double radiating burners placed underneath a sheet of steel, half an inch from the oven bottom, which prevents the flame from the burner coming in direct contact with the oven bottom. The flues are so arranged that the heat passes up both sides over the top and down the back, escaping at the flue in back, thus exposing every part of the oven surface to the action of the heat, while the fumes from the burning gas do not come in contact with the contents of the oven. The burners are of the latest design, having no loose caps to cause leakage of gas. An automatically hinged drop oven door forms a strong and convenient shelf when open. The cooking holes have covers and removable grates. Nickel has been judiciously used in ornamentation. The highest grade range of this type is provided with a back rail, to which are attached nickel plated swinging tea shelves. Variations of this range are shown in the catalogue, having water heater at the side, with two cooking holes over it, a high broiler or a high shelf. Cheaper grades are made in three styles, with either two, three or four burners on top. The line of table stoves includes three styles, respectively known as American Junior, with cast tops; Columbia stoves, with japanned steel tops, and Enterprise stoves, cast in one piece. Heaters are also shown in various styles and sizes, embracing both square and cylindrical constructions.

ODD PLATES.

THE PERRY STOVE COMPANY, for years at 74 Beekman street, are about to move into more commodious quarters at 103 Beekman street, where their manager, A. A. Thompson, will, after May 1, be pleased to see old friends and make the acquaintance of many new ones. The Gipsy and Hero portable ranges (one a modification of the other) have lately been improved and will in future be known as the New Gipsy and New Hero. We are told this pattern in New York and the immediate neighborhood for 1892 reached a sale of 4800, and 6000 could have been sold if the increased wants of the trade could have been anticipated. The improvements referred to consist of a swelled oven door, fire and ashpit door, together with a handsome name plate with tile ornaments. The New Gipsy can be supplied with or without base skirting and now has a foot pedal or oven door opener, formerly used only on more expensive ranges. They also have a full line of samples of Royal oil and lamp stoves which through recent improvements introduced in manufacture the company are enabled to sell at a less price than formerly. The Improved Dandy low gas stove of 1893 is now ready for shipment.

A DISTRESSING accident occurred late on the afternoon of Thursday, February 23, at the works of the Abram Cox Stove Company, Dauphin and American streets, Philadelphia, Pa. A gang of workmen were employed in tearing down a two story stable adjoining the stove works, in order to make room for improvements by which the plant is to be increased. Suddenly one of the walls of the building fell instantly killing two workmen, while a third was seriously injured.

THE MICHIGAN STOVE COMPANY favor us with a sample of the advance cards sent out by their salesmen to announce to customers that they may soon be expected to call. The one before us is in the form of a dainty pamphlet containing four leaves, bound together with silk cord. The salesman's announcement is on the front page of the cover, which is of heavy white paper, with a serrated edge. The inside pages contain a well worded argument in favor of the exclusive sale of Garland stoves and ranges.

WE ARE ADVISED by C. T. Boal that the C. T. Boal Stove Company, who have long conducted an extensive business at 245 and 247 Kinzie street, Chicago, have closed up their business. As they owed no debts it was found an easy matter to "quietly quit." Mr. Boal was for many years the Western representative of Orr, Painter & Co., of Reading, Pa, and also manufactured the Henrietta line of stoves at Chicago. He is well and very favorably known to the trade at large, and his many friends will hear of his retirement with regret. Our best wishes go with him in whatever channel he may see fit to enlist his energy in the future.

AT THE HEADQUARTERS of the Union Stove Works, on Beekman and Gold streets, the managers are busily engaged in renovating and improving the interior in the way of painting, readjusting samples and otherwise getting ready for an increased trade which they confidently expect. They have introduced among other things a system of pneumatic tubes designed to save time and facilitate the transaction of business, and propose to be up with the times and down to date.

H. RENDTORFF & Co., 16 Lake street, Chicago, have brought out a very handsome circular, illustrating and describing their Ideal wrought steel range. The illustrations show it with high closet, with high closet and water tank on side bracket, with high shelf, &c. Three sizes are made with six cooking holes and one size with four holes. The flues are asbestos lined throughout, and the ovens are thoroughly braced and bolted. They are adapted to any kind of fuel and are elegantly finished. A supplement sheet to their catalogue has also been issued which gives descriptions and prices of the Home Ideal cook stove, which is furnished in two sizes, either square or reservoir extension, adapted to hard or soft coal, and is offered to meet the demand for a cheap stove.

THE CORNING STOVE COMPANY of Corning, N. Y., are enjoying something of a boom just at present on their line of Garnet stoves and ranges. We understand that the works are crowded with orders, every department being pushed to its utmost capacity. Another gratifying feature in connection with this condition of affairs is that the warehouse is depleted of its stock of finished goods.

THE RIDGWAY FURNACE COMPANY, 76 Union street, Boston, Mass., were awarded a gold medal at the Massachussetts Charitable Mechanics' Association "for superiority and economy of their hot air furnaces." It is stated that this is the only furnace which has received a gold medal from the association named for the last 35 years.

ACCORDING to a local paper the invoice of the Girard Stove Works at Girard, Ohio, has been completed, showing the condition of affairs to be as follows: Bills payable, $55 000; accounts payable, $23,000; good assets, $15,000. Capital of company, $15,000. It is now said to be regarded as probable that the plant of the company

will be sold and purchased by the creditors who hope by operating it to save something from the wreck. The appraisers of the works appointed by Judge Robinson were C. D. Goodrich, W. J. Wallis and Henry Hartzell.

THE MARCH-BROWNBACK STOVE COMPANY of Pottstown, Pa., began last week to run their works full in all departments in order to keep up with orders. We understand that the prospects are such that there is not likely to be any let up before the first of July.

THE WARREN HARDWARE COMPANY of Warren, Ohio, held their annual meeting a short time since to elect officers and declare a 6 per cent. dividend for the year. We understand that the trustees decided to enlarge their works and increase the steel range business of the company.

THE J. S. & M. PECKHAM COMPANY of Utica, N. Y., have been incorporated under the laws of the State of New York for the purpose of manufacturing stoves, furnaces and agricultural implements. It is stated that the new concern assumes all the liabilities and assets of the firm of J. S. & M. Peckham. At the meeting of the stockholders Merritt Peckham, Edwin Peckham, Frank Peckham, Merritt Peckham, Jr., and W. C. Walker, all of Utica, were elected directors. Subsequently the directors elected Merritt Peckham, president; Edwin Peckham, vice-president, and W. C. Walker, secretary and treasurer. The capital stock of the company is said to be $100,000.

THE FEBRUARY ISSUE of the *Gasoline Stove Bulletin*, devoted exclusively to the interests of George M. Clark & Co. of Chicago, is designated as the 1893 Catalogue Number, and in it everything they make is illustrated and described. It is made up of 16 pages printed on tinted paper after the general style of its predecessors. It is full of interesting matter relative to the goods manufactured by the company named and presents illustrations of a wide range of Jewel stoves. Upon what may be termed the editorial page the statement is made that the policy of the publishers of the paper with regard to travelling men has been somewhat modified. There are now three representatives who will work on gas, oil and gasoline regularly, but in no stated territory. This is also the first number of Volume V, and in it the company present their annual greeting in which, among other things, they state that they have taken a new building 50 x 130 feet in size, five stories and basement in hight, which will enable them to double their output. Their line has been increased by the addition of a cabinet process range, a two and three burner low stove with a lay-down tank in both the junior and Acme styles, a two and three burner medium stove with a single generator, and a cake griddle which in the estimation of the manufacturers is simply "perfect."

THE CHICAGO TRADE in coal and wood ranges and cook stoves is by no means brisk. The house is highly favored whose mail brings in an occasional carload order. This is not surprising in view of the severe weather which has until very recently prevailed throughout the entire Northwest, almost preventing salesmen from making their regular visits to the towns in their territory. The city trade is light, orders generally calling for one or two stoves or ranges at a time, very rarely running up to half a dozen.

WE ARE INDEBTED to the Round Oak Stove Works, Dowagiac, Mich. for some very handsome photographs of the interior of the Beckwith Memorial Theatre, the completion and dedication of which was referred to in these columns not long since. One view represents the drop curtain, another shows the stage as viewed from the parquette, while a third represents a tier of boxes. Judging from the photographs before us, the interior is very handsomely decorated and conveniently arranged and is a credit to all concerned in its design and construction.

THE O'RORKE STOVE REPAIR COMPANY of Peoria, Ill., have brought out a volume entitled "O'Rorke's Stove Repair Key." It is issued for the purpose of enabling stove dealers to fill orders for repairs for a large number of stoves by means of a very small stock. The work gives a list, it is claimed, of over 5000 stoves which have interchangeable parts or are duplicates, and describes the marks on the various castings so as to enable the dealer to tell what stoves they will fit. The names of the stoves are arranged in alphabetical order down the left hand side of the page, while, after each name, in parenthesis, is an indication of the kind of stove—whether coal or wood, or for heating. Following this in turn are the names of the concerns making stoves which the castings named in the list will fit. We understand that the object of this volume is to facilitate the ordering of repairs on the part of dealers.

KEARNS WROUGHT STEEL RANGE COMPANY of Philadelphia, Pa., have removed their office and show rooms to No. 1020 Arch street, where they will be under the personal charge of John J. Kearns. They also state that they have secured a large factory in Burlington, N. J., and have fitted it up with every modern appliance for the quick production of their goods. These changes have been made necessary by the increase in their business, and the company state that it is the third time in as many years that they have been compelled to seek other quarters owing to lack of room.

JOHN JACOBS, the popular stove and hardware dealer of Little Falls, N. J., while giving Charles E. Coleman of Eugene Munsell & Co., a sleigh ride a few days ago, had the misfortune to get upset in front of the courthouse at Paterson. The sleigh became involved in the electric car tracks in such a way as to throw both gentlemen into the street. Although neither was seriously injured, the mishap caused no little excitement and a crowd soon gathered; even the small boy was there and participated in the fun.

THE WROUGHT IRON RANGE CO., of St. Louis, Mo., and with Canadian works at Toronto Junction, have issued an edition of their catalogue of Home Comfort wrought steel ranges and hotel kitchen outfits, which is considerably smaller in size of page than the one which was reviewed in these columns a week or two since. The matter embodied is practically the same as that contained in the larger catalogue, but the cuts are reduced in size and the text printed in smaller type. The covers are of red paper, and upon the front one is an interior view of a kitchen equipped with one of the company's outfits.

THE RETAIL STOVE TRADE along the Hudson River appears to be pretty well canvassed just at the present time, as may be evidenced from the fact that one day last week the following well known representatives were visiting dealers in that section: A. R. Bond of the Perry Stove Company; T. A. Dreer, of the Reading Stove Works; Charles E. Coleman, of Eugene Munsell & Co.; W. F. Geer, of Rathbone, Sard & Co.; Charles S. Ingham, of the Syracuse Stove Works; G. T. Hedenberg, of Janes & Kirtland, and W. F. Myers, of the Union Stove Works. All these knights of the grip reported a fair demand for the specialties of their several firms.

AT A MEETING of the directors of the Lebanon Stove Company, held at Lebanon, Pa., on the morning of Saturday, February 25, John H. Sultzer, treasurer, resigned, and Harry A. Reinoehl was unanimously elected to fill the vacancy. We understand that Mr. Sultzer has recently purchased the interest of John F. Snavely, of the firm of Sultzer & Snavely, and will devote his time to mercantile interests. The new firm will be known as J. A. Sultzer & Brothers.

THE WROUGHT IRON RANGE COMPANY, St. Louis, Mo., have recently secured a contract from the United States Government for a complete kitchen outfit for Mess Hall at Fort Crook, Neb. The weight of the range is 3 tons. They have also shipped Home Comfort ranges to the following places: Soldiers' Home, Minneapolis, Minn., weight of range, 3½ tons; Pacific Hotel, Jacksonsville, Ill., weight of range, 1 ton; Hotel Rennick, Bement, Ill.; Van Buren College, Van Buren, Maine, weight of range, 1 ton; Arkansas State Insane Asylum, Little Rock, Ark., weight of range, 4 tons; New Hotel Tahlequah, Ind. Ter.; Paxton's Hotel, Omaha, Neb., weight of range, 2½ tons; New Hotel, Taylorville, Ill., weight of range, 1½ tons; "B. & M." Eating Houses, Shreveport, La.; Wooding Camp, Deadwood, Dak.; Longinotti's Hotel, Atlantic City, N. J., weight of range, 1 ton.

A. C. BARSTOW, JR., treasurer of the Barstow Stove Company, made a flying trip through Arkansas last week inspecting a family railroad property with the superintendent of the Cleveland, Canton & Southern Railroad in which road Mr. Barstow is a director and officer. A little time was spent at the Hot Springs, which place is now in the height of season.

AT THE ANNUAL ELECTION of trustees of the Perry Stove Company, Albany, N. Y., the following were chosen: Nathan B. Perry, John T. Perry, George W. Hobbs, Edward R. Perry, A. N. Perry, G. Y. Lansing and A. A. Thompson.

The Commercial Credit Guaranty Company have just been organized by the wholesale merchants of Chicago for the purpose of insuring the commercial credits of the wholesale trade of the United States. On the 6th inst. a meeting was held at the Grand Pacific Hotel in that city for the election of officers and directors. James A. Sexton, of Cribben, Sexton & Co., presided, and the following officers and directors were unanimously elected: Edmund Burke, president; Edward Rose of Strauss, Yondorf & Rose, first vice-president; W. A. Mason of James H. Walker & Co., second vice-president; Aug. Blum, cashier Union National Bank, treasurer; Josiah Cratty, Tacoma Building, secretary; E. K. Sumerwell, general manager; H. Waldman, actuary and superintendent of agencies; S. H. Sweet of Sweet, Demptser & Co.; James A. Sexton, U. S. postmaster, Chicago; David Kelley of Kelley, Maus & Co.; A. D. Kelley of Kelley, Maus & Co.; Charles A. Morrill of C. A. Morrill & Co.; Charles E. Frankenthal of Frankenthal, Freudenthal & Co.; Samuel J. Kline of Jos. Biefield & Co.; Wm. H. Bush of Bush, Simmons & Co.; R. L. Henry of R. L. Henry & Co.; P. C. Maynard of Phelps, Dodge & Palmer Co.

The estimated export of wheat from Argentina in 1891 was five times as large as in 1885, and the area under wheat is believed to be nearly 3,000,000 acres, or nearly one-third of the whole area under cultivation in 1892. The crop prospects for the next season are only fairly good.

TRADE REPORT.

The Iron Market.

Taken as a whole, there is an increased demand for Iron throughout the country, though inside prices rule, and manufacturers have come to the point where some will shut down their works rather than submit to lower prices. With few exceptions orders are placed for immediate delivery, or for delivery covering but two or three months. In some parts of the West contracts have been made which cover shipments for the entire year. While the volume of business is fairly satisfactory the market is weaker, concessions being made by nearly all the districts which contribute to the supply of the territory tributary to New York. In the Eastern market generally the demand would be considered good in ordinary times, but with such a large capacity for production, and with so much delay in specifying, mills are all the time close to the end of their order books. Prices, therefore, are very feverish and in some cases during the past few days have been quoted lower than ever. The feeling is that a line must be drawn somewhere, and that line appears to be at inside quotations. Some leading concerns are refusing to meet the figures named by others, on the ground that business on such terms must inevitably result in loss ; and sooner than do that they will close their mills. The improvement, therefore, is somewhat of a negative character, and is comprised in refusing prices which were recently accepted, rather than on actual business at advanced prices.

The Pig Iron market shows no change from last week, and in all ordinary transactions prices have been well maintained. Anything not strictly first class in point of quality would probably have to be shaded a little, but at prices quoted below there is a market for almost anything that may be offered. The demand is chiefly for standard brands, and these are absolutely firm, but when it comes to an off grade or a large lot which can only be placed in certain quarters more or less dickering is required to get it through. With this exception the market is singularly monotonous; makers do not feel warranted in putting up their prices, and they certainly won't put them down so long as they are as well sold up as they are at present.

The first week in March finds the business situation in the Pittsburgh market more satisfactory than at any time during the two months of the year just closed. Of course there has not been much improvement in prices as yet, but there has been some, and in view of the heavy demand being experienced for some lines of both Finished and Raw Material, it is more than probable that higher prices will prevail on some articles before very long. This applies particularly to Wire Nails and Wire, the demand for both at this time being extremely heavy. This activity is being felt in the Steel market, and Steel for early delivery is in good demand and at satisfactory prices. A heavy increase in orders for Structural Shapes is reported, and makers confidently expect a very busy season. Railroads are commencing to place orders for both car and track equipment, and this will have a favorable effect on business of all kinds. Perhaps the worst feature in connection with the Iron and Steel trades to-day is the difficulty in making prompt collections. Much complaint on this score was heard last month, but with the opening up of spring trade and more favorable weather, we will, no doubt, have an easier money market.

The business interests of the West are now confronted with a possible serious disturbance in the shape of a strike of all the switchmen on the railroads centering at Chicago. The situation is regarded as very grave, because the railroad managers insist that they are not able to comply with the switchmen's demands for considerably higher wages. If the strike really takes place it promises to be the most serious with which the railroads have yet had to contend. Merchants and managers advise their customers to order goods promptly so as to get them out before railroad operations are completely suspended.

All branches of the foundry trade are participating in the demand, which is better than was known at the same time last year. The Architectural Iron workers report their trade more promising than for a long time, as they are now able to compete with the Steel manufacturers in making prices on Column work. Good contracts have been placed lately for Southern Coke Iron, but in almost every case at prices below our recent quotations. Representatives of strong Southern companies claim to be getting more for their Iron than small manufacturers, as consumers are somewhat apprehensive that they will not be able to get full deliveries from the latter on contracts covering shipments extending well into the future. Rumors are current of prices made for Southern Iron during the past day or two at lower rates than anything previously known in this market.

There has been a fairly satisfactory volume of distribution of Pig Iron during the week, although it was mainly in small lots, there being no disposition on the part of buyers to contract for large quantities for forward delivery; the largest sale made being 3500 tons for March, April, May and June delivery on the basis of prices current for spot delivery, and in almost every instance the sales have been made at the inside quotations. During the last few days there has been a more active inquiry for Pig in anticipation of the wants of consumers, which may result in a large volume of business. Iron is cheap enough; prices are as low as it is reasonable to expect them to be, but at the moment there appears to be no advantage in buying far in advance of current consumption. There have recently been liberal purchases of Soft Southern Iron, which is wanted for mixing with the harder Northern Irons, and No. 1 and No. 2 Soft Foundry Coke Irons have been pretty well sold up and they are becoming scarce.

In the New York market the Thomas Iron Company report having booked quite a number of orders from old customers under the usual conditions. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 25 @ $14.75 for No. 1; $13.25 @ $13.75 for No. 2 and No. 1 Soft.

In the Philadelphia market low-grade Irons are wanted at about 25¢ less than quoted rates, but as no one seems inclined to meet bids of this character. Makers claim that there is no money in the business at present prices, but there is nothing in sight to warrant predictions of anything better in the immediate future. On the other hand, solvent concerns are determined to go out of the business rather than to submit to lower figures, so that even if prices do not improve there is hardly a possibility of them working to a lower point. General quotations as follows for Philadelphia and equivalent deliveries, with 25¢ to 50¢ less on Southern brands at Harrisburg and Intermediately to Baltimore:

American Scotch, No. 1X.....	$17.00	@ $17.25
American Scotch, No. 2X.....	16.00	@ 16.25

At Chicago a very fair movement has taken place in local Coke Iron, but not so large as in the previous week. Plenty of business is reported to be still in sight. Buyers are coming in who were not expected to make their appearance at this time of the year. The disposition to purchase for long deliveries is still prominent and recent contracts have been made which cover shipments for the whole of this year. The consumption is unexpectedly active, as very heavy shipments are going forward now. Lake Superior Charcoal is still quiet. We revise our quotations as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	$16.50 @	$17.00
Local Coke Foundry, No. 1	13.25 @	13.75
Local Coke Foundry, No. 2	13.00 @	13.25
Local Coke Foundry, No. 3	12.75 @	13.00

It is reported from Southern markets that some of the Southern furnaces sold more Iron than they produced during the month of February and consequently reduced their stocks, and the indications are that this was the general experience. The feeling in the trade is rather better than a week ago, but there is no change to be made in quotations.

Foundry.

Southern Coke, No. 1	$13.25 @	$13.50
Southern Coke, No. 2	12.00 @	12.25
Southern Coke, No. 3	11.25 @	11.50
Ohio Soft Stone Coal, No. 1	16.00 @	16.25
Ohio Soft Stone Coal, No. 2	15.00 @	15.25
Mahoning and Shenango Valley	14.75 @	15.00
Hanging Rock Charcoal, No. 1	19.00 @	19.25
Hanging Rock Charcoal, No. 2	18.00 @	18.50
Tennessee and Alabama Charcoal, No. 1	15.50 @	15.75
Tennessee and Alabama Charcoal, No. 2	14.50 @	14.75

Metal Market.

Pig Tin.—Between a blunder of the Washington representative of the United Press regarding the fate of the bill to prevent the duty prescribed in the McKinley tariff law going into effect on July 1, and effective manipulation of prices by some prominent operators upon evidence that there really had been a serious mistake on the part of the news gatherers, the market has been enlivened considerably. When the announcement was made that the bill to abrogate the proposed duty had become a law prices drooped wearily, and there were apparent anxious sellers at 20¼¢ ℔ lb for any delivery up to and including July. Immediately upon the circulation of rumors, well supported, that the report was erroneous the complexion of affairs underwent a decided change. Instead of sellers at the price named, buyers at 20¼¢ came prominently to the front, but Tin did not. Subsequently the bull interest made the most of every circumstance in their favor and raised quotations to 20.80¢ @ 20.90¢, without actually buying enough Tin to inspire outside confidence in the apparent strength of the market. After the advance was established some few trades were put through, but the greater portion of the transactions were between a few operators who have everything to gain and nothing to lose by keeping quotations high. It is no secret that spot stocks are heavy, including a considerable "invisible" supply, and that about 2000 tons are due here this month. Some authorities state also that consumers are well stocked and unlikely to figure as heavy or anxious buyers in the immediate future, leaving the task of maintaining prices chiefly upon the sholders of the leading speculators. The short interest on this side of the Atlantic is comparatively small, but the reverse is believed to be the case in London.

Copper.—No large dealings or anything more than very commonplace run of orders are reported here as yet, but the statement comes from a reliable source that the spot supply of C. & H. brand has been worked down so closely that it was necessary to make some overland shipments to the works in order to fill contracts, and a few of the smaller producers, it is also learned, are almost bare of spot stock. No considerable quantities are available just now at less than 12¢ for Lake Superior Ingot and 11¢ for common casting brands.

Pig Lead.—During the early portion of the week under review about 300 tons Common were sold at 3.85¢, near future delivery. Subsequently single carloads realized 3⅞¢ @ 3.90¢ and toward the close the latter price was paid for larger lots to the extent of about 150 tons all told. At this writing the demand is rather slow, but reserved offering serves to impart some firmness to the market, temporarily at least.

Spelter.—Fair quantities of Western have been sold at 4½¢, delivered in Pittsburgh, and some business for Eastern account was put through early in the week at 4.22½¢ @ 4½¢, delivered, for May and later shipment. For the presept, 4.27½¢ is named as being a close price for round lots, future shipments, while 4.30¢ is generally asked. Spot parcels are held at about the usual premium.

Antimony.—Business has been moderate, but owing to tardiness of arrivals of some brands prices have ruled irregular. Current quotations are 10½¢ @ 10¾¢ for Hallett's, 10¼¢ @ 10½¢ for LX and 10⅝¢ @ 10¾¢ for Cookson's.

Tin Plate.—Fair orders, chiefly for lots of 500 to 1500 boxes of Cokes per month for delivery between May and August, have been placed, but interest in futures is still rather tame, there being no special incentive for anticipating future wants to any unusual extent. Spot business has continued on strictly conservative lines, and of barely fair average volume for the season. Prices remain almost stationary, and the market is steady although quiet.

Coal.

The Anthracite Coal market is steady under a steady demand and is supposed to be unaffected by the disintegration of the combine. The situation, it is claimed, is altogether normal, being governed by the law of supply and demand. No sales are heard of below the old combine schedule, though there has been some talk about cutting. All sizes are plenty, except Pea and Buckwheat, which are scarce, as usual whenever transportation is active. This is explained by the fact that freight charges on these sizes are 25¢ and 40¢ respectively less from the mines to tidewater than the prepared sizes and therefore the latter have a precedence on the railroads. Besides it is not unusual for the small Coal to become congealed in the cars, making it necessary to mine a second time in unloading. Pea, f.o.b., is $2.75 @ $2.85; Buckwheat, $2 @ $2.15. Production for the week, 516,500 tons, a decrease of 215,000 compared with the same week last year, and for the year the decrease is 85,500 tons.

A British syndicate has acquired possession of the Nicaragua State railways and lake steamer system.

Financial.

Now that a new administration is at the helm of public affairs, the financial necessities of the Treasury at once engage attention, as the foreign demand for gold continues, also the issue of notes in purchase of silver bullion, and special provision for the future becomes a peremptory need. The President's inaugural, while recognizing this fact, contains no intimation of the measures of relief to be adopted. It is understood, however, that negotiations are pending with a London firm which provide for a liberal supply of gold in exchange for bonds. Receipts for customs duties being at the present time less than 6 % in gold certificates as compared with more than 80 % two or three years ago, that source of supply can no longer be depended on. The probability of an extra session of Congress to consider the silver question is a subject of discussion, without any decided bias of opinion. For the first time during the current fiscal year the revenues of the Government show a slight decline as compared with a year ago. The receipts for February from all sources are reported as $30,009,000, compared with $30,755,000 for February, 1892. The national bank note circulation increased during February $1,032,235, making the total circulation of this class of money $175,320,356 on March 1.

The stock market was less active, showing the effects of the extreme depression that has overtaken several specialties since the break in Reading, which touched the lowest point since 1891, while Lehigh Valley declined from 121 to 93. The general disposition was to await events at Washington.

Money has been much firmer, influenced by the announcement of intended specie shipments and by the withdrawal of funds by Western banks. The bank statement, as was expected, showed a heavy loss in legal tenders in consequence of the outflow of currency to the interior. The decrease in cash was $5,557,600, and as the loans were contracted to about the same extent, the liquidation in deposit liabilities amounts to $10,703,800. The banks now hold $6,503,125 in excess of the 25 % legal requirement, against $21,292,225 a year ago and $10,880,975 in 1891. As the week closed the loan market was very strong, influenced by the poor bank statement and continued shipments of currency to the interior. Time loans were in active request at 6 %, and borrowers discriminated carefully in the acceptance of collateral. Commercial paper was very slow, and practically without a market. In Boston money loaned as high as 10 %, exciting severe criticism against the banks, but in Philadelphia money was quoted 5½ % @ 6 %. The Chicago market at the end of February was on a parity with New York.

The Prince of Wales has consented to preside at the jubilee banquet of the Iron, Hardware and Metal Trades' Pension Society of Great Britain, which is to be held this year in London.

Chicago Report.

Scrap.—Iron and Steel scrap are extremely dull again, and prices are weak. Dealers quote the following nominal buying prices:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	..
Malleable Cast	7.00	...
Stove Plate (free of burnt)	7.00	...
Burnt Iron and Grate Bars	5.00	...
Sheet Iron and Hoops	4.00	..
Plow Steel and Breaking Stock	8.50	...
No. 2, such as Shovels, Hoes, &c.	4.50	...
Old Boilers—whole (Iron)	8.00	...
" (Iron)—cut in single Sheets and Rings	12 00	...
Old Gas-Pipe and Boiler Tubes	9.00	..
Cast Borings	5.00	....
Turnings	6.00	..
Horseshoes	13.00	..
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	3 ¢

Anthracite.—Quotations are steady at the following rates on carload lots of 12 net tons:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

A correspondent of the *Indian Engineer* says: "Crushed steel is fast coming into use for cutting stone. It appears to be made by quenching very high carbon steel in cold water, from an excessively high temperature, such as would overheat steel for most purposes. This renders it not only hard, but rather brittle, so that it is possible to pulverize it. It is crushed in a stamp mill, and sifted closely to size. It is said to be not only cheaper, but much more effective than emery, giving a better polish and quicker, and lasting much longer."

The pneumatic dispatch system of the Electric Pneumatic Transit Company was tested at Philadelphia last month. A double line of 6-inch pipe has been laid on Chestnut street from the post-office building at Ninth street to the sub station between Third and Fourth streets, a distance of 2835 feet. Postmaster General Wanamaker sent the first package over the line at 4.18 p.m., a Bible wrapped in an American flag. The pipe is ordinary wrought-iron pipe bored smooth. The carriers used are of steel and carry about 15 pounds weight. The air pressure used is 6 pounds per square inch, and the speed of transmission in the tests was 45 to 49 feet per second—30½ to 34 miles per hour. The plant will be operated for a year by the company free of expense to the Government; at the end of that time the Government will have an option for the purchase of the system.

CONDITION OF THE

Hardware Trade.

MARCH BUSINESS thus far, although good, has not shown as much increase in volume over the latter part of February as was expected. While the demand is good and probably up to the average, purchases are not made as freely or in as large quantities as was hoped. The prevalence of severe weather in the Northwest has had a good deal to do with holding back trade in that important section, but with the opening of spring it is expected that there will be a general quickening in trade. There is also some unevenness in business, some manufacturers reporting a heavy and very satisfactory trade, while others refer to the demand as only fair. In heavy goods there appears to be a better business doing than in Shelf Hardware, and some of the manufacturers find it difficult to supply the goods as fast as required. Prices continue without important change with a maintenance of the improved feeling in some lines. Collections are fairly good, but in some cases complaint is made of sluggishness.

Advices from Chicago.—March has not realized the expectations of Shelf Hardware jobbers in the volume of business. Last week was exceedingly wintery throughout the whole Northwest, checking trade in every direction. Orders are better this week, which has opened in a way to encourage merchants in the belief that business will be large as soon as something like spring weather prevails throughout the agricultural sections. The heavy Hardware trade, on the other hand, is very much better than it has been, owing to the increasing demand from all classes of manufacturing consumers. Collections are still below the average and considerable complaint is heard of the scarcity of money. The remarks previously made with regard to the holding of grain stocks by farmers have covered this ground, but it is expected that as soon as spring opens and the grain in the lake harbors as well as in farmers' hands can be forwarded to Eastern markets, the situation will be very greatly improved in this respect.

Notes on Prices.

Cut Nails.—The condition of the Cut Nail market is substantially the same as last week. It is characterized by an improved tone and a good demand, with the promise of a heavy trade during the season. The mills are quoting almost universally on the basis of the Wire Nail card recently adopted by them, their price being in the East $1 25 base for carload lots at mill, and, while this price is fairly well maintained, it is sometimes shaded a little. The quotation for carload lots in New York is $1.40. The modifications in the extras on Clinch Nails made by the Eastern manufacturers at their Philadelphia meeting have not yet been adopted by the Western mills, and it is doubtful whether they will be, so that in this respect there is a slight difference in the cards used in the East and West. While this difference will cause but slight inconvenience, it would be more satisfactory if but one card applied to the whole country. Some criticism is expressed because under the Nail card now in use the matter of averages is considered in making quotations, even though it may not be explicitly referred to, inasmuch as manufacturers of both Wire and Cut Nails expect that orders will have about a 50-cent average, and decline to sell large Nails alone at the price of an assorted order. The adoption of the same card for both kinds of Naila is, however, an important step in advance and does a good deal to simplify the purchase of Nails. It would be a matter for congratulation, however, if the card were so graded as to obviate the necessity of coosideriog the question of averages. In order to do this it would be necessary for the Nails to have extras which would correspond to their cost, so that it would be a matter of indifference to the manufacturer what kinds or sizes were purchased. So long as the card is unequally graded, as at present, the question of averages will, however, have to be considered. For the convenience of the trade we give below the Nail card now in use, showing the difference on Clinch Naila as maintained by the Eastern and Western manufacturers:

National Cut Nail Schedule.

Adopted Feb. 15, '93.
Revised Feb. 21, '93.

Common, Fence, Brads and Sheathing.

	Advance.
60d	Base
50d	$0.10
30d and 40d	.25
20d	.35
12d and 16d	.45
10d	.50
8d and 9d	.60
6d and 7d	.75
4d and 5d	.90
3d	1.20
2d	1.60

Flooring, Casing, Box and Finishing.

50d and 40d	.40
20d	.50
12d and 16d	.60
10d	.65
8d and 9d	.75
6d and 7d	.90
5d	1.10
4d	1.25
3d	1.50
2d	1.75

Fine Finishing.

4 inch	.60
3¼ and 3½ inch	.65
3 inch	.75
2½ and 2¾ inch	.90
2 and 2¼ inch	1 10
1¾ "	1.25
1½ "	1 45
1¼ "	1.65
1 "	1.90

Fine Blued.

4d	1.25
3d	1.60
2d	1.90

Cut Spikes.

All sizes	.50

Light Barrel and Lining.

1 inch	$1.90
⅞ "	2.20
¾ "	2.50

Common Barrel and Roofing.

1½ inch	.90
1⅜ "	1.00
1¼ "	1.20
1⅛ "	1.40
1 "	1.50
⅞ "	1.75
¾ "	2.00

Slating.

5d	.90
4d	1.00
3d	1.20
2d	1.40

Boat Spikes.

All sizes	.75

Clinch.

	East.	West.
4 inch	.85	.50
3¼ and 3½ in.	.95	.60
3 inch	1.00	.70
2½ and 2¾ in.	1.10	.80
2 and 2¼ in.	1.25	.90
1¾ and 1¾ in.	1.40	1.00
1½ inch	1.70	1.40

Tobacco Mfrs.' Box Nails.

6d and 7d Lining	.75
4d and 5d "	.90
4d and 5d Caddy	1.20
3d Caddy	1.60

Cooper, Tobacco and Warehouse.

10d	.60
8d	.70
6d and 7d	.85
4d and 5d	1.00

Each half keg 10 cents extra.

Advices from Chicago.—The Wheeling makers of Steel Cut Naila are now having a decided revival of trade in the district from the Mississippi River west, which they are able to reach in competition with Chicago manufacturers. The new Nail card, they claim, is being strictly adhered to, and quotations are not being made on the base of an average. It is asserted, however, by jobbers that special prices are being quoted on orders covering particular sizes on which the average is high. It

is evident that the trade in Cut Nails is now better than for some time past, but it remains to be seen whether this is a gain on the Wire Nail trade or whether it is merely an incident of the unusually heavy spring demand for building material. Manufacturers' quotations are still $1.42½ for mill shipment, Chicago delivery. Jobbers are selling at $1.50 from stock on the new card.

Wire Nails.—The Wire-Nail market is in excellent condition and the recently advanced prices are regularly maintained. Notwithstanding the successive advances business continues good, and the mills are booking a good many orders and have many inquiries. The fact that most of the large jobbers have heavy stocks on hand purchased at the extremely low prices which ruled a few weeks ago is referred to as likely to interfere somewhat with the demand on the manufacturers, as the jobbers are in a position to meet if not undersell factory quotations. The present quotation is $1.50 for carload lots at mill, Pittsburgh being the point of equalization for the East and Cleveland for the West.

Advices from Chicago —Manufacturers of Nails report a quiet condition of trade. The advanced price has checked new business. Factories are well sold up, however, the largest of them reporting their full capacity engaged for the months of March and April. The regular quotation now from factory is $1.65, Chicago. This is the same price made on carload lots by jobbers, who are also quoting $1.70 for small lots. The jobbers report a good business, which only needs a few days of fine weather to develop into large proportions.

Barb Wire.—The market is characterized by an excellent tone, and prices are somewhat stronger, though there is no quotable advance. For carload lots at mill $2.40 to $2 45 representa the market, but some of the manufacturers are asking higher figures. Small lots of Galvanized Four Point from store in New York are regularly held at $3.10, an abatement of 10 cents per 100 pounds being made in carloads.

Advices from Chicago.—The demand is very good and prices are stiffening both from manufacturers' and jobbers' hands. Manufacturers report more trouble in securing cars with which to make shipments than in getting orders. They continue to quote $2.20 for Painted from factory and $2.60 for Galvanized. Jobbers are selling small lots at $2.25 and $2.65, respectively.

Cordage.—The National Cordage Company have withdrawn quotations and prices are named on application. Notwithstanding this fact the market, in the matter of price, is in substantially the same condition as for some time, except that perhaps Sisal is a shade higher. The competition between the combination and the outside manufacturers continues very animated and prices are somewhat uneven.

Carriage Bolts.—The market for Common Carriage Bolts being an open one low prices are ruling, and some of the manufacturers within a few weeks have been making concessions on quotations which had formerly prevailed. Other manufacturers are, however, maintaining prices more firmly and refusing to meet the quotations of their competitors.

Vassar Cylinder Night Latch.—This article, manufactured by the Reading Hardware Company, Reading, Pa., and 81 Reade street, New York, is quoted to the large retail trade at $13.50 per dozen.

Brass Kettles.—The line of Improved Brass Kettles, made by the Lalance & Grosjean Mfg. Co., 19 Cliff street, New York, are quoted at 21 cents per pound on all sizes from 7 to 20 inches, inclusive, f.o.b. New York, 60 days, or 2 per cent. discount for cash in ten days. The following table gives the sizes, weight and capacity of these goods:

Inches.....	7	8	9	10	11	12	13
Pounds.....	1¼	1½	1⅞	2	2¾	4	4½
Gallons....	¾	1	1¼	1½	2	2½	3
Inches.....	15	16	17	18	19	20	
Pounds.....	6	7	8	10¼	11¼	14¼	
Gallons....	5	6	8	10	12	14	

Enameled Iron Ware.—Under date of March 4, Manning, Bowman & Co., New York, issue a circular letter to the trade, in which they state their purpose to continue protection to the jobbing trade in their margin on Enameled Iron Ware, if they will hold fast to the agreed prices. The manufacturers state that this season opened with a slight cutting of prices by some jobbers, and as they have done their utmost for the maintenance of the established price, they have no other resource but to decline the orders of any jobber who may further violate the agreed discount of 25 per cent., 2 per cent. discount for cash. They further state that they shall do this without distinction or favor, regardless as to where it strikes. This letter is accompanied by a circular devoted to Perfection Granite Iron Ware and Decorated Pearl Agate Ware, containing information useful for traveling salesmen of jobbers who carry the goods, in properly representing the goods to customers.

The Henn Can Opener.—The following are the prices of the Henn Can Openers, manufactured by A. S. Henn & Co., New Haven, Conn.:

No.
60, imitation ebony handle, nickel plated, per dozen.....$1.50
60, imitation ebony handle, nickel plated, per gross.....15.00
65, enameled handle, polished, per dozen.. 1.25
65, " " " " gross..12.00

Prize Cartridges and Shells.—Peters Cartridge Company, Cincinnati, Ohio, for whom J. C. McCarty & Co., are agents, 97 Chambers street, New York, issue under date March 1 a revised price-list showing some additions to their line. Several numbers have been added to the Prize Cartridges since last season and Smokeless S. S. Cartridges, loaded with London S. S. Powder, in any size Shot, have recently been put on the market. The list of the latter is as follows, subject to a discount of 40 per cent.:

Smokeless "S. S." Cartridges.

12 Gauge.			Per 1000.
2½ Drams (measure)	1⅛	ounce.....	$35.00
2¾ " "	1⅛	"	36.25
3 " "	1⅛	"	37.50
10 Gauge.			
3½ Drams (measure)	1⅛	"	39.75
3⅝ " "	1¼	"	42.00
3¾ " "	1¼	"	43.25

Wolverine Hog Rings and Ringers.—Heesen Bros. & Co., Tecumseh, Mich., announce the following reduced prices to the retail trade on the above goods:

New or Old Style Ringers....$1.25 per dozen.
Hog or Pig Rings.....$2.50 per 1200 Rings.

Leggett's Liquid White Glue.—Leggett & Bro., 301 Pearl street, New York, are selling their Liquid White Glue at the following list prices, which are subject to a discount of 20 per cent.:

In Bottles, New Style, with Brush attached.

	Per gross.
1-ounce or small, 1 dozen in box, gross cases.....	$12.00
½-gill or 2-ounce, 1 dozen in box, gross case.....	18.00

In Tin Cans, New Style, with Brush attached.

	Per dozen.
Gill or 4-ounce, 1 dozen in box, 6 dozen in case.....	$2.00
½-pint cans, 2 dozen in case.....	3.00
Pint cans.....	4.50

In Round Tin Cans with Patent Double Cover.

	Per dozen.
Quarts, 1 dozen in case.....	$7.00
½-gallon, ½ dozen in case.....	12.00
Gallons, ½ dozen in case.....	20.00

Assortment A contains

	Per dozen.	
2 dozen 1-ounce or small bottles, at.....	$1.00	$3.50
1 dozen 2-ounce or ½-gill bottles, at.....	1.50	

Assortment B contains

	Per dozen.	
2 dozen 1-ounce or small size, at.....	$1.00	$7.00
1 dozen 2-ounce or ½-gill, at..	1.50	
1 dozen 4-ounce or gill, at ...	2.00	
½ dozen ½ pints, at.....	3.00	

A wire show stand is packed in each assorted case without charge.

Acme Dinner Pails.—The Acme Dinner Pail, manufactured by the Acme Stamping Company, East Stroudsburg, Pa., is sold to the trade at the following prices, which are subject to 2 per cent. discount for cash in ten days, terms, f.o.b. cars East Stroudsburg:

	Per dozen.
No. 1.....	$3.50
No. 2.....	4.00
No. 3.....	5.00

Special prices are made on orders of 1 gross or more.

Forhan's Improved Star Blind Tenons.—These goods are put on the market by Braunsdorf & Gerstner, 634 Eighth avenue, New York, and are sold to the trade at from 70 to 75 cents per gross.

Home Nails.—Atlas Tack Corporation, Boston, Mass., are now putting on the market their Home Nails. They are sold at the following prices, which are subject to a discount of 50 per cent.:

No. 200.....	per carton,	$2.50
No. 200.....	per case,	30.00
No. 400.....	per carton,	5.00
No. 400.....	per case,	60.00

Their Home Tacks, similarly packed, are sold at the following prices, subject to a discount of 50 per cent.:

No. 50.....	per carton,	$3.00
No. 50.....	per case,	36.00
No. 100.....	per carton,	6.00
No. 100.....	per case,	72.00

It is stated that orders will not be accepted for less than one case of 12 cartons.

Automatic Fishing Line Float.—The Horton Mfg. Company, Bristol, Conn.,

quote their Automatic Float at $12 per gross.

Aluminum Cooking Utensils.—The Illinois Pure Aluminum Company, Lémont, Ill., have recently added to their line of Aluminum Cooking Utensils 12 inch Fry Pans, which are sold at $15 per dozen, and 13 inch Wash Bowls, which are sold at $9.60 per dozen, these prices being net 30 days, or 5 per cent. for cash on receipt of invoice.

Eaves-Trough Hangers.—The prices given below apply to Eaves-Trough Hangers manufactured by Henry B. Todd, Meriden, Conn. The Boss Hanger is a new form of the Yankee Hanger, made under the same patent. They are non-adjustable, made of soft steel, and are designed to meet the demand for a strong, convenient and cheap Hanger. Prices on Hangers are as follows, subject to a discount of 2 per cent. for cash in 10 days:

Eaves-Trough Hangers—Yankee Adjustable.

	Per gro.
3 inch cross bars	$5.50
3½ " " "	5.50
4 " " "	6.00
4½ " " "	6.00
5 " " "	6.50
5½ " " "	6.50
6 " " "	9.50
7 " " "	12.50

The Boss.

Straps riveted on cross bars complete.

	Per gro.
3 inch	$3.50
3½ "	3.50
4 "	3.75
4½ "	3.85
5 "	4.00

Wrought-Iron Pipe.—The market in Wrought-Iron Pipe continues weak and demoralized, and being an open one manufacturers are free to make such figures as they choose. The following revised quotations have recently been issued by the Nason Mfg. Co., 71 Beekman street, New York:

	Per cent.
Plain, 1¼ inch and smaller sizes	60 and 10
" 1⅜ " " larger "	70 and 10
Galvanized, 1¼ inch and smaller sizes	52½ and 10
Galvanized, 1⅜ inch and larger sizes	60 and 10

Extra and Double Extra Strong.

Plain, 1¼ inch and smaller sizes	60
" 1⅜ " " larger "	70

Glass.—Quietness continues to be the prevailing feature of the Glass market, both in the city and with out of town trade. The prospects of mild weather, which would give employment to the building trades, were changed by snow and storm, and until settled weather is assured Glass will be in small demand. National Window Glass prices are being adhered to by members of the association, while jobbers who are not members are quoting somewhat lower prices, equivalent to 2½ to 5 per cent. Imported Glass has not recovered any of its lost ground and is being sold from 75 and 10 and 5 to 80 and 5 per cent discount. In Plate Glass the situation is unchanged, there being almost no demand. Quotations remain as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount to 80 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔	@	$0.03½
Rubber Shoes, in ton lots ℔	@	.03
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔	@	.04½
Wringer Wire Rolls, ℔	@	.02
Syringes, ℔	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper, ℔	10¢
Light and Tinned Copper, ℔	9¢
Heavy Brass, ℔	7¢
Light Brass, ℔	6¢
Lead, ℔	3½¢
Tea Lead, ℔	3½¢
Zinc, ℔	3¾¢
No. 1 Pewter, ℔	14¢
No. 2 Pewter, ℔	7¢
Wrought Scrap Iron, gross ton,	$17.00
Heavy Cast Scrap, gross ton,	10.00
Stove Plate Scrap, gross ton,	7.00
Burnt Iron, gross ton,	5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags, ℔		4 ¢
No. 2 White Rags, ℔		3 ¢
Mixed Rags, ℔	1¼ @	1¾¢
Blues and 3ds, ℔	1¾ @	2 ¢
Hard Sized White Shavings, ℔	2¾ @	3 ¢
No. 1 White Book Shavings, ℔	2½ @	2¾¢
No. 2 White Book Shavings, ℔	1½ @	1¾¢
Light Book Shavings, ℔	⅞ @	1 ¢
No. 1 Mixed Shavings, ℔		1½¢
No. 2 Mixed Shavings, ℔	⅞ @	1⅛¢
No. 1 Printed Books, ℔	1⅝ @	1½¢
Ordinary Mixed Books, ℔	¾ @	⅞¢
Newspapers, ℔		½¢
No. 1 Manila Paper, ℔	1½ @	1¾¢
No. 2 Manila Paper, ℔	¾ @	1 ¢
Bogus Paper, ℔	⅝ @	⅞¢
Common Paper, ℔	⅝ @	1⅛¢
Straw Chips, ℔	⅛ @	⅝¢
Binders' Clippings, ℔	⅛ @	⅜¢
Jute Butts, ℔		1¼¢
No. 1 Jute Bagging, ℔	1¼ @	1⅝¢
Mixed Bagging, ℔		1 ¢
No. 2 Bagging, ℔		⅞¢
Hemp Twine, ℔		2½¢
Manila Rope, ℔		2¼¢
Jute Rope, ℔	1⅞ @	2 ¢
Mixed Rope, ℔	⅝ @	⅞¢

Trade Notes.

THE MILWAUKEE GAS STOVE COMPANY, of Milwaukee, Wis., in an announcement elsewhere direct attention to the Perfection gas heating stoves and ranges, with or without water backs. They also refer to a long line of special Heaters for particular purposes.

IN A PROMINENT ANNOUNCEMENT in our advertising columns this week the Kanneberg Roofing Company, Canton, Ohio, make reference to a patent granted February 28 to Albert Kanneberg for an improvement in sheet metal roofs. The trade will be interested in this announcement, as well as in the reference to the increased capacity of the works of the Kanneberg Roofing Company.

J. M. & L. A. OSBORNE, Cleveland, Ohio, direct attention in our advertising columns this week to tin plate and sheet iron which they handle.

WE UNDERSTAND that the Stark Machine & Tool Company, Buffalo, N. Y., are meeting with an increasing demand for tinner's machines and tools. During the past week they have booked orders for 12 outfits, and they have to run their shop 90 hours per week to keep up with the orders.

THE JOSEPH DIXON CRUCIBLE COMPANY have been awarded a space of 25 x 28 feet in the Mines Building of the Columbian exposition for a general exhibit of Graphite productions, such as Crucibles, Lubricating Graphite, Graphite Axle Grease, Plumbago Facings, Graphite Machine and Railway Grease, Dixon's Stove Polish, Silica Graphite Paint, Core Wash, Electrotyping Graphite, Graphite Cylinder Oil, Graphite Specialties for electrical and other work, &c. A space of 13 x 10 was obtained in the Manufacturers Building for an exhibit of Dixon's American Graphite Pencils and Pencil Sundries. Although the assignment of space has been tardy, and the amount much less than required, and not much time left to properly equip it, yet the company propose to be there on time and in good shape as possible.

CURTIS & CURTIS, Bridgeport, Conn., send a copy of a decision rendered by Judge Ricks, June 20, 1892, in the Circuit Court of the United States for the Northern District of Ohio, Western Division, in the city of Toledo. The decision is in the case of Curtis & Curtis *vs.* Willet C. Wells, and is for the plaintiffs. The decision holds that the patents issued to William D. Forbes, No. 253,996, for an improvement in pipe threading machines and assigned to Curtis & Curtis, likewise patent 277,256, are good and valid and that the defendant had infringed upon these patents. The plaintiffs are awarded damages and a perpetual injunction is issued restraining the defendant from continuing to make any machines about which suit was brought. In a note to this decision Messrs. Curtis & Curtis state that Willet C. Wells has transferred his business to the Merrill Mfg. Company, who are continuing the manufacture of pipe threading machines. They warn all persons against purchasing these machines as being liable to damages.

THE WASHBURN & MOEN MFG. COMPANY announce that George A. Cragin, heretofore agent at San Francisco, has been requested to take charge of their interests in the State of Texas, with office at Houston. Mr. Cragin will be succeeded by Frank L. Brown, who has been appointed their Pacific Coast agent and will be in charge of their office and warehouse at 8 and 10 Pine street, San Francisco. Mr. Brown was for a number of years the secretary of Staver & Walker, and more recently of Mitchell, Lewis & Staver Company of Portland, Ore., and is, therefore, familiar with the trade on the Pacific Coast.

AMONG the enterprising salesmen one meets in Vermont are Charles Gallagher, with S. G. Davis & Co., Tin Ware, Boston, who has traveled his territory for a number of years, and long ago wore the edge off of that old chestnut, "Let her go;" and E. P. Fiske of J. H. Cunningham & Co., Boston, who is modest and retiring until Wrought-Iron Pipe and Fittings are mentioned.

A. B. KINGSLAND & Co., Burlington, Vt., have recently been allowed patents on an improved Portable Baking Oven. This Oven is constructed on a new principle and is described as great improvement over the old-style bakers. They are especially adapted for use in hotels, restaurants and bakeries.

AMONG recently authorized corporations in Illinois are the following: The American Smoke Preventer Company at Chicago; capital stock, $150,000; for the manufacture of smoke preventers; incorporators, William R. Mills, Charles Smith and Weston O. Knowles. The International

Automatic Air-Brake Coupler Company at East St. Louis; capital stock, $10,000,000; for the manufacture of automatic air-brake couplers and connections of air for railroad cars and other vehicles; incorporators, William R. Harris, John H. Wear and Lewis Bieman. The Marion County Rapid Transit Company at Centralia: capital stock, $75,000; to build and operate an electric railway and to furnish light, heat and power; incorporators, S. N. Pierce, O. V. Parkerson, C. B. Ellis, L. Sonnerville, John F. Sugg, S. J. Smith and J. D. Telford. The Watson Down Draft Furnace Company, at Chicago; capital stock, $100,000; for the manufacture of furnaces; incorporators, Edwin J. Noble, George F. Westover and M. W. Geisinger. The Indurated Fiber Ware Company at Chicago; capital stock, $10,000; for the manufacture of merchandise and to conduct a commission business; incorporators, George H. Best, Lowther Ferris and Harry T. Lockwood. The American Change and Register Company, at Chicago; capital stock, $40,000; for the manufacture of cash registering machines; incorporators, Charles E. Braden, George E. Hopkins and John G. Elliott. The Illinois Refrigerator Company, at Chicago; for the manufacture of refrigerators and wooden ware; incorporators, J. B. Markey, E. A. Smith and J. F. Hanehan. The Royal Columbia Heat Radiator & Automatic Lamp Filler Company, Chicago; capital stock, $2,000; incorporators, Ambrose A. McKey, James P. Hoselton and Alexander N. Murray. Post Metal Company, at Chicago; capital stock, $50,000; for the manufacture of metal specialties and to conduct a general transportation business; incorporators, Henry C. R. Post, Hugh L. Burnham and Oscar T. Lindrooth. The Coal-Saving Grate Company, at Chicago; capital stock, $50,000; for the manufacture of grates; incorporators, Henry Peterson, Carl H. Leopold and J. H. Kraft. The Ramsey Self-Lock & Nut Mfg. Company, at Ramsey; capital stock, $10,000; incorporators, H. E. Lantz, S. L. Neeley, George W. Nichols, J. L. Furneaur.

A. J. WEED & Co. of 106 Liberty street, New York, are now building a Vertical Marine Engine in three sizes—½, 1 and 2 horse-power. These engines are especially designed for those amateurs desire to build their own engines, or such parts of them as their facilities will allow. With that end in view the castings are to be had, not only in the rough, but also in various stages of completion. In one set all parts for which the planer is necessary are machined, thus giving the amateur who has only his lathe his castings ready prepared. In another set the cylinder and steam chest are bored and faced, the guide is bored, and, in general, the more difficult lathe work is done. In another set, in addition to that which is completed in the other sets, the bearings are babbitted, eccentric straps bored, and eccentrics, piston, cross head, slide valve and fly wheels are turned. As will be seen, this allows a selection of the parts in such stage of completion as will best suit the facilities of the builder. The engine is well designed and proportioned in every respect.

THE WESTERN TINWARE MFG. COMPANY of Omaha, Neb., are doing a successful business, and are giving employment to 35 men in the factory and keep six travelers on the road. The factory and offices are lighted by electricity, and the works are kept running the year round from seven in the morning till six in the evening.

THE PORTLAND TINWARE COMPANY is the name of the corporation which has succeeded F. E. Briggs, of Deering Center, that State. The plant of Mr. Briggs was removed to Portland and a stock company formed with a capital of $50,000. The new concern will carry on the business of manufacturing Tinware and Sheet Metal Goods, the same as was done by Mr. Briggs, but on a very much larger scale, and will supply their goods at wholesale only. L. W. Bradstreet is president and F. E. Briggs treasurer.

SWANN, WHITEHEAD & CLARK, lately incorporated in the new concern called the American Lamp & Brass Company, announce their sample room now at 96 Church street will be abandoned May 1, and the goods in future shown at 43-45 College place, now occupied by the Clark Bros. Lamp, Brass & Copper Company, another of the three interests absorbed in the late consolidation. The quarters in College place will be enlarged by the taking in of a portion of the building at No. 45, which will be remodeled so as to have twice the floor space now used. The partition wall between the two buildings will be broken through and a large salesroom provided.

WE ARE ADVISED that Wm. J. Lloyd Mfg. Company, Philadelphia, have discontinued the manufacture of the Great American Meat Cutter and that everything pertaining thereto has been purchased by the Enterprise Mfg. Company of Pennsylvania.

AT A MEETING of the stockholders of the Youngstown Stamping Company, whose affairs were recently placed in the hands of W. C. Hine, receiver, held at Youngstown last week, the following statement of the condition of the concern was presented:

Assets.

Merchandise	$32,131.35
Machinery	13,414.97
Fixtures	2,857.05
Real estate and buildings	22,000.00
Ledger accounts	10,499.13
Total	$80,892.50

Liabilities.

Bills payable	$90,750.00
Acceptances	9,025.80
Ledger accounts	9,035.86
Pay roll	2,170.13
Total	$110,981.79

It is stated that the above figures were made up on the basis of actual values, and when anything of a questionable value came up it was not included. A committee was appointed to confer with the creditors of the concern and endeavor to devise some plan satisfactory to them by which the works can continue in operation.

THE LUDLOW-SAYLOR WIRE COMPANY, St. Louis, Mo., report a large trade in their jobbing department, and have a number of good orders on hand for Ornamental Brass, Iron and Aluminum work. Among those recently secured is one for the grille work for handsome screens to be placed in the rooms of the Noon Day Club of St. Louis.

THE NUBIAN IRON ENAMEL COMPANY of Cragin, Ill., whose main warehouse (250 x 50 feet, two stories) was entirely destroyed by fire February 17, are again manufacturing to their fullest capacity. Before the fire had been extinguished Manager Bonnell was telegraphing for supplies and arranging for the continuance of business. Materials have been contracted for and two buildings instead of one are now under process of construction. The company will, of course, suffer some inconvenience for 60 to 90 days, but they will do their best to satisfy their customers.

THE DUBUQUE STAMPING & ENAMELING WORKS will commence active operations about April 1.

BERNHARD STADELMAN, Pittsburgh, Pa., are manufacturing the Keystone Coffee Jar. The vessel is made of flint glass, with a nickel-plated cork-lined cap, designed to keep liquids carried in the Jar free from rust or acid. The keystone shape of the Jar is referred to as adapting it to oval or square dinner pails and baskets, and the glass of which it is made as preserving the natural flavor of the liquid as long as desired, besides being always sweet and clean. The Jar is made in pint and quart sizes.

THE STANDARD STEEL WIRE MAT COMPANY, recently organized, of New Castle, Pa., have leased the plant of the old Cunningham foundry, which is said to be well located and a substantial building. The concern are now having their machinery erected and are fitting up the plant and will commence operations at an early date.

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THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, March 18, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....220 South Fourth Street
BOSTON.....146 Franklin Street
PITTSBURGH.....Room 509 Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....219 Superior Street

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Spring Fogs.

The last week has brought with it some weather which in any reasonable climate would indicate that winter is broken. The conditions are likely to be favorable for the prevalence of fogs. Fogs characterize a state of the atmosphere peculiarly favorable to the spread of certain diseases, and over land surface are in general a depressing influence upon the human constitution. Far out at sea a fog has quite a different character from fogs found near cities or near malarial districts, because the latter always hold, suspended in the air, particles of dust, smoke and soot from chimneys, dust floating in the air, gases emanating from foul sources, and effluviæ from lungs of human beings and animals, all of which the finely divided water suspended in the air is especially fitted to rapidly absorb and hold near the earth's surface. Here they are breathed in over and over again, very much as exhaled impurities are breathed over and over again in a crowded but very ill-ventilated room. Prof. G. V. Poore stated in a lecture delivered at University College in 1892 that during the great fog in London that occurred on Christmas of 1891, and spread like a pall over that city for five days, the death rate was increased by 1442 deaths, according to returns made January 2, 1892.

Ventilation and Sanitary Plumbing

The arts of ventilation and of sanitary plumbing are so intimately related to atmospheric conditions that any facts concerning these conditions, like those stated in the previous paragraph, should be studied as possibly affording information valuable when practically applied to these arts. A practical lesson that may be drawn from what has been written is, that while air supplied for ventilation should not be so dry as to become irritating to the respiratory passages, it should also not be supplied from exterior sources when fogs prevail and passed into apartments for ventilating purposes without first being dried to the proper degree of humidity and then filtered to remove noxious matters that float in it when fogs exist. In the near future, the problem of purifying air through absorption of hurtful gases and effluviæ of which it may be the vehicle, and the removal of irritating dust particles, will receive far more attention in sanitary engineering than has yet been given to it. We cannot live but a very few minutes without air, while only occasional potations of water are needed; yet the subject of purifying potable water has received the profoundest attention from physicians, engineers, chemists and mechanics employed in furnishing water supplies. In the art of ventilation the purest sources of air supply are sought when an important building, say a hospital, is required to be ventilated: but when a dense fog prevails around such a building there is no source from which pure air can be obtained; it enters the ventilating ducts temporarily loaded with seeds of disease, and these noxious matters, so far as it depends upon any law of nature, are as possible to be removed from the air so entering as are the impurities contained in water. If any difficulties are to be encountered they are likely to be purely practical ones. A promising field for experimental research in this direction is yet comparatively unexplored; and there may be concealed therein a rich reward for the inventor who shall supply simple and sure appliances for rendering air pure for ventilation, regardless of such an external condition as is produced by a dense and persistent city fog.

Change in Business Premises.

A marked change has of late come about in the general features of places where business is transacted. Big business blocks, with light and airy offices, have superseded the earlier and less pretentious buildings where men traded and gathered wealth. That the change is, in most respects, an improvement, is not to be denied. The physical comfort of workers in offices has been enhanced to a great degree by the transition, and it is certainly a welcome change for those who have to visit many offices in the way of business. Until quite recently many old-established business houses were content with, and, indeed, took a species of pride in remaining in, the dingy and cramped quarters in which the founders of the firm had carried on their work. Offices were religiously maintained in the same condition in which they existed during the lifetime of the fathers and grandfathers of the present occupants. They were fearful of ostentation and display, and were conservative to a degree. But now, even these steady-going concerns find they have to march with the times, if they do not wish to fall behind. Even houses with long-established reputations find they cannot insure the maintenance of all their old business if they do not keep themselves perpetually in evidence. They must advertise, and they must let their light shine in as public a manner as possible.

Better Offices.

A name and a dingy office in a back street are not now sufficient. They must do as others do and put their name and business forward so that they who run may read. The old painted board which did duty outside the ancient store or office must be replaced by the substantial metal plate, which is its modern equivalent, suggesting solid wealth and standing. The interior and exterior must be furnished and decorated in accordance with the requirements of modern business procedure. Plate glass, handsome furniture, electric lights and the various conveniences of the day are regarded as evidence of a progressive and up-to-date business house, and are not, as some suppose, looked upon with suspicion, or held to be ostentatious. The tendency of the day is to comfort in business quarters, combined with as much display as is consistent with good taste. And no one can deny that to transact affairs in one of the modern, well-lighted, handsome and attractive offices is a considerably pleasanter matter than it was in some of the ancient dungeon-like premises which flourished but a short while ago.

Moderate Abilities

All men are not born with an endowment of brilliant talents, or even with the faculty for acquiring and retaining knowledge, although this is open to the majority if they will avail themselves of their abilities. Some men there are who are born dull, and who remain dull and apparently incapable of much mental improvement during the whole course of their lives. These are the minority, however, and yet, perhaps, even these might in most cases be open to the reception of more mental thew and sinew had the world the time and patience to take them systematically in hand. But in the rush and hurry which characterize modern life—and especially modern business and trade life—such expenditure of time and trouble is hardly to be hoped for, except in occasional instances. Each tub has to stand more or less on its own bottom, and the dull man almost invariably remains plodding along the lower planes of life and effort, content to remain there to the end of his days. It is not of such cases that we are thinking now, however. An old writer, who was a profound student of human nature, laid it down that mankind might, in respect to their capacities, be divided into three classes—first, those who understand things by means of their own natural endowments; second, those who understand things when they are explained to them; and, third, those who can neither understand them of themselves nor when they are explained to them. In accepting this general classification as substantially correct, we find that the vast majority of the human race naturally fall into the second category, as those "who understand things when they

are explained to them." In other words they are the men of average or moderate abilities. These are the individuals who form the bulk of the workers in all fields of effort. They are the men on whom the real stress and strain of the struggle for existence mainly falls—the rank and file of the great army of humanity.

Advantages of the Average Man.

Many of them, nevertheless, rise to the highest posts of command, by dint of hard effort and utilization of those moderate abilities with which they were originally endowed, together with the capacity for turning them to the best account. The first class above mentioned includes the geniuses and the third the imbeciles of the world, but these taken together form only a small minority of mankind; and, as a rule, even the former are not the men who make the most substantial successes in life. The greatest prizes modern life has to offer are almost without exception—at any rate in the industrial walks of life—open to the men of moderate abilities, and are frequently grasped by them over the heads of the brilliant men whose natural endowments, according to Macchiavelli, enable them to understand things intuitively. If the choice were offered between the two first classes it would not be unwise to desire to be placed, as most of us are placed, among the great mass of average men. It is a great thing to be born a natural king among men, but greater still to have achieved that eminence by fair and hard effort in competition with one's peers. We believe that the majority of those who have climbed to the highest places, and who have worthily filled those places, were men of moderate abilities who merely made the most of their opportunities, and not the men of brilliant natural endowments. In fact, take it for all in all, it is open to question whether it may not be a positive blessing to many men to be the possessors of but moderate abilities, provided they are thereby impelled to use them to the utmost advantage.

The Chicago Smoke Nuisance

The best evidence thus far elicited that the Chicago crusade against bituminous coal smoke is proving effective is seen in the recent organization of a society to protect the smoke makers. Quite a respectable number of manufacturers have agreed to support one another in fighting the efforts of the Society for the Prevention of Smoke. They are supported by some of the bituminous coal merchants, who believe that their commodity is suffering unjust treatment at the hands of the society's agents. An address which has been issued by the "smoke makers," and which states that they have been unable to find economical and efficient devices for the complete combustion of bituminous coal, has called forth quite unexpectedly a most gratifying expression of opinion from other manufacturers, who state that they are using apparatus for the prevention of smoke which they have found both satisfactory and economical. The Society for the Prevention of Smoke, instead of being overwhelmed by adverse sentiment crystallized through a formidable organization, have had their methods vindicated by a chorus of enthusiastic steam-raising supporters in the Chicago daily press. It is quite safe to say that nothing could have happened to give their efforts to suppress the smoke nuisance a greater impetus than this abortive opposition. The fight against smoke makers has been long and bitter, with the result often doubtful, but now the prospects appear to indicate that victory is at last dawning for the smoke preventers.

The Skylight Competition.

The time is drawing near when the Skylight Competition which has been announced for some time past in *The Metal Worker* is to be brought to a close. The date there fixed is the 1st of April, which occurs a week from next Saturday, and we would remind our readers who intend to take part in this competition that the drawings and descriptions must be received at this office by that date, so ample time should be left for their carriage, by mail or express. Some have already sent in their plans, and we believe that the competition will call forth a generous response, for the subject is surely an interesting one, and the various ways in which the problem will be treated will prove instructive to all who are required to do work of this kind.

Winding up of Partnerships.

There are a number of very important practical questions which arise in the winding up of partnerships with which every one in business has need to be familiar.

What will bring a partnership into dissolution, requiring it to be wound or settled up, besides mutual agreement, is the death of a partner, sale of a partner's interest, whether voluntary or upon execution, or the marriage of a single woman. A court will also decree dissolution upon being shown a failure of the undertaking, misconduct of one partner excluding the other or others from joint control over the business, insolvency of a partner, lunacy of a partner, or abandonment of the business by a partner.

Notice of dissolution must be given, except when it is brought about by death, in order to terminate a partner's authority to bind his partner as before. This notice must be actual notice for those having dealings with the firm, but as to strangers, published notice at the place where the partnership was carried on will be sufficient.

The formal dissolution of a partnership and notice of it is very important in order to prevent the possibility of one of the partners, if he took the notion, from binding the other as he otherwise could do, for if the business was merely broken up by sale of the stock one partner could still bind the other by a commercial paper, and perhaps in other ways, as, for example, by admitting a firm debt barred by the statute of limitations.

Upon the death of one member of a partnership, says the Supreme Court of New York in a recent case, the surviving members become the legal owners of the assets, and have the exclusive right to manage and dispose of them in closing up the affairs of the partnership. But while the surviving members of a partnership have the legal title to partnership property, and the right to dispose of its assets, they only have the title and right of disposition for the purpose of closing up the partnership business, not for the purpose of continuing the business. They cannot keep possession of the property indefinitely. The legal representatives of the deceased partner have a right to an accounting by the survivors, and payment over to them of their proportionate share of the assets after payment of the firm debts. However strong may be the desire of the surviving partners to continue the business, the legal representatives of the deceased partner have a right to have the business closed up within a reasonable time, and the capital belonging to them cannot be continued in the business to gratify the desire or promote the interests of the surviving members; and while, under ordinary circumstances, the court will not interfere with the control of the partnership property by its surviving members, or with their management of the firm assets, yet it must be self-evident that there must be power in the court at some time to interfere and cause a final settlement of the partnership business; and when it is apparent that the surviving member or members of a partnership are conducting the business, not for the purpose of closing it up, but to expand, enlarge and continue it, that it then becomes proper for the court to interfere. This may be done by the appointment, on application of the legal representatives of the deceased partner, of a receiver. True, it might be that in some cases it would be better for all concerned that the business should be continued, but neither the surviving partners nor the court can coerce the legal representatives of a deceased partner into leaving his share remain in the business.

The general rule is that the assets of a firm are to be applied in the following manner: 1, in payment of the debts of the firm to persons who are not partners; 2, in payment to each partner ratably what is due from the firm to him for advances, as distinguished from capital put in; 3, in paying each partner ratably what is due from the firm to him in respect of capital; 4, the ultimate residue, if any, is divisible among the partners in the proportion in which profits are divisible under the partnership contract.

The doctrine is also well settled, states the Supreme Court of Appeals of West Virginia, that in a suit between partners for a settlement no final decree can be made while debts due from the firm remain unadjusted, unless the partner asking it will deduct the amount of such debts from the sum which he seeks to recover, and it is an error for the court to decree personally for money collected, or any part thereof, in favor of one partner against the other, until payment of the partnership debts are first provided for, unless good reason is shown for a different course. The reason of the rule is obvious—the partner decreed against is still liable to the unpaid partnership creditors.

THE LETTER BOX.

Removing Water from Cellar.

From D. F. P., *Alexandria Bay, N.Y.*—In reply to "J. E." who asked in *The Metal Worker* of March 4 for a way to get the water out of his cellar, I would refer him to a plan adopted by a resident of this place who was troubled in the same manner. His residence is on a rocky eminence, and the cellar drain, which has to pass under the street to reach the river, was not below the line of frost this winter and became frozen solid. It was a difficult matter to reach the spot, as it seemed to be in the terrace wall, so he took his lawn hose, which was long enough to extend down the terrace some distance, stopped the nozzle end, filled it full of water, put the other end in the lowest point of his cellar and then turned the cock and syphoned all the water out. As I write a good stream is running. By keeping this arrangement working he manages to keep the cellar nearly dry, whereas if he had to dig up his drain it would be a long and expensive job.

Plaster of Paris Molds.

From G. H. R., *Richfield Springs, N.Y.*—Can plaster of paris molds be used for casting brass, copper, silver or gold, if the molds are thoroughly dried?

Answer.—Plaster of paris molds can be used for casting, but it is difficult to get them sufficiently dry for the purpose, on account of the water contained in them, and which was used in mixing the plaster. This difficulty can be overcome to a certain extent by holding the molds over burning tar or kerosene, thus giving them a slight coating of soot or carbon. A piece of tar paper or a common kerosene lamp without a chimney can be used for the purpose.

Tinning Old Copper Wash Boilers.

From C. F. T., *Toledo, Ohio.*—I would like to know how to tin old copper wash boilers, as so many of my customers want this work done for them. I wish you would furnish this information through the columns of *The Metal Worker*.

Answer.—This question, or a similar one, has been answered several times before in the columns of *The Metal Worker*, and from these previous accounts we condense the following notes about the work. The first thing to do is to thoroughly clean the copper, which is done by washing it repeatedly with commercial muriatic acid, using a swab of tow to assist in the operation. After having cleaned it with the acid, take sharp sand and thoroughly scour it; then rinse it off perfectly clean and examine it closely to see that no foreign matter remains. To tin the vessel, first wet it all over and let it drain, and while damp sprinkle the inside surface with some sal ammoniac. Then place it over the fire and warm it until the sal ammoniac begins to smoke and dissolve from the heat. A few pounds of tin having been melted in a ladle, taking care not to burn it, pour a portion of it in the copper vessel and flow it around with the help of a wad of sal ammoniac. If the tin refuses to adhere to any part, rub the place well with sal ammoniac. After the vessel has been tinned in all parts, turn it upside down and let the surplus tin drain off.

Equalizing the Temperature of Rooms.

From R. N. W., *Pa.*—How can I manage to draw cold air out of rooms so that the temperature will be the same at the floor level as it is in the more elevated parts? What method would answer for this purpose for a large room, such as a hall or a church.

Answer.—The desired result can be attained by properly ventilating the rooms by outlets either near the floor level or located in the floor itself. These outlets must be ample in area, and connected with flues or ducts of sufficient drawing power to take the cold air out. A simple way to draw the cold air from any ordinary room is to place a register at or near the floor, connected to a heated flue; a chimney flue will answer for the purpose. It is often the case in a building such as a church or a hall that no provision has been made for the flues needed for this purpose. In such a case they will have to be built, located at such places in or against the walls that they will take the cold air evenly from all parts of the floor. Such ducts, to work, must be heated. This can be accomplished by placing a small heater at the base of the duct, the smoke pipe from the heater passing up through the entire length of the duct to the outside above the roof. A small fire in the heater will cause an upward movement of air drawn from the floor into the duct. The heat generated by one or two gas jets located near the bottom of the duct in some cases is sufficient to accomplish the desired result. Another method made use of in some instances is to connect a small pipe from the furnace hot-air chamber to each duct.

The Tinners' Trade.

From JOHN BAKER, *Fort Wayne, Ind.*—I read the article in *The Metal Worker* of March 4 on trade education and the difficulty of procuring competent workmen. What inducement, however, do employers offer to an intelligent boy to learn the tinsmiths' trade? The first thing he has to do is to clean up a dirty and often insufferably hot shop, for every one in the store, after it is cleaned up, to upset again. The clerks come in and black their shoes on the bench and dirty the whole place. All this the apprentice boy has to clean up. Next, he is made a beast of burden and has to take loads of tools and tin to all parts of town, sometimes lugging a fire pot half the size of himself. Finally, when he has spent about two years at this kind of work (I can't call it a trade), another boy is taken to learn the work, and these constitute the jour. and helper in nine shops out of ten. And then if he is so unfortunate as to become a good workman, how is the case with him then? Every one is supposed to tell him what to do, and he has all sorts of menial jobs that no other tradesman will undertake. They all say, go to the tinner for such work.

Chimney Connections for Gas Ranges.

From G. W. H., *Germantown, Ohio.*—In discussing the cause and remedy of condensation from a natural gas range one's mind is very naturally switched off in several other directions. The amount of moisture given off from a natural gas flame is so great that nothing short of absolute flue connection will carry it out of the room. A canopy or other device will not do. The range itself must be made so as to conduct the products of combustion to a pipe without the possibility of their being distributed in the room. It must have as direct and complete flue connection as any coal or wood stove should have. There are quite a number of heating devices on the market for which the makers never expected or thought of flue connections. All this is radically wrong, and the sooner the manufacturers tumble to this fact the better. In this State the authorities are raising considerable racket about adulterated or impure food. I would like to know what would be the matter with a law to regulate heating devices. Approximately, heating arrangements are as deleterious to health as impure food. All oil, gasoline, gas, patent fuels, from which the products of combustion are discharged directly into the room where used, are injurious to health. Electric heating may solve the problem, but that is further along. These fad devices are sold to seemingly intelligent people. Gullible merchants, ministers, and even doctors have been buying them, and nearly smothering themselves and their friends with the gases which must result from the combustion of any form of carbon. Instead of being the agents and means of foisting these humbugs upon the public, the merchants should stand as a stone wall against the distribution of this class of goods.

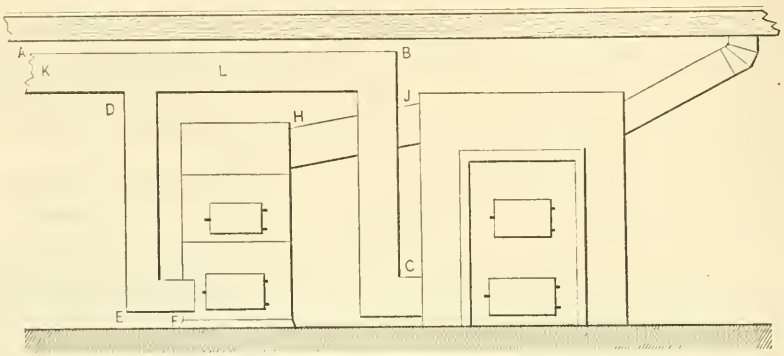
Note.—That the burning of oil and gas gives off harmful gases goes without saying; but we think our correspondent takes rather extreme views as to what should be the action of dealers in the matter. The products of combustion from a gasoline stove, for instance, are poisonous, but so are the gases that are breathed out by human beings and animals. A room would have purer air if every flame, whether of a stove, a lamp, or the flame of a candle, were connected with a chimney flue and every individual had a special exhaust pipe to breathe into, but such a multiplication of ventilating ducts would be out of all reason. A sitting room with ordinary ventilation may have one or more kerosene lamps in it without affecting the health of the occupants, and the same amount of oil burned in a stove would not vitiate the air any more than the lamps vitiate it. The thing to do is to deal with the problem reasonably, and this means the connecting of

ranges and stoves of any sort with chimneys if the air is vitiated by them to an unwholesome degree.

Two Furnaces Connected with One Cold-Air Box.

From E. D., *New York.*—The following diagrams are intended to illustrate the cold-air box for the portable furnace, the one supplying the large furnace was tapped and the pipes arranged as shown in Fig. 1. A great advantage to be derived from this scheme was, that no changes were required in the heating pipes—only one of which is shown in the engraving—leading from the brick-set furnace to the rooms above. The original cold-air box which was constructed to supply the brick-set furnace is represented by A B C, and the branch leading to the portable furnace by D E F. Dampers were placed at K and L, damper K to be used for regulating the supply of air from outside.

During moderate weather the portable furnace only is used. Damper L being closed, the air is required to pass down the cold-air box D E F and through the furnace, where it becomes heated. It then passes through the connecting pipe H J into the brick-set furnace (in which there is no fire), and up the various pipes to the rooms above. By this arrangement the upper part of the brick-set furnace serves as a warm-air reservoir from which the various heating pipes draw their supply.



Two Furnaces Connected with One Cold-Air Box.—Fig. 1.—Arrangement of Fresh-Air Pipes.

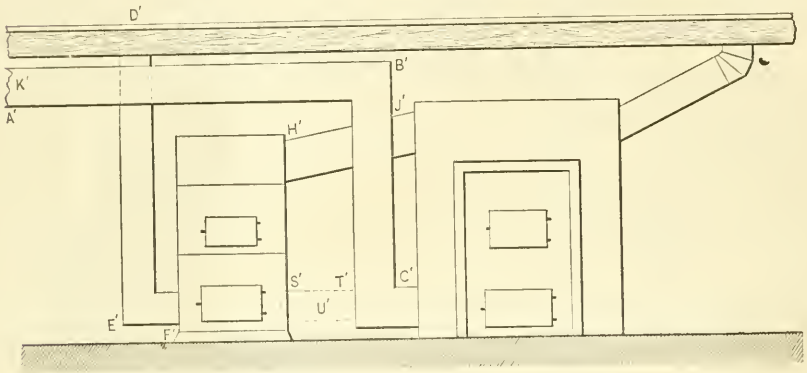


Fig. 2.—Portable Furnace Supplied with Cold Air from Hall.

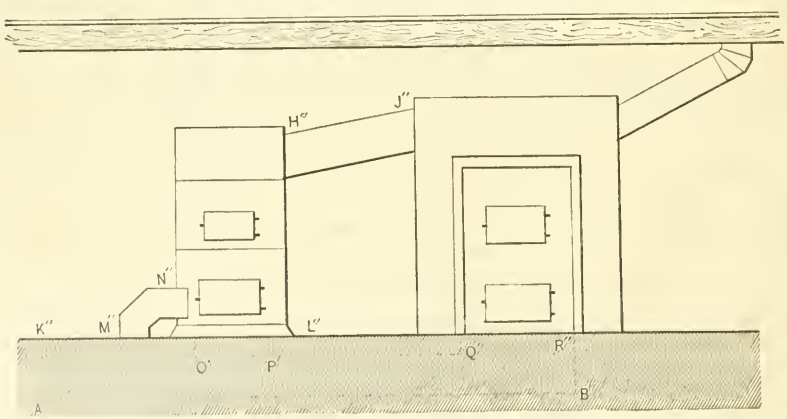


Fig. 3.—Two Furnaces Connected with Underground Duct.

The weather becoming colder, and more heat being required to warm the house, the brick-set furnace can be used. Damper L is opened, thus allowing the air to pass through the box A B C to the furnace where it becomes heated and passes up the various heating pipes. When the weather becomes excessively cold the two

manner in which two furnaces were connected with one cold-air box. The brick-set furnace was first in use and found insufficient to properly warm the house during extremely cold weather. Accordingly a small portable furnace was connected with the brick-set, and as it was not convenient to construct a separate

furnaces can be used together. The damper L is to be turned so each furnace will receive its proper supply of air.

Another scheme is shown in Fig. 2 that might be desirable under some circumstances. The cold-air supply for the portable furnace is derived from the hall or any convenient room, as indicated at D, and the air passes to furnace through D E F. A register placed at D could be used for regulating the flow of air. By this arrangement the cold-air could be taken from the rooms above for supplying the portable furnace, and from outside, through the box A B C, for the brick-set furnace.

By connecting the portable with the brick-set furnace, as indicated by S T, and placing a damper at U, another combination would be the result. When the portable furnace was in use, by closing damper U the air could be taken through D E F. By closing register D and opening damper U and K, the air would pass into portable furnace through A B T S.

The brick-set furnace being in use, by closing damper U (damper K open), the air could be taken through A B C. Then by closing damper K and opening damper U, the air would pass through D E F and S T. When the two furnaces were in use, the damper U could be closed and damper K opened. D E F would then supply the portable and A B C the brick-set. With register D closed and dampers U and K open, A B C could supply the two furnaces. Damper K being closed, and register D and damper U being open, D E F could be used for the two furnaces. In this case the air would be obliged to pass through the portable before entering the brick-set furnace.

In Fig. 3, the two furnaces are shown connected by the underground duct A B. The brick-set furnace receives its supply of air at Q R. A similar opening can be made for the portable, as indicated by O P, or an elbow can be used to connect the duct with furnace, as indicated by M N. By placing dampers at K and L, the cold-air supply can be controlled and the furnaces managed in the same manner as shown in Fig. 1.

Price of Material.

From E. P. B., *Osterville, Mass.*—I would like the opinion of the readers of *The Metal Worker* regarding the profit to be added to the cost of material used in jobbing. For a number of years I have been using quantities of copper, and it has been my custom to add a profit to cost of same, besides charging for my time. Sometimes I have an argument with a customer regarding the subject of profit on material, and so would like the advice of others.

In the library of Congress, says an exchange, which has over 650,000 bound volumes, the books will hereafter be handled almost entirely by machinery. Orders will be sent to the book-stacks and books brought from them to the desk for distribution by trays suspended from endless chains, the latter being made to travel by means of an engine in the basement. The mechanism will be noiseless and invisible also, the carriers going beneath the floor of the great central reading room, to and fro between the librarian's desk and the book-stacks. Every arriving tray will dump itself automatically at the first desk. Likewise, in taking volumes back, each tray will spill its contents, of its own accord, at a certain tier.

From a Western contemporary we learn that Pope's Theatre in St. Louis possesses one convenience which could be adopted with profit by all other similar places of amusement. In inaugurating the season of 1892 93, the management of this theatre has given the purchasers of its seats telephonic communication, enabling those attending the performances to be called quickly in case of necessity. By leaving their seat numbers in the box office they can be called immediately.

NEW PUBLICATIONS.

REPORT OF THE CHIEF OF MASSACHUSETTS DISTRICT POLICE FOR THE YEAR ENDING DECEMBER 31, 1892, INCLUDING THE RESULT OF THE INSPECTION OF FACTORIES AND PUBLIC BUILDINGS. Boston, 1893.

The records of the inspection and detective departments or the State police force of Massachusetts for the year 1892 fill a handsome volume of 500 pager, containing numerous well-executed plans and illustrations of systems pursued and proposed for the heating and ventilation, as well as general arrangements of schoolhouses and public buildings in the State. The division of work between the two branches of the force—namely, the detective department and the department of inspection of public buildings and factories, which was instituted in 1888—is stated to work admirably. Of the 37 officers who compose the executive, 26 are detailed for service in the inspection department, leaving 11 for detective duty. The former are not called upon to perform any other duties than those pertaining to the office of inspector of factories and public buildings, except in cases of great emergency. Among other interesting topics treated of by Chief of Police Wade are the means taken for the prevention of elevator accidents by legislation and rigid inspection, the 58-hour law, regulations for the erection and construction of public buildings, arbitration of labor disputes and a review of the working of labor and inspection laws in the commonwealth. Perhaps the most important portions of the document are the reports and remarks in regard to ventilation and heating of schoolhouses and other public buildings. This matter appears to have received very full and earnest consideration at the hands of Mr. Wade and his staff of inspectors. Chapters on "Ventilation Practically Considered" and "Ventilation by Mechanical Means" furnish some valuable suggestions on this important but too-often neglected subject.

AMERICAN NEWSPAPER ANNUAL. N. W. Ayer & Son, Philadelphia. Price $5.

The "American Newspaper Annual" for 1892 is the thirteenth edition of this valuable compilation of the newspapers and periodicals published in the United States and Canada, and shows that the development of journalism, press and class, is keeping pace with the growth of population and increase in intellectual and industrial progress.

The work under review is not only a catalogue of newspapers, giving information concerning their circulation, issue, date of establishment, political and other distinctive features, together with the population of the counties and places in which the papers are published, but it also furnishes a description of every place in the United States and Canada in which a newspaper is published, including railroad, telegraph, express and banking facilities, thus forming a valuable guide to advertisers and the public in general.

Some interesting information is presented regarding the growth of journalism in this country. In the present edition 20,115 newspapers and periodicals are enumerated, an increase over last year of 1104. It is stated that the increase is due partly to the average yearly net gains of from 800 to 850 and partly to the fact that the Presidential election always adds temporarily to the number of papers. In 1879, according to best authority, the number of papers in existence was 10,115, or exactly 10,000 less than the present count. In the ten years since 1882 the average net annual increase has been 831. These figures, however, it is stated, give no idea of the number of papers started in any one year. Probably not less than 3500 publications of all kinds have sprung into existence since work on the edition of 1891 was closed, but of over 3000 recorded many ceased publication with the first or a very early issue.

There were published in the United States in 1892 14,204 weekly, 2188 monthly and 1806 daily papers. New York leads, with 1902, followed by Illinois, with 1572; Pennsylvania, with 1384; Ohio, with 1112, and Iowa, with 975.

The "American Newspaper Annual" embraces 1426 pages of descriptive, statistical, advertising and miscellaneous matter, and the method of indexing employed makes it possible to turn to the information desired without loss of time.

New York's Water Supply.

The question of contamination of the water supply of New York City, in view of a prospective visitation of cholera, is now occupying the minds of the medical fraternity and the public generally. A special meeting of the Academy of Medicine was held last week to consider the subject and to hear the report of a committee recently appointed to confer with the city Board of Health. In support of complaints of pollution, it was shown by one of the members of the committee that the condition of some of the feeders of the Croton River, from which New York's water supply is obtained, is such as to be a deadly menace to health. One tributary was found to be actually an open sewer for a large village through which it flows. Drainage from barnyards, vaults and other sources of pollution was seen to empty directly into this brook, which even receives the percolations from cesspools, as well as the garbage and offal of the whole village, including human excrement. Small wonder that, when such a state of things exists, the medical profession should think it time to sound a clear note of warning of the impending danger. Should cholera come this year a contaminated water supply will be the most effective medium of assistance in its ravages. It appears that the laws of New York State do not provide any effective method for checking such pollution of streams as is described above. Great efforts are therefore being made to initiate such measures as will insure the immunity of the city's water system from dangerous sources of contamination. The medical profession have taken the lead in the movement and have collected abundant evidence to show the reality of the danger. They propose that a special board of sanitary engineers, chosen by the State, should be invested with large powers in dealing with this matter. The matter is a larger one than a mere city question. It really concerns the whole country, for should the scourge of cholera unhappily arrive this summer, New York would in all likelihood be the first place of its appearance, and if the plague is to find the assistance of impure drinking water awaiting it there, the chances of its suppression or confinement to a small area will be greatly lessened.

A Berlin correspondent, discrediting the reports of negotiations in progress for a new commercial treaty between the United States and Germany, says: "It is likely enough that, should the disposition of the new American Government be favorable, Germany might try to make some commercial arrangements with the United States, but there is little chance for a treaty which would materially improve the commercial relations between both countries."

WORLD'S FAIR NOTES.

The Forestry Exhibit.

Out on the lake shore, near the southern extremity of the World's Fair grounds, is a structure that differs materially from any other in the park. The Forestry Building is *sui generis*. After seeing the magnificence of staff construction in the large buildings it may be with relief that some visitors will turn to the rustic simplicity of the forestry building. Instead of the intricate work of designers, molders or artists, the highest effects in the forestry building come from groupings of natural woods. No other building on the ground shows so clearly at first impression the uses for which it is designed.

The scope of the World's Fair forestry exhibit is of peculiar interest to Americans. When a separate department of forestry was created, it was pointed out that the opportunity had arrived to make constructive forestry as important a science in this country as in Europe. On this idea the fair managers have worked with a will. Although constructive forestry and the restoration and preservation of forests are yet in their infancy in America, it is believed that the turning point has arrived and that the World's Fair exhibit will have a most potent influence in preventing the further wholesale destruction and waste of native forests.

The Forestry Building itself is the main exhibit in the department. It is 200 x 500 feet in area. On all four sides is a veranda, with supports forming an imposing colonnade. This colonnade is one of the most unique affairs ever designed and is peculiarly appropriate to a cosmopolitan fair. It is built from woods contributed by foreign countries and about 30 States and Territories. It consists of a series of columns, each composed of three tree trunks 25 feet long. One of the trunks in each column is from 16 to 20 inches in diameter at the base and the other two are from 9 to 12 inches. All the trunks have the natural bark of the tree. Each of the States, Territories or foreign countries furnishes specimens of the most characteristic timber growths within its borders. The sides of the Forestry Building are built of slabs with the bark removed. The rest of the building, including the window frames, has the same rustic treatment. The roof is thatched with tan and other barks.

The main entrances are finished in different kinds of wood and are very elaborate. The one on the east side, facing the lake, deserves special mention. It is put in place and finished by the Southern Lumber Manufacturers' Association. The vestibule is of yellow pine and cypress. It is built in such a way as to show the susceptibility to polish of the Southern woods and their usefulness for panels and interior decorations. The cost of this main vestibule alone was between $5000 and $10,000. Some of the States—Alabama, for instance—have sent tree trunks for the Forestry Colonnade, although prohibited from making an interior exhibit by lack of appropriations. The tree trunks in the columns taper toward the top and are joined by rustic work in longitudinal sections. Some of the latter are also furnished by the States contributing the columns. On each column there will be a tablet, giving the common and scientific names of the trees and the State or country contributing them, besides other valuable information concerning the resources of the locality. Above the cornice of the veranda, on all four sides of the building, are flagstaffs, which will bear the colors or coats of arms of the nations or States represented in the interior exhibits.

The interior exhibits will be in several main groups. Natural woods will be shown exclusively by States, Territories and foreign countries. The product of the various woods, finished or partially finished, will be shown by individual exhibitors or firms. The methods and processes of manipulating timber at every stage, from the tree trunk to the finished product, will be shown by firms or corporations. The completely finished product will not be shown in this building, as it belongs to the department of manufactures; neither will there be any machinery in motion in the Forestry Building. It will be a still exhibit, but the various ways of denuding forests for economic and commercial purposes will be shown by models, maps, drawings and other methods.

The foreign countries which have obtained space inside the Forestry Building are Japan, Honduras, Peru, Hayti, Spain, Germany, Ecuador, Colombia, Brazil, Mexico, New South Wales, Canada, Russia, Italy, France, Siam and India. Each of these countries has a separate space, and will make a showing of its most characteristic woods. Miniature structures will be built, with arches and railings of natural wood and in rustic design. Canada has the largest space of any foreign government, and the various provinces of the Dominion have promised to make an interesting showing of their timber resources.

The States and Territories which will have interior exhibits are: Pennsylvania, Louisiana, Virginia, Arizona, Kentucky, Minnesota, Nebraska, Montana, Wyoming, New Mexico, Wisconsin, North Dakota, Ohio, Washington, Michigan, West Virginia, Missouri, North Carolina, Indiana, Maine, New York, California, Utah and Idaho. Of these West Virginia and Michigan have the largest space, and the exhibits from these States will be on an elaborate scale. Other States will show peculiarly unique specimens, and the grouping of woods in the various spaces will form a most artistic whole. Sections of tree trunks will be built one on top of the other, and each portion of the exhibit will be accompanied by detailed information as to the locality producing the exhibit, the area still under growth and where located, and all other pertinent information.

It is one of the rules of the forestry department that there shall be no finished wood products in the building, and where it is necessary to show the special uses of certain kinds of woods it will be shown by pieces of disjointed furniture or other partially finished product.

The foreign exhibits will include all the remarkable woods and wood products that are familiar in name only to Americans. The India exhibit will include sandal woods and a precious Government collection of unique and valuable woods. Brazil will show the various grades of mahogany, California the red wood and gigantica, Canada the various pines, birch and maple and a host of other trees of commercial value.

Some of the State exhibits will be peculiarly interesting. Nebraska will show the results of tree planting and the special results of the observance of Arbor Day in that State. This exhibit will contain specimens of actual woods, with tabulated information showing the age of each specimen, how and when planted. North Dakota will make a similar exhibit. Some of the exhibits will be genuine surprises. For instance, Kentucky, which is not popularly considered a forest State, will show as elaborate an exhibit as most of its neighbors. From Kentucky there will be specimens of white oak, 4 or 5 feet in diameter, built in the form of a pyramid. Kentucky will also show a very fine relief map, pointing out the principal forests in the State, with full statistical information regarding them. Ohio, Wisconsin and North Carolina will make exhibits of medicinal plants and herbs gathered in those States. Ohio alone will show varieties of medicinal herbs amounting to 400 or 500. This is a new feature in American exhibits.

One of the remarkable foreign exhibits will be from Paraguay, which will show 321 varieties of woods, each 1 meter high and from 12 inches to 4 feet in diameter. In this exhibit will be beautiful specimens of barks, dyewoods and other commercial products of that portion of South America. The Argentine Republic will have an exhibit of remarkable woods. France and Germany will have the best scientific exhibits, giving illustrations of constructive forestry from the results of wide experience. Japan will make a most creditable showing, and the various wood specimens from the flowery kingdom will be the first ever shown outside of that country.

Among the spectacular exhibits will be an immense trophy in the center of the building. This will consist of a collection of large natural timbers from various States. North Carolina will send a large walnut log, Kentucky will send a mammoth white oak, Kansas will send a walnut log 7 feet in diameter and weighing 30,000 pounds. There will be immense tree trunks from the State of Washington. Another spectacular exhibit will be a long spar of ship timber from Washington.

The individual commercial exhibits will include specimens of wood pulp, cork, parts of furniture and wooden ware. The pulp industry, which is rapidly growing in importance, will be represented by several exhibitors from foreign countries. The World's Fair exhibit will contain the most complete display of the utilization of wood products that has ever been brought together.

Outside the Forestry Building, but connected with the department, there will be shown a typical logging camp. This is contributed by Michigan, and will be located at the south end of the park.

Logging methods will be shown, including snowsleds loaded with logs, saws, axes, chains, skids, rollers and old implements used in the early days by the lumbering industry. There will also be a typical logging hut, showing how lumbermen live in the back woods. In another part of the grounds, near Machinery Hall, will be shown an actual sawmill in full operation. The process of converting logs into various kinds of lumber will be gone through on a realistic scale.

To practical builders from other countries the Forestry Building itself will convey many suggestions as the American methods of house raising. There was not a single nail used in the construction work. The method of construction followed by Mr. Atwood, the designer, is intended to show peculiarly American methods of joining timbers so as to economize materials. Wooden pins were used instead of nails.

An Official Change.

After having served the exposition as mechanical and electrical engineer for 18 months, Frederick Sargent last week tendered his resignation to Director of Works Burnham, and it was promptly accepted. The Council of Administration lost no time in approving Mr. Burnham's action.

Mr. Sargent's resignation hardly caused a ripple of surprise among the exposition officials, although it came unannounced. It has been known for several months that affairs in the department of electrical and mechanical engineering were dragging. Mr. Sargent, when questioned by the council concerning the progress of the work in his department, returned answers that were most unsatisfactory. Finally he was asked whether the electrical and mechanical engineering would be completed by May 1. He replied that it would not.

Then Mr. Burnham interrupted with the assertion that the engineer was mistaken, and that the work would be completed. Shortly after that meeting the affairs of the department were reorganized. R. H. Pierce was given charge of the electrical division, and Charles F. Foster the mechanical department.

This having been accomplished and everything made ready for renewed action, the resignation referred to was next in order.

Silver Statue to be Cast Soon.

Commissioners W. M. Bickford and Dr. A. H. Mitchell of Montana are in Chicago to superintend the casting of the silver statue for the World's Fair, and within the next ten days the image of Ada Rehan will be taken from the molds of the American Bronze Company and presented to the gaze of the public. The National Smelting & Refining Company have 11,994 ounces of the silver and an additional 12,000 ounces was delivered to the commissioners last week by the Adams Express Company from the Omaha smelters. The white metal is from the Moulton, Curlew, Elizabeth and Wickes Mines, all of them noted silver producers, and the World's Fair Board is under bonds for its safe return to its owners. Invitations will be issued by the American Bronze Company to a public pouring, and the casting will be conducted with due ceremony. The heads of the departments of the exposition will be in attendance and Chief Skiff will pour the metal into the mold. Several Montanians will be present at the ceremony.

Fete Days at the Exposition.

The following is a complete list of special fête days as arranged up to date by the Committee on Ceremonies:

Washington	May 17
Wisconsin	May 23
Maine	May 24
Denmark	June 5
Germany	June 15
Nebraska	June 15
Massachusetts	June 17
New Hampshire	June 21
France	July 14
Utah	July 24
Liberia	July 28
Commercial travelers	July 26
Independant Order of Foresters	Aug. 12
Hayti	Aug. 16
Colored people	Aug. 25
North Carolina	Aug. 18
Austria	Aug. 18
The Netherlands	Aug. 31
Nicaragua	Sept. 1
New York	Sept. 4
Brazil	Sept. 7
California	Sept. 9
Maryland	Sept. 12
Michigan	Aug. 13 and 14
Kansas	Aug. 15
Colorado	Sept. 19
Montana	Sept. 20
Patriotic Order Sons of America	Sept. 20
Iowa	Sept. 21
Rhode Island	Oct. 5
Spain	Oct. 12
Italian societies	Oct. 12
Minnesota	Oct. 13

Arrival of a Large Cannon.

One of the biggest guns belonging to the United States Government was shipped into Jackson Park last week for installation in the Government Building. It is not the biggest gun in this country because there are two or three others of equal size, but none larger. It is 36½ feet long and weighs 58 tons. It is a 12-inch breech-loading steel rifle and will carry a projectile weighing 1000 pounds. A charge of 460 pounds of powder is used every time the lanyard is pulled. A specially constructed twin car was required to carry the gun. Each car used was 70 feet long and built of steel. The cannon rested on a truss, or bridge, the center of which was over the couplings of the cars. Great care was manifest in the making of the little train. Each car was provided with 12 wheels of steel, and on each was a brake to secure the instant stopping of the train in the event of that being necessary. On arrival at the Government Building three big gun lifts were placed over the car and three immense chains wound about the cannon and by means of hydraulic jacks the gun was lifted slowly upward and the special cars pulled from beneath it. The cars were returned to the East, and will be used to carry the Krupp cannon, which is expected shortly. The Krupp gun will be almost twice as large as Uncle Sam's specimen cannon. It will weigh 128 tons and have a bore 25 inches in diameter.

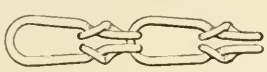
The cannon which reached the park last week came from the United States arsenal at Watervliet, N. Y. It has never been tested. There is a companion gun of its size at Sandy Hook, N. Y., and several shots have been fired from it. It will throw a projectile at least ten miles.

British Exhibits.

Pitt & Scott, foreign carriers, have shipped from London several hundred tons of exhibits for the fair. The exhibits are of a most varied description and include a number of models of steamships, among which is the model of the famous Confederate cruiser Alabama. This model is sent by the builders, Laird Bros. of Birkenhead. Another package measuring nearly 50 cubic tons was shipped last Friday and contains a large model of Her Majesty's steamship Victoria, which was exhibited at the naval exhibition in London. This model is forwarded by Armstrong & Co. of Newcastle-on-Tyne.

The Strength of Small Chains.

In a paper read at the meeting of the British Association at Edinburgh, in 1892, Professor H. S. Hele-Shaw states that he has frequently found the result of using small chain most unsatisfactory. In the



The Triumph Chain.

first place, no small chain which he has been able to procure seemed to give a reasonable amount of strength in proportion to its weight and the tensile strength of the material. In the second place, no maker will usually give any guarantee of strength below a certain size, generally $\frac{1}{8}$-inch, although in some special cases makers will guarantee the strength as low as $\frac{1}{4}$ inch. Below $\frac{3}{16}$ inch no strengths are ever quoted in text books, engineering pocket books, or books of engineering reference.

Commenting on data found in engineering works, the author says that these data are not very satisfactory in themselves, and there are no results of chain of less than $\frac{3}{16}$ inch diameter; whereas enormous quantities of chain under this size are made and sold.

Recently there have been a number of tests on the strength of small chains in the Walker engineering laboratory. These tests include all sizes of chain up to $\frac{1}{4}$ inch diameter that could be bought or procured either in shops or from wholesale makers.

The result of these tests is given in five tables, under the following heads: Single Jack, Double Jack, Ordinary Welded, Triumph (American), shown in the engraving, and Miscellaneous (brazed and odd-size welded). Of these we print the two most interesting:

English Welded Chain.

Maker's size.	Diameter, inches.	Area, square inches.	Strength in pounds. Test I.	Test II	Test III.	Average strength in pounds.
13	0.496	0.00769	295	369	369	344
10	0.127	0.126	546	535	537	539
9	0.146	0.0167	633	598	624	618
6	0.155	0.0188	1,097	920	1,164	1,060
5	0.181	0.02 7	1,214	1,256	1,181	1,217
4	0.223	0.39	2,226	1,711	2,058	1,998
3	0.252	0.0 68	2,826	2,735	2,694	2,751
2	0.296	0.0555	3,389	3,934	3,158	3,476
1	0.283	0.0629	4,204	3,852	4,408	4,154

American Triumph Chain.

Maker's size.	Diameter, inches.	Area, square inches.	Strength in pounds. Test I.	Test II.	Test III	Average strength in pounds.
7	0.058	0.0022	284	286	280	283
6	0.057	0.0 0 25	322	322	320	321
5	0.068	0.0063	408	452	448	428
4	0.071	0.00395	506	497	474	492
3	0.084	0.00554	661	681	688	676
0	0.120	0 0113	1,290	1,281	1,315	1,295
00	0.135	0.0143	1,046	1,500	1,568	1,401
000	0.149	0.0174	1,996	2 000	2,049	2,015
4-0	0.164	0.0211	2,484	2,522	2,607	2,531
5-0	0.178	0.0248	2,927	2,976	2,950	2,951
6-0	0.22	0.038	3,772	3,801	3,747	3,773

In every size three tests of ultimate strength were made, the results of which, in pounds, have been recorded, the average being given in another column. The want of uniformity in results is sufficient to explain why no values for strength are given by the makers and why the recorded results in books differ so much.

The chief effect to be noticed is the extraordinary strength of the new American chain, which, on an average, is twice as strong for every corresponding size as the English welded chain; five times as strong as the double jack chain, and eleven times as strong as the single jack chain, and, in every case, gave way, not as in the case of the jack chain and welded chain at the joints, but in the material itself.

A further experiment was made of twisting a piece of iron wire into the form of the American link, and then testing the link and afterward the wire itself, when it was found that the strength of the link was about 1¼ times the strength of a single section of the iron wire from which it was made. The author understands that this chain is not yet manufactured in England, but steps are being taken to introduce the machines necessary for the purpose.

A very neat method for coating sheet steel with copper is being developed by W. B. Hollingshead of Bronxville, N. Y. He deposits copper electrically and then rolls the sheet. Upon this he deposits a second coat and rolls it again, or works it under a planishing hammer. Some fine specimens of sheets thus coated have been made, opening a promising future for the material. Mr. Hollingshead aims to overcome by his method the drawbacks incident to the crystalline and loose nature of electrically deposited coats of copper.

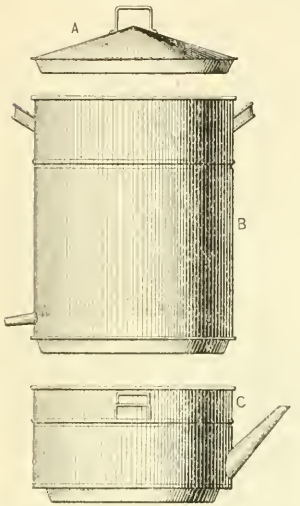
The annual catalogue of the Massachusetts Institute of Technology shows that of the 132 graduating members of the class of 1892, 22 graduated in civil engineering, 26 in mechanical engineering, 4 in mining engineering, 36 in electrical engineering, 4 in chemical engineering and 6 in sanitary engineering. The total registration this year has been nearly 1100.

THE TIN SHOP.

A Wax Extractor.

BY OLIVER TWIST.

In the first place, it may be well to say what it is for, although the name is almost enough for the dullest man to understand



A Wax Extractor.—Fig. 1.—Cover, Body and Boiler.

that it is for extracting wax. From what? Well, we will try to explain. After taking the honey-comb from the hive and extracting the contents by means of a honey extractor, the comb itself is left, but in such shape that it is not in a fit condition to be

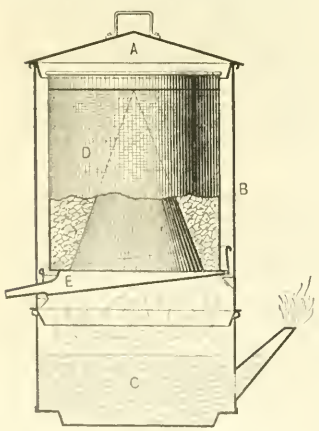


Fig. 2.—Sectional View of Wax Extractor.

sold as wax. This is where the wax extractor comes in to melt the wax and to separate from it any wood slivers or other matter which it may have collected, so as to get the wax in a salable condition. In Fig. 1 the different parts are shown separately, A being the cover; B the body or outside shell; C, the boiler, to contain water, which will produce the steam to circulate up through and around the perforated cylinder D (illustrated in Fig. 2) containing the wax. This, when melted, will fall through the perforations into the pan E, shown in Fig. 2; and so out of the spout into the molds or any vessel placed to receive it. Fig. 2 gives us a peep inside, or, in other words, a section, showing the different parts in their proper places and ready for use.

The boiler C can be made with an ordinary No. 9 tea kettle-pit, which can be bought, ready spun, cheaper than it could be made. Take two sheets of tin 14 x 20 and one sheet 7 x 20. Cut 5 inches off the end of each sheet, which will give two pieces 5 x 14 and one piece 5 x 7, which, when grooved together lengthways, will make a strip 5 inches wide and about 34 inches in length. This will just make the circumference of a No. 9 spun tea-kettle pit. The other two pieces will be 15 x 14, and one piece 15 x 7, which, after grooving together as before, will be 15 inches high and 34 inches long to make the body B. If you make two of these extractors at once you can get two of each kind—that is, B and C—out of five sheets of 14 x 20 tin, exactly. The cylinder D, Fig. 2, is made from perforated tin. After double seaming the bottom (you can do this in the usual manner if you are careful), cut a circle out of it about 7 inches in diameter, in order to admit the cone which is shown inside, and which is also made of perforated tin. To protect the upper edge, and in order to make it strong, wire a rim about 2 inches wide, as shown in cut, and solder on inside the cylinder. The rough edge of the perforated tin will then finish underneath the wire edge, thus making a smooth job. E, Fig. 2, is a pan about 2 inches deep, placed on an incline and supported with lugs. This may be adjusted permanently, as it cannot be removed, owing to the spout passing through the outer shell B. The cylinder D, however, is to be removed occasionally, and is provided with rings for that purpose. The body B, of course, has no bottom, simply the rim to set down into the boiler C.

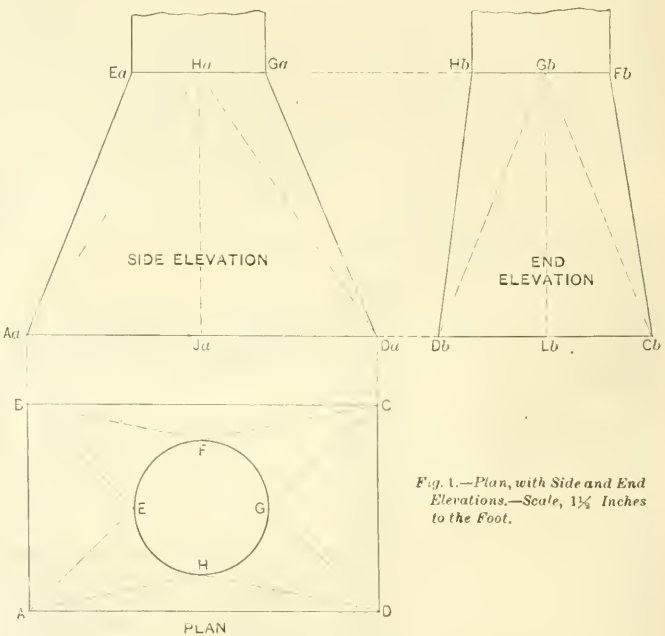


Fig. 1.—Plan, with Side and End Elevations.—Scale, 1¼ Inches to the Foot.

PATTERN FOR CHIMNEY TOP.

Pattern for Chimney Top.

From L. N. H., *Milroy, Pa.*—Will you, please publish a short and simple rule for describing the pattern for a chimney top, square or oblong at the base and round at the top?

Answer.—There is always a call for short and simple rules for describing the various patterns used in connection with sheet-metal work. The "short and simple" part of a rule could be said to depend upon one's understanding the underlying principles upon which a rule is founded.

The underlying principles being thoroughly understood, much of the drawing necessary to show the article from various Ea Ga Da, and at the right the end elevation, as indicated by Db Hb Fb Cb. The slant hight of Ja Ha of side elevation elevation, the ends of two triangles similar to D G C, and the four "corner" pieces as C G F, which are sections of oblique cones. The reader is at liberty to determine how necessary the elevations are for an understanding of the required shape.

In Fig. 2 is shown a duplicate plan of the article. The patterns for side, end and one of the corners will be obtained separately, the plan being used for the purpose, in connection with the hight of the article. To obtain the pattern of one of

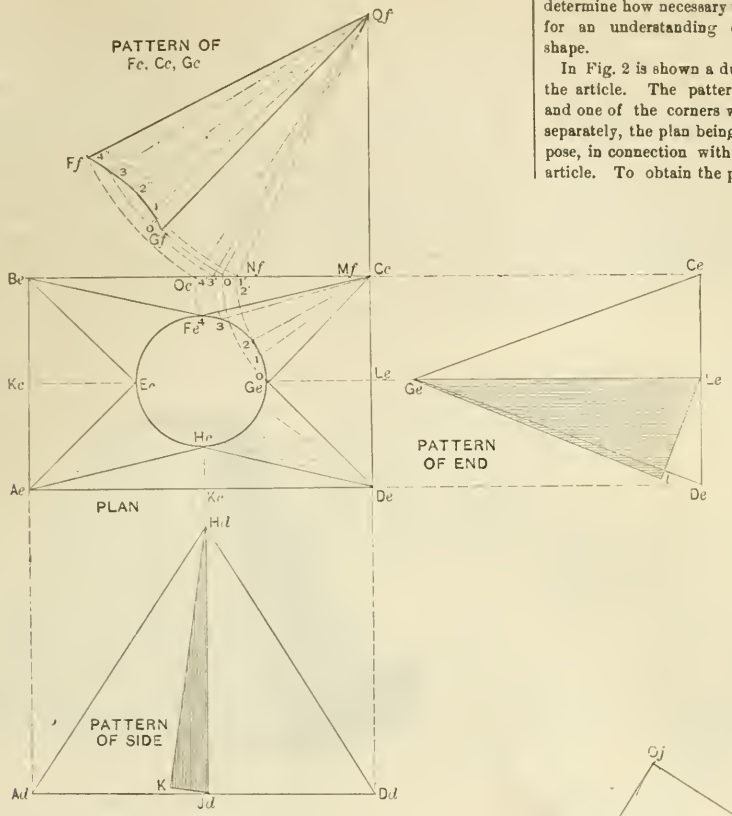


Fig. 2.—Method of Obtaining Patterns of Side, End and Section of Oblique Cone.—Plan Only Used, the Hight of Article Being Known.

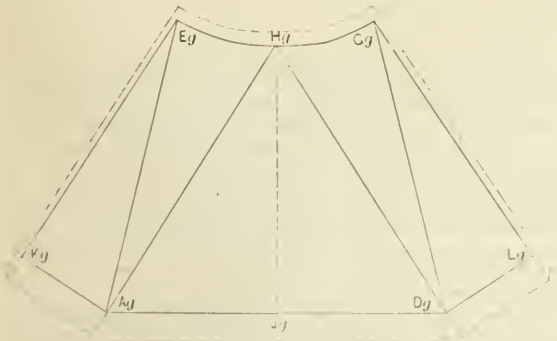


Fig. 3.—Patterns Obtained in Preceding Figure Placed Together so as to Form One-half the Article.

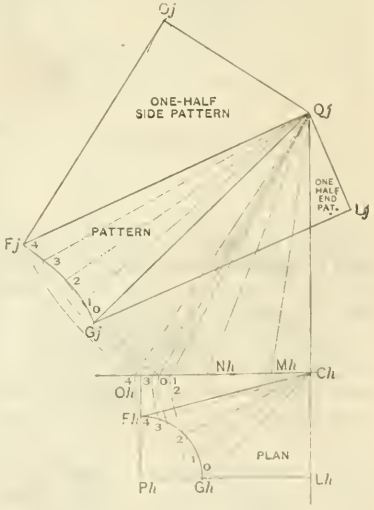


Fig. 4.—Pattern for One-fourth the Article Obtained from the Quarter Plan.

PATTERN FOR CHIMNEY TOP.

points of view can be omitted, as will be shown.

In Fig. 1 let A B C D represent the size of top in plan, and E F G H the opening. Above the plan is shown the side elevation of article, as indicated by Aa is equal to Db Hb of end elevation, as the slant hight of Lb Gb of end elevation is equal to Aa Ea of side elevation. An inspection of the plan will show that the sides of the article are formed of two triangles similar to A H D, Aa Ha Da of side the corners, as Fc Cc Gc, proceed as follows: On Dc Cc extended, set off the hight of article, as shown by Cc Qf. This distance is the same as shown in Fig. 1 by Ja Ha, or Lb Gb. Divide Gc Fc into any convenient number of equal parts, as

indicated by the small figures. With Cc as center, strike arcs from the various points in Gc Fc, cutting Bc Cc, as shown. Also set off from Cc the distances Kc Hc and Dc Kc, as shown by N*f* M*f*. If desired, carry lines from the points thus obtained to Q*f*.

If the triangle M*f* Q*f* Cc was cut out and placed with its base on Kc Hc of plan, the hypotenuse M*f* Q*f* would give the distance from Kc in the base to Hc in the top, as if measured on the finished article. The hypotenuse of triangle N*f* Q*f* Cc gives the distance from point Lc in the base to point Gc in the top. The hypotenuses of the remaining triangles give the distances from point Cc in the base to the various points in Gc Fc of top.

strike small arcs in the direction of Ge, then from the point of intersection draw the lines De Ge, Ge Ce. It is evident the length of side pattern Ge Ce must be the same as G*f* Q*f* of corner pattern, as the two are to join. The triangle N*f* Q*f* Cc is shown with its hypotenuse N*f* Q*f* on Ge Le of end pattern, thus showing that N*f* Q*f* and Le Ge are of the same length. Ge *l* Le is a right angle.

The pattern of side Ac Hc Dc can be obtained in a similar manner. As shown below the plan, A*d* D*d* of pattern is equal to Ac Dc of plan, and the length of J*d* H*d* of pattern is equal to M*f* Q*f* of triangles. The triangle M*f* Q*f* Cc of diagram is shown in pattern by H*d* J*d* *k*, and the hypotenuse H*d* *k* is equal to M*f* Q*f* of diagram.

An inspection of the half pattern in Fig. 3 will show that if we had obtained the pattern of H*g* G*g* L*g* D*g* J*g*, the other part, as indicated by H*g* J*g* A*g* K*g* E*g*, could be marked from it, or the quarter pattern could be used for marking off the whole of pattern, if the article was to be made in one piece.

In Fig. 4 is shown a method for obtaining the quarter pattern for the top, in which much of the drawing previously shown has been dispensed with. To describe the pattern, draw any line, as Q*j* L*h*, indefinitely. Erect the perpendicular C*h* O*h*, and from C*h* set off the half width of end. Draw L*h* P*h* parallel with C*h* O*h*. From C*h* set off the half width of side, as shown by C*h* O*h*. Draw O*h* P*h* parallel with C*h* L*h*. With P*h* as

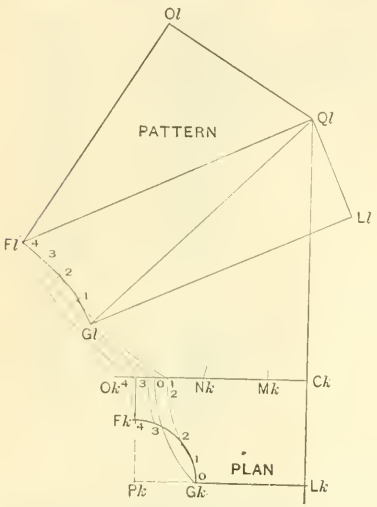


Fig. 5.—Same as Preceding Diagram with Unnecessary Figures Omitted.

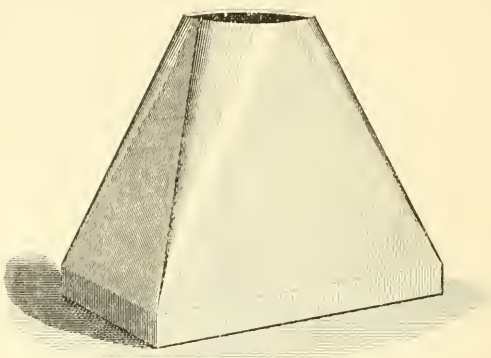


Fig. 6.—The Finished Article.

PATTERN FOR CHIMNEY TOP.

With Q*f* as center, strike an arc from the point *o'* and draw the line G*f* Q*f*, which is the distance from point Cc in base to point Gc in top. With Q*f* as center strike arcs from the points 1', 2', 3', 4', and with the dividers set to the spaces in Gc Fc of plan, and starting from point *o''* G*f*, space off the stretchout of Gc Fc, stepping from arc to arc, as indicated by the small figures 1'' to 4''. Draw the line F*f* Q*f*, and trace a line free hand through the points in F*f* G*f*, as shown. Then G*f* F*f* Q*f* is the pattern for part of article shown on plan by Ge Fc Cc.

For the pattern of end Dc Gc Cc, proceed as follows: Draw any line, as De Ce, in length equal to Dc Cc of plan. Bisect this line and erect the perpendicular Le Ge, in length equal to N*f* Q*f* of diagram, and draw the lines De Ge, Ge Ce. Then De Ge Ce is the pattern for end of article shown on plan by Dc Gc Cc.

Another way of obtaining this pattern would be by drawing the line De Ce, as previously directed, and with Q*f* *o'* as radius and the points De and Ce as centers,

We will suppose the pattern for the article is to be described in such a manner that two pieces will make the article. Also that the seams are to be at the ends, as indicated by Kc Ec, Gc Lc of plan. This pattern is shown in Fig. 3. A*g* H*g* D*g* is a duplicate of A*d* H*d* D*d*. The pattern of G*f* F*f* Q*f* could be cut out of some convenient material and used to mark off D*g* H*g* G*g* and H*g* A*g* E*g* of Fig. 3, or the pattern for these parts could be obtained in the same manner as shown in Fig. 2. For the pattern of the half ends, proceed as follows: With D*g* and A*g* as centers, and De Le of plan as radius, strike small arcs L*g* K*g*, and with G*g* and E*g* as centers, and Ge De as radius, strike other small arcs intersecting the ones just struck. From the points of intersection draw the lines G*g* L*g*, L*g* D*g* and E*g* K*g*, K*g* A*g*. Or, the duplicate of Ge Le De can be used for marking off the half pattern of the ends. The allowance for laps and for going over the top of chimney can be made as indicated by the dotted lines, or as desired.

center, and the compasses set to the desired radius for size of pipe or opening in top, strike the arc F*h* G*h*. Divide this arc into any convenient number of equal parts and draw lines to C*h*. With C*h* as center, strike arcs from the points in F*h* G*h*, cutting O*h* C*h* as shown. Make Q*j* equal to the hight of article, and from the points in O*h* C*h* draw lines to Q*j*. With Q*j* as center and the points in O*h* C*h* as radii, strike arcs as shown. From any convenient point, as G*j*, draw the line G*j* Q*j*. Set the dividers to the space used in stepping off the arc F*h* G*h* and, commencing at the point G*j*, step to the second arc and from that point to the next arc and so on, reaching the last in the point F*j*. Draw G*j* F*j* Q*j*. From C*h* set off the distances O*h* F*h* and L*h* C*h*, as shown by M*h* N*h*. Draw lines from these points to Q*j*. With Q*j* as center and C*h* L*h* as radius, describe an arc, L*j*, and from G*j* as center, with radius equal to N*h* Q*j*, intersect the arc L*j*, as shown. Draw G*j* L*j* and L*j* Q*j*. In a similar manner, with F*j* as center, and Q*j* M*h* as radius, describe the arc O*j*, and

from Q*j* as center, with a radius equal to C*h* O*h* of the plan, intersect the arc at the point O*j*. Draw Q*j* O*j* and O*j* F*j*.

An inspection of Fig. 4 will show that the lines in C*h* G*h* F*h*, O*h* Q*j* C*h* and the dotted lines in F*j* Q*j* G*j* are not necessary for the development of the pattern, but are used for convenience of illustration. The pattern can be obtained as shown in Fig. 5, thus dispensing with the drawing of ten lines. The allowances for laps can be made about the quarter patterns in Figs. 4 and 5 as desired, or as indicated in Fig. 3.

The finished article is shown in Fig. 6.

Relative Cost of Gas and Electricity.

In an able article, published under the above heading, in the *Engineering Magazine*, C. J. Russell Humphreys discusssses the cost of lighting by electricity as compared to that of gas, a question which has been much agitated with varying conclusions during recent years. Mr. Humphreys evidently approaches the subject with ample knowledge of all its details; and his article is a most exhaustive treatment of the question. He marshals therein a long array of facts and figures relative to the output and expenditure of gas companies and electric light companies, from which he draws his deductions. Comparing facts and statistics obtained from official documents and by personal observation and calculation, the writer reaches the conclusion that for the present electric lighting is more costly than gas lighting, although the future may possibly reduce the cost of the former by the development of cheaper "handling," if we may so term it, of electricity.

Mr. Humphreys' paper is of such general interest that we present a summary of it, with extracts, for the benefit of our readers:

"We are told that one gas acts as a vacuum to another, and so it has seemed in the lighting business. Though the world has absorbed in a vast amount the newer illuminant known as electricity it does not follow that the use of gas has decreased to a corresponding degree. On the contrary, more gas has been used year after year, showing that the world is finding use for a larger amount of artificial light.

"A glance at night along the main thoroughfares of any large city will show a vast increase in the amount of light used as compared with a period of 20 years back. Much lighting is done now purely for advertising purposes. It no longer suffices to have a store lighted so that salesmen and customers can find their way around, before and behind the counters, and stop at that: the whole interior of the shop, and the exterior as well, must be flooded with light, and whether the lighting agent be gas or electricity, it must be of high intensity and in large volume. The effect of this is far-reaching, for the merchant who grows used to bright lights in his store or counting room insists on having a great deal of light at his home. Nor is this all. In days gone by it would suffice if the streets were lighted with lamps few and far between, but now they must be lighted in the fullest meaning of the term. Again, the tendency in recent years to erect sky scraping buildings, which shut off the natural light from the smaller edifices and the lower stories of the larger ones, entails the use of vastly increased amounts of artificial light during that portion of the 24 hours when Old Sol was once supposed to do all the lighting business. Thus it happens that this large receptive capacity of the world for artificial light has led to the building up of a large business for the electric light corporations, without by any means snuffing out the older illuminant.

"In support of this assertion it can be shown than in 1891 the gas companies of Massachusetts made 20 per cent. more gas than in 1889. This showing is the more remarkable when we consider the business done by the electric lighting companies of the same State. The figures for 1891 show that the gross receipts of these companies were equal to 45 per cent. of the gross receipts of the gas companies, a statement which is at once a testimonial to the energetic manner in which the electric lighting business has been pressed, and evidence of the increasing demand for artificial light. To illustrate the latter tendency in another way, it may be shown that in the same State, during 1889, the capacity of the incandescent electric light companies aggregated 84,400 lights, reduced to the standard 16-candle lamps, whereas in 1891 the figures had grown to 183,120 lamps. During the same years the capacity of the arc light stations increased from 11,529 to 15,338 lamps."

The question is then asked, "Is this growth to hold for the future, and how will it affect the sale of gas for lighting purposes?" The answer depends largely upon the relative cost of gas and electricity. To obtain this cost Mr. Humphreys reduces his figures to a common standard for the two illuminants—namely, 16-candle light—and then considers the relative amount of capital required in each business per unit of light, and the percentage of gross receipts in each case required to pay the expenses of manufacture and distribution.

The capital required by an electric light company engaged in central station lighting—that is, supplying light to a large number of customers from a central station—is shown to approximate $30 per dynamo capacity of the station, reckoned on a basis of a 16 candle light. The capital required for 1000 feet of yearly output of gas is estimated at $6. Reducing these figures to the basis of a lamp-hour—that is, of 16 candles for one hour—calculation shows the capital required per 16-candle lamp-hour output to be as follows:

For electric light.....3.6 cents.
For gas, on same basis.....2.6 cents.

According to which the electric lighting plant requires 40 per cent. more capital for doing a given amount of business.

In comparing the relative cost of manufacture of gas and electricity and expressing the same in percentage of gross receipts, the receipts and expenditures are reduced to the common 16 candle lamp-hour standard, with the following result:

	Per cent.
Cost of gas in percentage of gross earnings.....	71
Cost of electric light in percentage of gross earnings from equal unit of light.....	91

or, otherwise expressed, the unit of light costs by electricity 20 per cent. more than by gas.

It is thus found that, in order to obtain the unit of light from gas or electricity, we must invest 40 per cent. more capital in the electric business than gas, and the cost of making the unit of light will cost by electricity 20 per cent. more than by gas, as expressed in percentage of gross receipts of the latter. And, as the earning of a 6 per cent. dividend on the capital invested requires in the case of gas an amount equal to 26 per cent. of the gross earnings, and as the capital required in the electric business per unit of light is 40 per cent. greater than in the gas industry, it follows that in order to obtain a profitable investment from the electric business we must obtain for a dividend an amount equal to 36 per cent. of the gross earnings from gas. That is, if A = gross receipts from gas per unit of light, then we must obtain for electric light: (A + 91 per cent) + (A + 36 per cent.) or 127 per cent. of the price of gas, which simply means that if gas sells for $1 per 1000 feet, the selling price of electricity for an equivalent light must be $1.25.

That this is the practical result so far is evident from the fact that, as before noted, the receipts from electricity per unit of light are about 28 per cent. greater than from gas.

The writer, in conclusion, remarks that his observations have been strictly confined to the conditions that actually obtain to-day in the case of gas and electric lighting. He does not discount the future, and figure on the possibilities of reducing the cost of electricity on the one hand by improvements in the steam engine, or on the other by the possibilities before the gas engineer in converting the energy of the gas into light; remembering that by our present wasteful method we actually utilize but a scant 8 per cent. of the energy of gas in burning it.

After all, the question resolves itself into one of economy in coal consumption; and in the long run that system of illumination will predominate which gives out in the form of light the greatest percentage of the energy of that substance which we are too apt to squander so thoughtlessly—coal.

According to statistics gathered by the *Puget Sound Lumberman* for the year 1892, the cut of lumber of Washington shows a decrease over 1891 of 214,000,000 feet. This is accounted for by the subsidence of the building boom of 1890-91, causing a shutdown of many mills on Puget Sound. Meanwhile the cargo trade done in 1892 in foreign and coastwise shipments exceeded the figures of the previous year by 50,302,933 feet, while the rail shipments show an increase amounting to 20 per cent. The most marked feature of advance has, however, been in the growth of the shingle trade. With 127 new shingle mills the increase of shipments amounted to no less than 311,068,000 shingles in 1892 over 1891, and the mills are stated to be behind with orders, owing to not being able to get sufficient cars to ship the material.

The Detroit Foundry Equipment Company have established a Foundrymen's Exchange at 225 Dearborn street, Chicago, with a view to diffusing knowledge of the industry, through printed matter, and to bring into closer touch those engaged in the foundry business generally. It is suggested that this step may possibly lead to the formation of a permanent foundrymen's association such as exists at Philadelphia, and which has proved so popular and from which so much good has resulted. Newspapers, journals and reading matter of a popular and technical nature are on file in the club room, which is open free to those interested for study and social intercourse.

Shares of numerous trust companies formed in England a few years ago, when a mania for this sort of enterprise was prevalent, are now either greatly depreciated or wholly unsalable. The London *Economist* says: "Week after week evidence accumulates, proving only too forcibly that those responsible for the management of these trusts have based no inconsiderable part of their operations upon false principles, with the inevitable result that, after a more or less brief period of apparent prosperity, losses and difficulties have arisen, and unless greater foresight and ability is displayed in the future than has been shown in the past, it is highly probable that collapses of a disastrous kind will take place."

STEAM AND HOT WATER.

Steam Hot-Blast Apparatus.

BY WALTER B. SNOW.

What is familiarly known as a steam hot-blast apparatus, or blower heating apparatus, in its complete form always comprises at least three elements—a fan, for producing movement of the air; a steam heater, for heating the air thus set in motion; and a motor, for driving the fan either by direct connection or through the medium of a greater or less amount of belting and shafting.

FORMS OF FANS.

Fans are varied in their forms and uses, but may all be classed under two general heads—the disk or propellor fan and the paddle or peripheral discharge fan.

Of the two, the former is probably the more familiar, employed as it is so generally in its character of electric fan, with its blades of brass, scarcely visible at the high speed it is run to produce a refreshing breeze on the hot summer day. Much ingenuity has been displayed, and the higher mathematics often employed, in the design of the numerous forms of disk wheels now upon the market.

The simplest of all types consists of a wheel of six or more radial blades set at an angle of 45° with the shaft, and acting as inclined planes to force the air in a direction parallel to the shaft. A simple yet somewhat more elaborate form is shown in Fig. 1, the outer ends of the blades being curved over and attached to the concentric ring which binds them all together. This curvature serves to prevent any possible radial discharge, and also presents an extremely satisfactory manner of building the wheel.

Surprising results have been obtained by a wheel consisting merely of two radial arms, upon the extremity of each of which was attached a thin blade about the size and shape of one's hand. When properly formed into shape and set at the proper angle to the shaft, such a wheel will discharge a solid volume of air in a direction so nearly parallel to its shaft that at a distance of 15 feet the circumference of this moving cylinder of air is distinctly discernable by the hand.

The paddle or peripheral discharge fan is illustrated in its most common form in Fig. 2. The blades are all radial and flat, although to accord better with theory, while producing scarcely better practical results, they are frequently made curved, the convex side being presented to the air. The curving of the blades, however, is desirable when noise is to be avoided. A somewhat more efficient form of this wheel has a cone or conoid in each of its inlets, the axes of the two being formed by the shaft and their bases meeting upon a plane in the center of width of the fan and at right angles to the shaft. The air as it enters the inlets of the fan is thereby gradually changed in its direction of movement until it leaves the blades radially.

In this latter type of fan the two inlets are frequently connected to some pipe or space from which the air is to be drawn, and the air is discharged freely all around the fan periphery into the apartment in which the fan is located. The simple type of paddle fan is, however, almost universally incased in a shell having inlets corresponding to and concentric with those in the wheel and an outlet properly placed somewhere upon its circumference. Such cases were originally constructed of cast iron, being expensive and bulky. The adoption of sheet iron, properly braced, as a fan casing, practically revolutionized all designs in ventilating fans driven at low speeds.

The popular form as now manufactured is represented in Fig. 4, in connection with a heater. Fans of this description can be readily built 15 feet to 25 feet high, a practical impossibility with cast iron.

THE HEATER.

The duty of the heater in a steam hot-blast apparatus greatly exceeds that of any form of radiator under any other conditions. The extremely large volume of air brought in contact with the pipes and its rapid cooling effect when taken directly from out of doors on a cold winter's day, produces within the heater the most rapid condensation and the greatest extremes of temperature, expansion and contraction.

Among the earlier forms of heaters applied in connection with the last described type of fan was the tubular variety, in arrangement similar to a tubular boiler on a small scale, consisting simply of a cylinder with a head at either end and a series of connecting copper or brass tubes expanded therein. Steam, either live or exhaust, was admitted to the space around the tubes and inside the cylinder while the air was rapidly drawn through the tubes by the blower and forced through a system of piping to its destination.

As the field broadened, this form of heater became inadequate to fill all requirements and the sectional base heater was evolved, being in fact nothing more than a steam pipe radiator specially constructed for use in connection with a fan.

This form of heater requires :

1. That the pipes shall, for economy of space, be as compactly arranged as possible.

2. That they shall, for efficiency, be far enough apart to prevent serious obstruction to the flow of air to or from the fan.

3. That they shall be so arranged as to most thoroughly break up the currents of air and cause every particle to impinge upon the surface of the pipes in its passage through the heater.

4. That the pipes shall not be too long for the effective condensation of the steam.

5. That the area for steam passage through the pipes shall be such as to place no objectionable back pressure upon an engine supplying exhaust steam to the heater.

6. That, as in the case of all sectional radiators, these sections shall be capable of being readily made up into groups and inclosed in housings through which the fan can force or draw the air.

Of course, as in all radiator designs, the questions of expansion, weight of sections, convenience of handling, durability and cost must also enter in.

With the extremely rapid condensation taking place in a steam hot-blast apparatus, long pipes are to be avoided, particularly with exhaust steam; in the coils first exposed to the cold air in its passage through the heater the steam is so rapidly condensed as to travel but a short length of the pipe before becoming water. For this reason the trombone coil type of heater, when in large sizes with only a single inlet and drip for each coil, becomes inefficient and a multiplicity of inlet and drip manifolds becomes a necessity in order to reduce the distance the steam must flow. This type of heater is, however, quite generally used in the form shown by accompanying cut, Fig. 3.

The most common and convenient form of heater is constructed of rows of vertical pipes screwed into cast-iron bases. The end pipes are the highest and gradually decrease in length toward the center of length of the base. The top of each pipe is elbowed, and connection with its corresponding pipe upon the other end of the row is made by a horizontal cross pipe. The cast-iron base is cored and divided midway of its length by a diaphragm. Steam admitted to one end of this section can therefore reach the other end only by passing up, over and down the pipes—no one pipe being of excessive length. Such sections are usually built in sizes 3, 4, 5, 6 and 7 feet in length with the respective hights of 4, 5, 6, 7 and 8 feet, so even in the 7-foot section the greatest length of pipe cannot be over 22 feet through which the steam must pass from one end to the other.

Drainage of water of condensation from the end of the base to which steam flows is accomplished by any of the well-known devices of traps or float valve receiving tanks. These sections are usually constructed with two or four rows of pipe to a section, rendering them easily portable and making it more feasible to combine than in heaters of various capacities.

HOT-BLAST APPARATUS.

Two different forms of steam hot-blast apparatus are shown in Figs. 3 and 4. The former represents a disk wheel forcing air through a heater of the trombone construction. The entire heater is incased in the sheet-iron jacket and steam and drip connections made as shown. The fan forces the air directly against the pipes, whence it passes to the further end and is either discharged directly into the room or, by means of a system of sheet-iron piping, connected to the end of the heater case, is conducted in the required proportions to the various apartments to be heated. The entire apparatus is mounted upon a wooden platform, which renders it portable. While such a type of fan is usually of necessity driven by belt on account of the high rotative speed required, a steam engine is sometimes directly connected to the fan shaft, as here shown, and supported upon a special cast-iron bed.

The advantage of a direct connected, or, at least, a special engine for any steam hot-blast apparatus must be evident. It renders the heating system independent of the remainder of the motive plant in a manufactory; makes it possible to run the apparatus at any and all times independently of any other engines or machines, and allows of an instant change in speed to meet any conditions. Unless there is already an abundance of exhaust steam to be utilized, the cost of running the fan is hardly to be considered, as all of the ex-

haust of the fan engine will be condensed in the heater and pound for pound will be practically as efficient as live steam for heating, but will only require a larger condensing surface.

Fig. 4 represents the general construction of a steam hot-blast apparatus, with cased fan and sectional heater. The fan is constructed of sheet iron, its method of bracing being plainly shown. In large sizes this type of fan is sometimes constructed the end of its extended shaft, and will thereby avoid a bearing in the inlet of the fan upon the opposite side from that upon which the engine is placed.

POWER FOR FANS.

Where high speed of fan is desirable with a direct connected engine, a double-cylindered short stroke engine capable of high rotative speed is often employed, and with its two well spaced journal bearings, easily supports the fan wheel upon the shaft end.

The heater shown in Fig. 4 has its cast-iron bases so constructed that steam can be admitted to their upper portion, while a passage beneath, connecting with the further end of the section, serves to drain the water of condensation. The sections, supported upon an angle iron frame with ball bearings to allow for expansion, are bolted together by through bolts, with gaskets between the sections, so that a single inlet or drip serves for the group. The arrangement of the heater pipes is at least hinted at by the small section where the jacket is shown broken away in the upper corner of the heater.

Air enters the heater at the open further end, which cannot be seen, and is drawn in an even volume across the pipes to the inlet of the fan, which is connected with the heater jacket, and is discharged from the fan outlet into any desired system of distributing ducts.

Steam hot-blast apparatus of either type

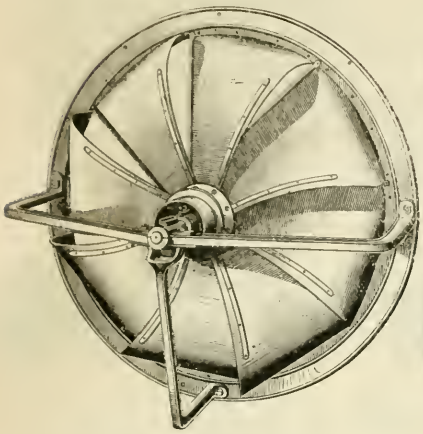


Fig. 1.—Illustration of Disk Fan.

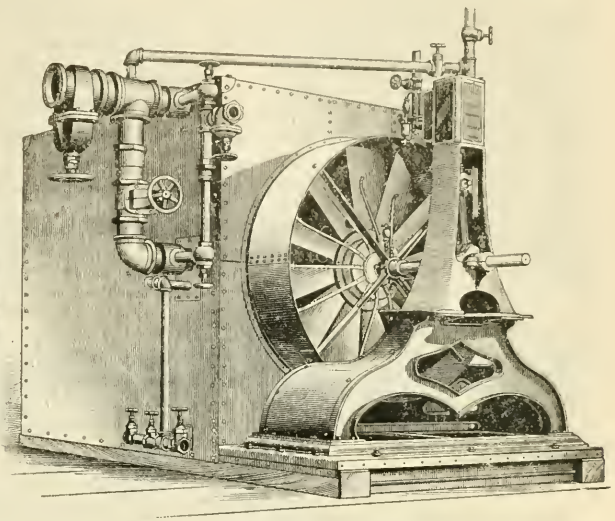


Fig. 3.—Fan and Trombone Heater.

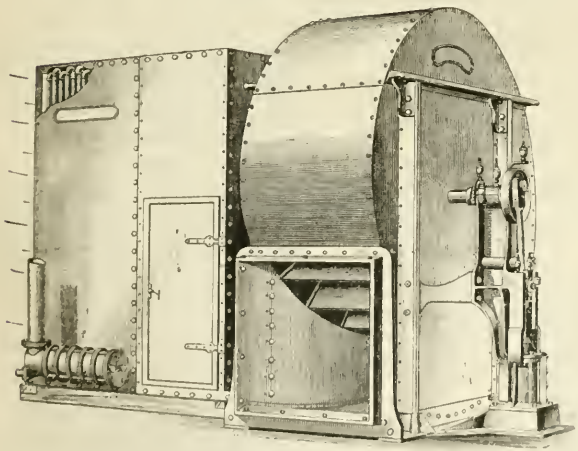


Fig. 4.—Fan and Heater.

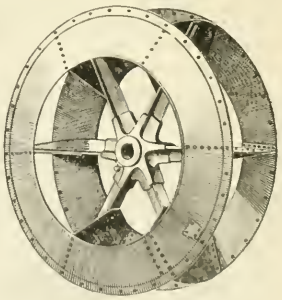


Fig. 2.—Illustration of Paddle Fan.

STEAM HOT-BLAST APPARATUS.

so that only the upper portion is of sheet iron, the lower portion, just including the hight of the outlet, being formed of brick in the foundations and the air duct carried beneath the floor. Of course the same general construction may be employed when the fan is to discharge in any other direction. With this type, known as the "three quarter housing," a horizontal engine must be substituted for the upright shown in the cut. Various types of upright engines are employed with the full-housed fans. One, with two journal bearings, will serve to carry the fan wheel upon

here illustrated may be operated with either live or exhaust or with live in one position and exhaust in the other. The fan velocity may be varied at will with a direct-connected engine, but seldom is run over 1 ounce air pressure, corresponding to a velocity of the circumference of the fan wheel of nearly 1 mile a minute.

The electric motor is fast becoming a rival of the steam engine in fan propulsion, and, when of first-class design, has many points of advantage with a practically constant speed and load. For the non-mechanical man, it is much easier to

start up a motor by turning a switch than to start up an engine with attendant care of drips, oil cups and bearings.

Destruction of Pipes by Condensed Steam.

From E. S. & S., *Arbor Springs, Mich.*—We are troubled with our steam-heating pipe being eaten up by the soft water condensation of steam. In our system no water is returned to the boiler, the exhaust from the pumps heating the feed water to the boiler. We use steam from waterworks boiler to heat residences, shops, &c., and at some distance away—one 500 feet, another 300 feet and two shops about 200 feet distant. Where there is a cinder welded in the pipe holes soon appear and we have been obliged to take out as many as eight pipes during one season. Is there any way to prevent it?

Note.—The trouble mentioned by our correspondent is a very general complaint from those who have to handle the water of condensation in underground pipes. A great deal of trouble from this cause was experienced in New York, the return pipes which carried the pure water back to the main heating plant corroding very rapidly. We have also heard of similar difficulty in other cities, and so far as we know, no remedy has been suggested. If any of our correspondents have met and overcome this trouble, we should like to know how they did it.

HEATING NOTES.

With a view to bringing about the organization of the contracting master fitters of the State of Michigan, a general call was issued for a meeting to be held at Detroit, on Wednesday and Thursday of this week. The call was signed by Webster & Meath, Detroit; Sproul & McGurrin, Grand Rapids; Wheeler & Pitkin, Kalamazoo; Watson & Tossell, Bay City and Charles W. Light, East Saginaw. Secretary George H. Reynolds of the National Steam and Hot Water Fitters' Association was to be present in the interests of organization, and it was hoped that President Hudson would likewise be there.

The Raymond & Campbell Mfg. Company, Middletown, Pa., have just completed arrangements with the following well known houses, for handling their Sun boiler: Timmins & Manning, Boston; Baker, Smith & Co., New York; E. C. Shaw & Co., Philadelphia, and the Brewster Hardware Company, Raleigh, N. C. The terms of the agreements cover a period of five years.

Charles E. Wakeman, Pontiac, Mich., has secured a patent on a new form of steam heater. The features of this apparatus include a special arrangement whereby more perfect and uniform combustion is secured and the heating surface greatly increased in proportion to the volume of water.

The J. L. Mott Iron Works, 311-313 Wabash avenue, Chicago, are to place one of the Sunray hot water heaters in the Chicago & Northwestern Railway depot at Oak Park.

The Smith & Anthony Stove Company, 219 Lake street, Chicago, have the contract for the steam heating of the Hull House, Chicago's famous philanthropic institution.

The Wells & Newton Company, 1108-1109 Monadnock Block, Chicago, do the steam heating of the Marshall Field building, Art Institute building and Chicago Beach Hotel.

Prize Competitions

$25.00.

In order to obtain information which will be of practical service to our readers we hereby announce

Prize Competition No. 16.

subject:

Three or More Rules to be Observed in Buying.

This competition will remain open until April 8, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received

Replies are to be received not later than April 8, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96-102 *Reade street,*
New York.
Prize Competition No. 16.

The committee to whom the contributions in Prize Competition No. 2 were referred have awarded the prizes as follows:

First Prize to M. W. Carleton, Cleveland, Ohio.

Second Prize to F. F. Gilmore, Louisville, Ky.

Third Prize to Walter Eikel, Chihuahua, Mexico.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 13. Closing March 18.
The Best Method of Changing a Credit into a Cash Business

No. 14. Closing March 25.
Suggestions Regarding the Sale of Spring and Summer Goods.

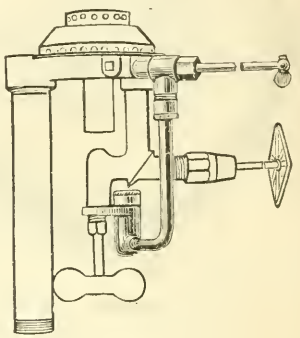
No. 15. Closing April 1.
Suggestions in Regard to the Sale of Athletic and Sporting Goods.

No. 16. Closing April 8.
Three or More Rules to be Observed in Buying.

Another subject will be announced in our next issue.

Attachment for Gasoline Stoves.

An attachment for starting gasoline stoves has just been patented and is being introduced to the trade by H. E. Borzell of 1943 Germantown avenue, Philadelphia, Pa. The construction of this device is claimed to be such as to render an overflow impossible; while the burner on top can be kept always ready for use, thereby preventing all danger of the clothes catching fire. It is also stated that its employment does away entirely with the use of cups. It lights like a candle and can be



Attachment for Gasoline Stoves.

applied, it is said, to any gasoline stove at a nominal cost. A good idea of the construction and arrangement of parts may be gathered from an inspection of the engraving presented herewith.

Scrap.

Franklin Rudolph, Chicago, Ill., has secured a patent on a process for manufacturing tin plate. The articles to be treated consist of sheets of black iron or steel, coated on one side only with tin. The patentee points out that such a material would be useful, among other purposes, for roofs, trunk covering or tin cans. The chief feature of the process is to treat two sheets at a time, so that only one surface of each sheet is exposed to the coating metal.

Albert Hatten and W. J. Stone of Binghamton, N. Y., have opened an establishment for all kinds of sheet-metal work, tin and iron roofing, gutters, eave troughs, cornices, conductors, ridging, &c., for building purposes. Both men have been active in business at Binghamton for years, and have many friends who wish them success.

A Minneapolis journal says the outlook for the spring season in the Northwest is not at all favorable. It is many years since the country has been covered with so deep a body of snow as now covers it, and this is a guarantee that roads will be bad when the break up comes. For several weeks the roads have been in an almost impassable condition, and the prospects are that when the spring season sets in things will be unpleasant for the country merchants unless the sun is strong enough to hasten the break-up of the snow.

The Maris Hand Traveling Crane.

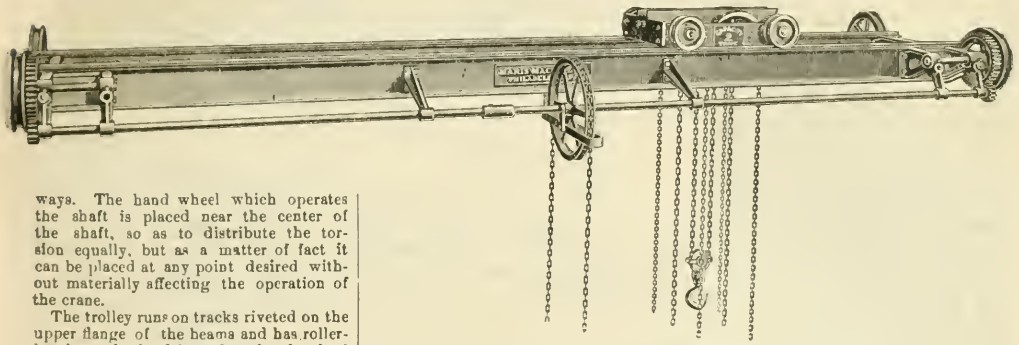
This crane was originally designed to meet the requirements of general machine shop use, and especially in those places where the infrequency of use of such a machine prohibits the employment of power cranes.

The bridge of the crane is constructed of two steel I beams of proper section to give ample strength and prevent undue deflection when the load is in the center of the span. To these are bolted at each end separators on the inside and truck brackets on the outside. A wrought-iron tie rod extends from the outside of the wheel bearing on one side, under the beams to the outside of the wheel bearing on the other side—thus bringing the tensile strain on the wrought iron and the compression strain on the cast iron.

The truck wheels have roller bearings working in steel bushings and are driven at equal rates of speed on both ends of the crane, by a shaft running across the span of the bridge, carrying on each end a pinion which gears into the wheels, thus keeping the crane straight on the runways. The hand wheel which operates the shaft is placed near the center of the shaft, so as to distribute the torsion equally, but as a matter of fact it can be placed at any point desired without materially affecting the operation of the crane.

The trolley runs on tracks riveted on the upper flange of the beams and has roller-bearing wheels driven by a hand wheel mounted in the trolley itself.

The hoist is mounted in the trolley and does not hang underneath it unless specially desired. This arrangement gives the greatest possible lift and, together with the small amount of head room taken up by the trolley, makes the crane very economical of space. These cranes are made by Maris & Beekley of 2343 Callowhill street, Philadelphia, in all sizes from 1000 pounds up.



THE MARIS HAND TRAVELING CRANE.

World's Fair Hotel.

R W. Montross, manufacturer of specialties at Galien, Mich., and H. W. Coolidge, who has been identified with the wholesale Hardware trade at Chicago for 20 years, will conduct a hotel on the European plan, named the Audubon, on Oglesby avenue, near Midway Plaisance, only four blocks from the main entrance to the World's Fair. These gentlemen first conceived the idea of entertaining their own friends and customers, so as to supply them with inexpensive but good accommodations, but afterward decided to increase the scope of their plan. The scale of prices may be of interest. One-half of the house, containing 50 rooms, is rented by the room at $3 to $6 per day per room, while the other half is rated per person at from $1 to $2 per day. These rates are subject to change as the season advances, and of course do not include meals. A *café* will be conducted in the hotel for the convenience of the patrons. The proprietors require reference from applicants not personally known to them who make advance engagements. The hotel will be directly under the management of N. H. Henchman, Jr., an experienced and widely known hotel manager. Souvenir catalogues and further information can be obtained by addressing Montross & Coolidge, Room 1433 Masonic Temple, Chicago.

Ventilation.

The following article, which treats of ventilation in a very simple way, was prepared by D. H. Smith, Watkins, N. Y., to present the subject to a few country school trustees and teachers, all technicalities being purposely avoided:

Ventilation may be simply defined as a process of supplying pure air to a room and getting rid of the impure air at the same time. Ventilation and warming must necessarily be considered together, as artificial ventilation, without the use of machinery, must be accomplished by means of heat. Natural ventilation may be obtained by opening windows in opposite sides of a room. Pure air will come in at one opening, and the vitiated air will go out of the other, according to the direction of the air currents outside. This form of ventilation will do in summer, but not when the outer air is too cold to be brought into the room. This fact must always be remembered—that a room always contains the same volume of air. It is full. You cannot increase the quantity, neither can you diminish the volume. Therefore, if air is taken out of a room by any device, and no special opening is provided for the ingress of pure air to replace that taken out, the air must come in as best it can through crevices in the windows and doors. On the other hand, warm air will not come into a room through furnace pipes any faster than air can escape from the same room. This is the reason it is so hard sometimes to warm a dwelling with a warm-air furnace when there is no ventilation.

It is a wise law of nature that the most impure and coldest air is at the floor of a room. The purest and warmest air is near the ceiling. House ventilation should be planned to get rid of the cold and impure air, and in this way ventilation will assist in the heating, by getting the cold air out of the way and allowing the warm air from the ceiling to descend and warm the room. A room is always warmed from the top downward, the warm air from whatever source rising at once to the ceiling and settling down as it is cooled. It is also important that the pure air which is introduced into a room to take the place of the air sent out should pass over a heated surface of some kind on its way, so as to come into the room warm.

The fact that air when heated will rise and when cooled will fall is taken advantage of to effect ventilation. Flues may be properly built and openings properly made, but the air within the flue will be as likely to descend as to rise, if it is not artificially warmed. Any flue in the wall, having an opening at the floor into a room and extending up through the roof, will make a ventilating flue, if the air within the flue is warmed in some way. A good way is to construct a chimney with two flues, one for the smoke flue of the heating apparatus, the other for ventilation. The heat from the smoke flue will warm the ventilating flue, so that the air within the flue will rise and escape, and, of course, draw the air from the room through the opening at the base. A still better way is to build a large chimney (12 x 20 inches inside is about right for a large country schoolhouse) and use a cast-iron smoke pipe 8 inches in diameter, placed inside the flue when it is built and extending to the top. The space inside the brick flue and surrounding the smoke pipe makes one of the best ventilating flues known, as the cast smoke pipe will warm the air in the flue much more than one side of a brick flue possibly can. Leaving out of consideration the large heating and ventilating apparatus, too costly for general use, the best schoolroom heater is a warm air furnace of suitable size. This heater can be set up in one corner of the room out of the way, no matter where, if smoke flue is near. It should be set a few inches above the floor with a case open at top and bottom. When in operation the air inside of the case becomes heated and rises to the ceiling and the cold air is drawn in at the bottom, and this circulation will continue as long as there is fire in the heater. This circulation is not ventilation; not a bit of it. The temperature in all parts of the room, at same hight from the floor, will be the same whether the room is warm enough or not. When the room is warm scholars close to the heater will not be too warm, and those in distant parts of the room not too cold, as is the usual way.

To complete the arrangement properly there should be a ventilating flue suitably warmed, and also a cold-air flue of the same size from the outer air brought with the opening directly under the heater. Then the air which comes into the room to take the place of the foul air sent out through the ventilating flue, will come in warm as it should, instead of coming in cold through the crevices of doors and windows.

ROOFING AND CORNICE.

Kanneberg's Patent Folded Lock Seam Steel Roofing.

The Kanneberg Roofing Company of Canton, Ohio, are introducing to the trade a patent folded lock seam steel roofing, which we understand is meeting with much satisfaction. In the making of the seam a patent cleat is employed, the holding power of which is not only its full width, but a tongue which hooks over an inch flange avoids, it is stated, the bending down process. Another feature to which attention is invited is that the pressure of the tools in forming the seam forces the tongue against the flange over which it is hooked, indenting it into the aperture of the cleat, thus practically locking it in place. In Fig. 1 of the illustrations is shown a view of the cleat or fastening, which is made of Bessemer steel, and is 2 inches high by 2¼ inches wide. Fig. 2 shows a 1-inch flange, A, turned up on the roof, the tongue B of the cleat being hooked over it and the foot of the cleat secured at C to the sheeting boards. Fig. 3 shows another step in the construction of the seam. The 2¼-inch flange D of an adjacent sheet is turned up on the roof and placed against the back of the cleat and of the 1-inch flange A of the sheet in contact with it. The next step in the work is shown in Fig. 4, which represents a ¼ inch hem, E, seamed over the top of the cleat, while in Fig. 5 the upper half of the unfinished seam is turned over the 1-inch flange, thus completing it. The finished seam is shown turned back in Fig. 6, for the purpose of indicating the manner in which the tongue B when the seam is being formed presses against the flange A, indenting it into the aperture of the cleat and locking it in place.

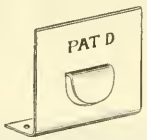


Fig. 1.—Bessemer Steel Cleat or Fastening.

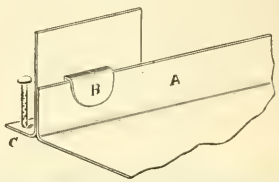


Fig. 2.—Flange Turned on Roofing with Tongue of Cleat Hooked over it, and Foot of Cleat Secured to Sheeting Boards.

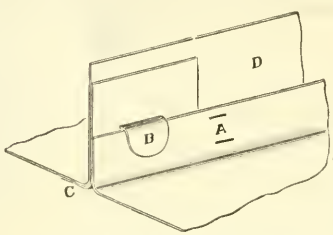


Fig. 3.—Flange Turned Up on Roofing and Placed Against the Cleat and Flange of Adjoining Sheet.

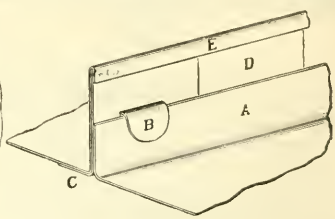


Fig. 4.—The Hem Seamed over the Top of the Cleat.

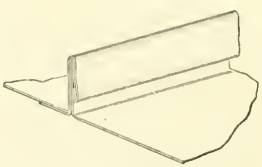


Fig. 5.—The Completed Seam.

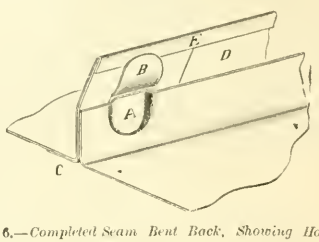


Fig. 6.—Completed Seam Bent Back, Showing How the Tongue Presses Against the Flange A, Indenting it into the Aperture of the Cleat and Locking it in Place.

KANNEBERG PATENT FOLDED LOCK-SEAM STEEL ROOFING.

FLASHINGS.

The Perkins patent double plate rolling and swinging shutters and doors is the subject matter of a circular which is being distributed by the Borden-Swearingen Shutter & Iron Works, Kansas City, Mo. Accompanying it is also a circular illustrating iron crestings, finials, expanded conductor pipe, &c.

The Pedlar Metal Roofing Company of Oshawa, Ontario, are distributing to the trade cards illustrating some of their sheet metal specialties. The goods shown include steel pressed brick, corrugated iron, the Pedlar metal shingles, crimped iron, cave trough and metal ceilings. It is said of the latter that the company make 15 styles.

The Kanneberg Roofing Company of Canton, Ohio, favor us with a neat circular, printed in colors relating to the metal roofing and siding which they manufacture. Illustrations are given of Cushman metallic shingles, which are claimed to be quickly and easily laid, crimped-edge iron, corrugated iron, sheet-steel pressed brick, iron weather boarding and cave trough and conductor pipe.

The St. Louis plant of the American Roofing Company has been fitted with new machinery for the purpose of increasing and improving their product. The firm are now very busy in all departments, and their Cincinnati branch will soon be in shape to receive orders for any quantity of sheet-metal material.

John L. Eichberg of Memphis, Tenn., is distributing to his friends in the trade a souvenir in the shape of a medal made of aluminum. It is designed as a pocket piece, and carries upon one side a list of the specialties manufactured by Mr. Eichberg, while upon the other side is brief reference to the metal aluminum, and some of its peculiarities. In the centre of the medal, on a circular panel $\frac{5}{16}$ inch in diameter, is the Lord's Prayer. Mr. Eichberg states that aluminum is used for a great many purposes, and is especially adapted in its alloy form for valleys, gutters, pipes, &c. Mr. Elghberg is also agent for the Bennett & Peck and Rutan & Smead systems of heating and ventilation, as well as for the Aluminum Alloy Metal Company's valleys, gutters, &c.

The Lloyd Iron Roofing & Paint Company, 99 and 101 Monroe street, Chicago, have at last succeeded after a long series of experiments in perfecting a special machine for the manufacture of an imitation of black Spanish tiling in large sheets, for which patents were secured some time since by F. E. Sagendorph, manager of the company. The perfection of the necessary machinery now enables the company to offer to the trade this new product in any quantity desired in large sheets. The difference between this tiling and that heretofore manufactured by others is that the Lloyd tiling can be furnished in sheets 4 and 8 feet long by 24 inches wide, while the other tiles are only about 12 x 18 inches. A 4 foot sheet presents a *fac simile* of 36 tiles and an 8-foot sheet 72 tiles. The Spanish tile is exactly reproduced in size, the peculiar curves, the laps, &c., the imitation being so perfect that it would be difficult for any one to detect it without very close inspection of the roof. There are no patent locks or joints connected with it, but it is laid the same as the old-fashioned corrugated iron. The price is of course very much below that of the genuine tiling, being about one fourth as much. The Lloyd tiling is remarkably handsome in appearance and has already attracted a great deal of attention.

"The Metal Worker" Competition in Skylight Pattern Cutting.

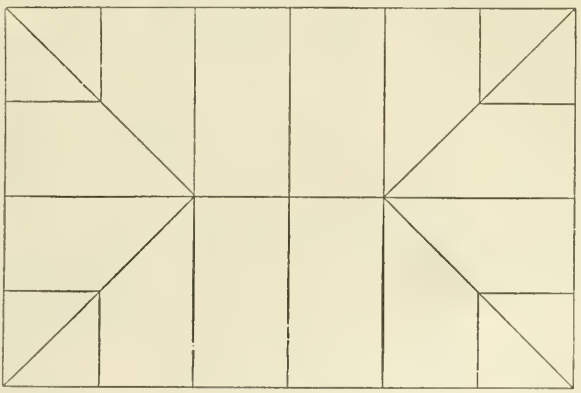
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

House Warming.—VI.

VACUUM OF SPACE.

Now, let us consider in conjunction the two facts that celestial space is a vacuum (and therefore devoid of any powers of conducting or absorbing heat from the passage of solar rays), and that the more remote planets receive less of the sun's heat than the nearer ones. If this latter proposition be true, it would seem to indicate that there is an absolute loss of heat, and not merely a change by transmission from one body to another, as in the cases previously referred to. And, if true on a large scale, there is good reason to believe that it would be so within the smaller limits, though whether to an appreciable extent is not clear. But, that from all sources there is a very considerable loss of heat in the passage from the radiant to the absorbent body is a fact clearly demonstrated by experiment.

Returning for a moment to the sun's rays—Box gives, as the result of observations, some valuable information, in the shape of definite quantities. By exposing a thermometer, with bulb blackened to facilitate absorption (see "polished silver" and "lampblack." Table XIII), to the full power of the sun's rays at noon, and to the effects of atmospheric temperature only, in shade, the following data were obtained: In January the average mean temperature in the sun was 47°. The average maximum in shade 43° As both readings were taken at the same time, the excess due to solar radiation is 47° − 43° = 4°, or 8½ per cent. In June, the results were 110° in the sun and 71° in the shade, the excess being 40°, or 36.36 per cent., as against 8½ per cent. in January.

Unlike conduction, the radiation of heat is irrespective of the thickness of the radiant body, the extent and character of the surface only being the governing factors. There is, however, similarity between conductivity and radiation, in that both are different in degree, in different materials.

EFFECT OF SURFACE.

Radiation is also greatly affected by the character of the surface, its color and comparative smoothness being very marked in their effects. Black and all dark colors and all rough surfaces radiate and consequently absorb heat with much greater rapidity than light colors and smooth polished surfaces. A familiar instance of this may be observed when the sun's rays fall upon ice or snow on the ground where the latter is rough and of very dark color—the snow will melt, even though the atmospheric temperature may be at zero, while that within a few inches of it upon a smooth light colored surface will show no signs of thawing. This, of course, is only illustrative of absorption, but there are examples of radiation quite as common, though the effects are not so easily observed. For instance, a black cast-iron tea kettle will cool the water it contains when removed from the fire far more quickly than will one having the same amount of external surface and made of bright tin. In Table XIII, from Box, we give the results of experiments by Péclet of the absorbing and radiating powers of ordinary substances.

Table XIII.—Absorption and Radiation.

Material.	Heat units per square foot per hour, for 1° difference in temperature.
Silvered copper—polished	0.02657
Copper—polished	0.03270
Tin—polished	0.04305
Zinc and brass—polished	0.04906
Tinned iron—polished	0.08585
Sheet iron—polished	0.09200
Sheet lead	0.13286
Sheet iron—black	0.56620
Glass	0.59480
Cast iron—new	0.64800
Chalk	0.67860
Cast and sheet iron—rusted	0.68680
Wood sawdust—fine	0.72150
Building stone, plaster, brick and wood	0.73580
Sand—fine	0.74000
Calico	0.74610
Woolen stuffs	0.75220
Silk stuffs, oil paint	0.75830
Paper	0.77060
Lampblack	0.81960
Water	1.08530
Oil	1.48000

We see by the above, not only the difference in radiating and absorbing power of different materials, but also that due to the color and character of surface, of the same material. For example, we find that in the case of polished copper, silvered and unsilvered, the difference is very marked, being 0.03270 heat unit for the latter and but 0.02657 for the former—a difference of 0.00613, or 23.55 per cent. greater by the plain copper than the silvered, due to color only.

To illustrate the difference from character of surface, apart from its color, we may consider the case of cast iron, new and clean, as compared with old and rusted—the latter being 0 6868 and the former 0.6480, making a difference of 0 0388, or 5.67 per cent. For the difference resulting from comparison of two materials having substantially the same color and character of surface, we may consider tin and silvered copper—both polished. For the former, the figure in table is 0.04906 and the latter, 0.02657, and the difference 0.02249, or 84.64 per cent. greater for tin, due to the nature of material only. Comparing the materials (solids) having the highest and the lowest power of radiation, we see by the table that they are lampblack and polished copper, silvered, the figures being 0.81960 and 0.02657 respectively. The difference, 0.79303, being nearly 300 per cent. greater for the lampblack. For sheet iron, black and polished, the difference is (0.56620 − 0.09200) = 0.47420, or over 515 per cent Comparing the power of radiation and absorption, as in above table, with the conductivity—Table XII—we find that copper, having the highest conducting power, is the lowest in the list of radiants, being 515 to 0.02657. Were it not for this fact, the use of sheet copper for stove cylinders, pipes and radiators would be undoubtedly good economy, notwithstanding its comparatively greater cost. As we shall see later, however, the radiant heat represents a large percentage of the total heat from all sources which can be realized from the use of any form of apparatus from which the heat is obtained by the exposure of its heated surfaces to the surrounding atmosphere.

LOSS BY CONVECTION.

Besides conductivity and radiation, there is but one other source from which the diffusion of heat may be obtained. This is technically termed the "contact of air." In its consideration there are numerous conditions which must be taken into account, and the subject is considerably more complex than either of the two last referred to. Clearly, the heating of a volume of air by contact with surfaces at a higher temperature must be accomplished through the indirect conduction of heat, successively, from the particles of air nearest to the heated surface to those most remote from it. As air is a very poor conductor of heat, the effect from contact with a heated surface is necessarily very slow as compared with the direct conduction by other bodies.

The loss of heat from absorption by the air in contact with a heated body is not affected by the kind of material of which the latter is composed, nor by the character of its surface. The temperature of surface alone is the governing factor as regards bodies of like form and position, though, as may be readily understood, the latter conditions, by having an influence on the circulation, must be taken into account. As we have seen by Table X, the weight of air varies considerably at different temperatures. At 62° 1 cubic foot will weigh 0.0761 pound, while at 209° it is but 0.0600 pound, and the difference shows that at the lower temperature to be 26.83 per cent. heavier than that at 202°.

It is therefore evident that, as the air directly in contact with the heated surface of a stove, for example, will not remain stationary, but that as rapidly as its temperature is increased and the weight correspondingly decreased, it will be displaced by the colder and consequently heavier air, which, in its turn, will become heated and displaced, thus establishing a continuous circulation, and diffusing the heat throughout the volume of air in the room. This being the case, it is readily seen that the form of body, and the position of its surface with reference to the vertical line, must affect the rapidity of circulation necessary to a maximum effect. Also, that the length of the surface, vertically, cannot be considered as only so many square feet of uniform effect, for the reason that as the air in contact with it continues to rise, it becomes warmer, and consequently the difference between its temperature and that of the surface is proportionately decreased.

Take, for illustration, the case of a vertical cylinder 2 feet in diameter by 20 feet high in which the number of units of heat lost per square foot per hour for each degree of difference between its temperature and that of the air in contact with it at bottom will be for the first foot in hight 0 6471, while for the whole 20 feet the average will be but 0.4487, or over 30 per cent. less.

As by a horizontal plane surface the circulation is the least rapid, it will suffer the smallest loss due to contact of air. Vertical planes, such as a wall, afford a much better surface for the free movement of currents, though the latter is confined to a direction parallel with the surface, and is therefore of the form of vertical surface by which there is the least loss. The horizontal cylinder comes next in order; and, lastly, the vertical cylinder.

The diameter of both horizontal and vertical cylinders is an important factor as regards the freedom of air circulation and consequent loss or diffusion of heat. In the former it is 0.7280 heat unit for 2 inches diameter and but 0.4381 for 36-inch. In the vertical, 0.7733 for 2 inch and 0.6377 for 36-inch. A globe, though of a form which is not likely to enter into calculations of the subject under consideration, may be mentioned as having, for small diameters, the greatest capacity for the diffusion of its heat by contact of air, and it likewise shows the greatest difference in effect in proportion to its diameter. Comparing it with the vertical cylinder of 2 inches diameter, we have as before 0.7733 for the latter, while for the globe it is 1 4110, and for 36 inches diameter 0.6377 and 0.4219 respectively.

In the following tables are given the results of calculations by Box from experimental data relating to the various forms and positions of surfaces above referred to. For practical application, the quantities given will require to be modified in some instances, and for this purpose supplementary tables by the same authority will be given in their proper place, together with the necessary illustrations of the methods by which their application to practical calculations may be made. In all of these tables, unless otherwise specified, the quantities given represent the loss in heat units per square foot per hour for each degree of difference in temper-

ature between the air and the heated body.

Table XIV.—Loss of Heat by Contact of Air from a Vertical Plane or Flat Surface.

Hight of plane in feet.	Average loss per square foot.	Hight of plane in feet.	Average loss per square foot.
1	0.5945	20	0.4133
2	0.5280	30	0.4037
3	0.4962	40	0.3980
4	0.4780	60	0.3924
5	0.4655	80	0.3871
10	0.4347	100	0.3843

As it may frequently become necessary to ascertain the loss for a given foot in the hight of surface, it may be readily calculated from the above quantities. Suppose it is desired to know the loss for the fourth foot in hight of a 10-foot wall or other plane surface. By the table we find the mean, or average loss per foot, up to that hight, to be 0.4780, and by the following progression we may calculate the individual loss for each foot up to that point. For the first foot the figure is 0.5945, which we subtract from that of the second foot multiplied by 2, which gives (0.5280 × 2) − 0 5945 = 0 4615, or the individual loss by second foot For the third foot we have (0 4962 × 3) − (0.5945 + 0.4615) = 0.4326, and for the fourth foot (4780 × 4) − (0.5945 + 0.4615 + 0 4326) = 0 4234. Table XV gives the loss for each foot in hight up to 10 feet:

Table XV.—Loss of Heat at Different Hights.

Foot from bottom.	Heat units.
First	0.5945
Second	0.4615
Third	0.4326
Fourth	0.4234
Fifth	0.4155
Sixth	0.4093
Seventh	0.4066
Eighth	0.4037
Ninth	0.4009
Tenth	0.3990

Mean = 4.3470 ÷ 10 = 0.4347, as per Table XIV.

To find the loss for horizontal cylinders and pipes of any diameter we add to the constant number 0.421, the quotient of constant 0.307 ÷ the radius or one-half the outside diameter of the pipe or cylinder. Thus for a 12 inch pipe $\left(0.307 \div \frac{12}{2}\right) + 0.421 = 0.4722$ heat unit per square foot per hour for each degree of difference in temperature. In Table XVI we have the loss for sizes from 2 inches diameter to 48 inches. Any sizes not given in table are easily calculated as above. In addition to the horizontal cylinder the table gives the figures for spheres of corresponding diameters, which are found by the rule (constant 1.0476 divided by radius) + constant 0.3634; and for a 12-inch globe we have $\left(1.0476 \div \frac{12}{2}\right) + 0.3634 = 0.5380$, as per table.

Table XVI.—Horizontal Cylinders and Spheres.

Diameter in inches.	Horizontal cylinder.	Sphere.
2	0.7280	1.4110
3	0.6256	1.0618
4	0.5715	0.8872
5	0.5440	0.7824
6	0.5230	0.7126
7	0.5087	0.6627
8	0.4978	0.6253
9	0.4892	0.5962
10	0.4824	0.5729
12	0.4722	0.5380
18	0.4551	0.4798
24	0.4496	0.4507
36	0.4381	0.4219
48	0.4338	0.4170

To use the figures in above table, find the outside area of pipe by multiplying the diameter in feet by 3.1416 and by the length in feet. Multiply this area by the number opposite the given diameter in table and by the number of degrees difference between the temperature of pipe and that of the air near to it. The result will be the total heat units lost per hour by the pipe from contact of air. If it is desired to know the loss per running foot divide this result by the length of pipe in feet, which will give the answer required.

For a sphere, the surface or area may be found by multiplying the diameter (in feet) by itself, and by 3.1416; then proceed as for the horizontal cylinder. The loss by vertical cylinders and pipes is found by a formula quite as simple in its operations as any of the preceding ones, although in appearance rather complicated. It may be expressed as follows: [Constant 0 726 + constant 0.2163 ÷ square root of radius of pipe in inches × constant 2 43 + (constant 5.49 divided by square root of hight in inches)] × constant 0 2044

For example, let us suppose a pipe 12 inches diameter by 20 feet high. We then have $\left[0.726 + \left(\frac{0.2163}{\sqrt{6}}\right) \times \left(2.43 + \frac{5.49}{\sqrt{240}}\right)\right] \times 0.2044$. The square root of 6 being 2 4995, and of 240 = 15.4919, the operation becomes simple addition, multiplication and division, and we have for answer 0.4634 heat unit. Table XVII gives the figures from 2 inches to 48 inches diameter, and the gaps between sizes may easily be calculated as above.

Table XVII.—Loss in Vertical Cylinders.

Hight of cylinder in feet.	Diameter of Cylinder in inches.						
	2	4	8	12	18	24	36
1	0.7773	0.7213	0.6846	0.6683	0.6350	0.6471	0.6377
3	0.6442	0.6088	0.5731	0.5591	0.5383	0.5416	0.5338
5	0.6046	0.5639	0.5353	0.5224	0.5121	0.5058	0.4985
10	0.5654	0.5273	0.5005	0.4886	0.4788	0.4730	0.4662
20	0.5363	0.5002	0.4747	0.4634	0.4542	0.4487	0.4422
30	0.5237	0.4885	0.4636	0.4526	0.4446	0.4382	0.4318
40	0.5164	0.4816	0.4571	0.4462	0.4374	0.4320	0.4255
50	0.5113	0.4769	0.4526	0.4418	0.4330	0.4278	0.4183

In order to ascertain the individual loss for any given foot in hight, we proceed by the same rule as given for vertical planes. Supposed it is desired to know the loss from a 2-inch steam pipe, at 3 feet from bottom end. Referring to Table XVII, we find that the mean loss for 2 feet hight is not given, and being necessary for our purpose, must be calculated. Then by the rule $\left(0.726 + \frac{0.2163}{\sqrt{2 \div 2}}\right) \times \left(2.43 + \frac{5.49}{\sqrt{24}}\right) \times 0.2044 = 0.6837$; and 0 6837 × 2 = 1.3674, from which, by subtracting the loss by first foot (by the table), 0 7733, we have 0.5941 as the individual loss by second foot, although the mean loss for the first 2 feet is (0.7733 + 0.5941) ÷ 2 = 0 6837, as previously calculated by the formula. For the third foot, the table gives the mean loss up to that hight as 0.6442. Then (0.6442 × 3) − (0.7733 + 0.5941) = 1.9326 − 1.3674 = 0.5652 as the loss for third foot.

It must be borne in mind that all of the foregoing tables and calculations are based on the supposition that the surfaces are exposed to a free circulation of the air surrounding them, as, for instance, a group of 2-inch pipes—say a steam radiator—will not give off their heat at the same rate as that just calculated for the single pipe, for it is clear that the natural circulation of air surrounding the individual pipes cannot be perfectly free. By means of a blast or other forcing medium the current may be made sufficiently rapid as to be the same in effect as the natural circulation by the isolated single pipe; and this is a plan very commonly adopted in the improved methods of steam heating, to which reference will be made in its proper place.

Hot-Air Furnaces.

In a recent volume of the proceedings of the Engineers' Club of Philadelphia was the following note by George T. Gwilliam:

The difference in the cost of steam or hot-water apparatus, when compared with hot-air furnaces, will make the latter the most popular method of heating dwellings for some time to come. The heater in common use is of the portable type, made up of a cast iron fire box, with a system of wrought or sheet iron drums and tubes the whole covered with a sheet-iron jacket, from the top of which the heat pipes diverge. To supply moisture to the heated air a cast iron water box is located at some point of the heater to suit the fancy or convenience of the workman; the box will hold from 1 to 3 gallons, and seldom contains water, usually mud and rust; the heat pipes are seldom tight and rarely covered. The cracks and crevices around the cellar windows and the foundations of the house supply the heater with fresh air; it collects, in its passage across the cellar, coal dust, ashes and the different odors commonly found in cellars; the gases from the leaky heater joints are added, then it is delivered throughout the house at varying temperatures, from 60° in very cold weather to 140° when the weather moderates.

In theory the question of heating and ventilating should go hand-in-hand; the practice is, however, to heat only. While it is next to impossible to get a heater that is perfectly tight, a good one can be selected—one with a minimum number of joints—and it should be large enough to heat the volume of air required without forcing. The fire box of a heater should not be allowed to get red hot. The pipes conducting the heat should be run direct, avoiding abrupt turns and horizontal runs. The jacket of the heater and the heat pipes should be covered with some non-conductor. The water pan, properly placed, should be connected with a tank having a ball cock, so the water supply will be constant.

All rooms should have some means of ventilation, and when no provision has been made to that end, good results can often be obtained by simply adjusting the window sash.

Since the introduction of laws regulating house drainage and plumbing in this city, the character of the work has changed greatly for the better; and if similar laws were passed regulating heating systems, much sickness arising from breathing impure air and gases from defective heaters would be avoided.

A foot warmer, says the Paris correspondent of an English exchange, depending for its action on the slacking of quicklime, has been invented by M. Loison de Viviers, who divides the case into two compartments, one containing lime and the other water. The flow of water on to the lime is regulated by a valve, adjusted from the outside, so that it is possible to regulate the degree of heat by the quantity of water admitted to the lime. It is said that the temperature may attain the boiling point of water, and be maintained thereat for a considerable period, varying with the size of the foot-warmer.

Tin ore in very promising quantities is said to exist in the Margui district of Lower Burmah. Prospecting and mining licenses are said to have been recently granted to a syndicate of British and Chinese capitalists.

PLUMBING AND GAS FITTING.

Common Errors in Plumbing Practice.

It has been suggested to us that having published in connection with the "Plumbing of a City House" in the issue of February 25, 1893, all that is called for in the line of advanced sanitary pumbing, it would serve a useful purpose to bring pointedly before those of the plumbing trade who need such reminders the common blunders in plumbing practice so frequently made, either through carelessness or ignorance, or both. In accordance with the suggestion, we present a few of those things which the plumber and helper would do well to avoid, but which it must be acknowledged are not unfrequently found to exist even in jobs of plumbing that have passed from the hands of journeymen who not unfrequently believe that they have nothing to learn.

It is well to begin at the foundation of the house-plumbing system by raising the first note of warning to the plumber against

IMPROPER GRADING OF HOUSE, SEWER AND DRAIN

at the outset. It is by no means uncommon to see these pipe lines laid from the sewer in the street to almost the full depth of cellar—that is, back to the rear wall—before it is discovered that the grade is too steep, when the work has to be done over again. If, for instance, the pipe had to be laid in a trench under cellar floor, and a certain head-room had to be secured at back of cellar, it could not be accomplished satisfactorily unless the plumber took the precantion to provide for it at the outset instead of afterward having to alter the grade.

SETTING THE TRAP AT FRONT WALL AT AN ANGLE.

This should be avoided, as the trap, if set at an incline, will empty itself and defeat the object of placing it on the main drain.

BREAKING JOINTS IN HORIZONTAL LINES.

This is a trade term which means inserting the spigot end of one length of pipe into the hub of another at an angle so as to effect a slight deviation in the line. This leaves the calking space in the hub unequal, besides taking away from the smoothness of the interior bore of pipe. This should be avoided, and where any deviation is called for it should be made with "bends" or other fittings, so that the joint in the hub can be equally calked all around.

USING QUARTER BENDS ON HORIZONTAL LINES

is not good practice and helps to check the flowing sewage. If a deviation is necessary it is better to use two-eighth bends than one-quarter bend, the sharp angle of the latter being thus avoided.

DOUBLE TRAPPING HORIZONTAL LINES.

There should not be more than one trap on a horizontal line, as "air-bind" is likely to result, thereby checking the flow of sewage. Branch horizontal lines needing trapping should be trapped before connection with main line.

DRAINING FRONT AREA INTO HOUSE SEWER OUTSIDE MAIN TRAP

should be carefully avoided. Even if the drain is trapped it is not always certain that the trap is sealed in dry weather, and there is consequent danger that sewer air will come through and enter the house by the doors and windows. If the area drain cannot be brought into the cellar and connected with house drain at inlet side of main house drain trap, it should be drained into the fresh-air inlet. It would then be safe.

DISCHARGING VERTICAL SOIL AND WASTE PIPES INTO HOUSE DRAIN THROUGH T OPENINGS

is bad practice. The tendency is that sewage discharged in this manner is liable to accumulate in the drain pipe and eventually close the opening. The vertical line should be connected with the house drain by, and discharged through, Y branches and eighth bends.

TRAPPING VERTICAL SOIL AND WASTE PIPES AT BASE

is not permitted in good work. The only trap allowed on a vertical line of pipe is where the rain leader is inside the building, when as a precaution it is trapped at the base as a protection for adjacent houses with windows opening above the roof.

USING T CONNECTIONS ON VERTICAL SOIL AND WASTE LINES.

This should be avoided. A closet with a half S trap connected with a T opening discharges the sewage, not down the soil pipe, but in a straight line against the opposite side of the pipe instead of downward as with the use of a Y branch. Unnecessary fouling of the pipes is the consequence.

DISCHARGING BATH AND BASIN WASTES INTO WATER-CLOSET TRAPS.

This is a matter of too frequent occurrence, but should be carefully avoided, also neglecting to separately trap baths and vent the trap in usual manner.

CONNECTING BATH AND BASIN OVERFLOW PIPES BELOW THE TRAP

is an error very frequently encountered and a very dangerous one. These overflow pipes should always connect with waste pipes on the inlet side of traps.

SETTING WATER CLOSETS WITH INSUFFICIENT SIZED FLUSH PIPE

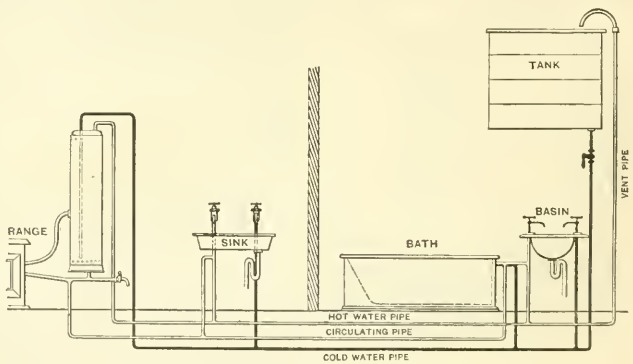
is something to be guarded against. The value of a flush is greatly enhanced by the immediate discharge through a pipe at least $1\frac{1}{4}$ inches in diameter.

DRAINING SAFES UNDER CLOSETS INTO THE CISTERNS OF CLOSETS ON LOWER FLOORS.

This is a reprehensible habit. A water closet apartment has at all times an abundance of aid to foul-smelling without the water in flushing cistern being fouled before being used.

OTHER IRREGULARITIES.

Viz.: Trapping regulator and safe wastes into soil pipe, connecting the overflow of house tank on upper floor with water-closet cistern, placing traps at long distances from fixtures, connecting sediment pipe of boiler on outlet side of trap of kitchen sink, making bowed or trapped vents to traps, &c., all of which mistakes are certain to lead to bad results and to redound to the injury of the plumber who does the work. In this, as in other cases, there is abundant room for the application of the ounce of prevention.



Range Boiler Emptied through Relief Pipe.

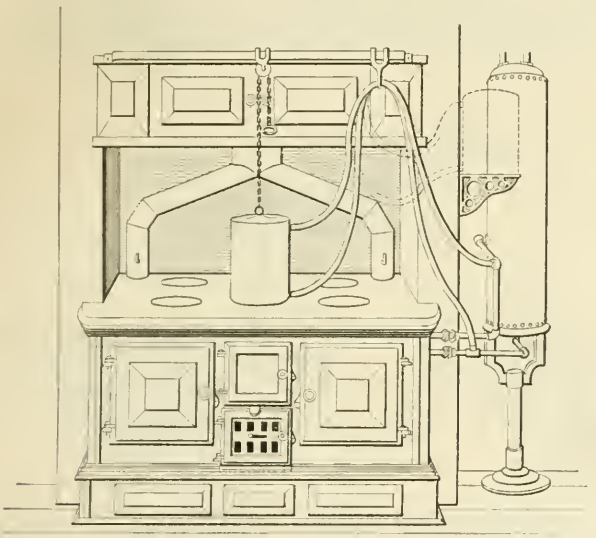
Range Boiler Emptied through Relief Pipe.

From C. Q. A., *Ohio.*—I inclose drawing of work that has given me considerable trouble, and I wish to have some assistance from the trade. As soon as the boiler fills up with water it will syphon back into the supply tank through the vent pipe. The work is all on the second floor, with pipes running under the floor and as nearly level as they can be put. The water is all supplied with the tank pressure, the bottom of the tank being on a level with the boiler. The capacity of the tank is 27 barrels, and it makes no difference whether the tank is filled or only two-thirds full, the action will be the same. You will see that the circulation pipe is branched into the hot-water pipe, both at the sink and wash basin; also into the bottom pipe leading from the boiler to the stove. The pipe conducting the water from the top of the boiler to a point within 12 inches of the bottom has a hole in it near the top. The stove water back is at the side, as shown. We had no trouble in heating the water. The piping is all of $\frac{5}{8}$-inch lead pipe. The water syphons when it is hot.

Movable Water Top.

We describe below an attachment for a range boiler devised by E. C. Tainter, Madison, Wis., and which he calls Tainter's Latent Heat Retort for kitchen ranges. The engraving, which is made from a photograph of the apparatus, shows its principal features. It is designed to utilize more fully the heat from the range and serve as a sort of supplementary water back. The apparatus illustrated is only an experimental one, and was made movable by flexible steam hose. We understand, however, that this particular attachment was used with much satisfaction, and gave such good results that the hose was replaced with metallic fixtures and joints, permitting the kettle to be moved. According to the illustration, the kettle can be placed either on the range or on a shelf, as indicated by the dotted lines. Describing this apparatus, Mr. Tainter writes as follows :

"The can shown in the photograph is a hot-water retort or movable water top, supplementary to the water back. In this case of preliminary work it was made movable by flexible steam hose, one for cold water and the other for hot water. The two acted the part of hinges, and by them the retort can be placed on any pot hole and set aside when not required. All parts of the apparatus are in sight. The capacity of the boiler has been doubled by the use of the retort. The picture shows a lifting chain and shelf for the retort, where it may be placed out of the way. The chain and shelf, however, were never made, as they were not needed. The flexible hose is shown too long. It is only necessary to have it long enough to straighten out and bend readily. The cold-water connection is branched from the cold-water pipe of an ordinary kitchen boiler to the retort, from which a hot-water pipe is connected in the same way to the hot pipe of the ordinary water back at any point near the boiler."



Movable Water Top.

Waste of Water.

From J. B., *Brooklyn, N. Y.*—There is a great quantity of literature written on the waste of water during the winter and the hot months of summer. What I wish to say relates to the waste in winter. I live on the second floor of a private house where the water is heated by a range on the first floor. When I want hot water I have to waste all the water which comes before the hot does. The cold water is so close to it, furthermore, that when I want cold water the water is warm and it has to waste before the cold water comes. I think it would be a good thing to have a clause in the plumbing regulations of the city to have a return pipe so that the hot water could be procured the instant it is turned on, also that the cold-water pipes should be 15 inches or so from any part of the hot-water pipes. I would like to hear from those who are better qualified to write on the subject.

TRAPS AND VENTS.

THE MIDDLESEX COUNTY COUNCIL in England have, as reported by a London plumbing exchange, established a class on plumbers' work in connection with the Museum of Sanitary Appliances at Highgate, London. A registered foreman plumber is appointed as instructor, and the board have ruled that the teaching shall be alternately technical and practical. The class is open to those actually engaged in the plumbing trade, either as apprentices or otherwise. A nominal fee of 60 cents for the course is imposed, and this will be returned to those students who make 75 per cent. of the possible number of attendances. Similar plumbing classes appear to be commencing all over the United Kingdom, and promise to be a prominent feature of British trade education.

A LARGELY ATTENDED MEETING, convened by the British Institute of Public Health, was held at the Mansion House, London, on February 18, in order to discuss the training and examination of sanitary inspectors and plumbers. The conference, which included medical men and sanitary authorities from all parts of the United Kingdom, unanimously passed a resolution to the effect : "That this congress of delegate representatives of the sanitary authorities of Great Britain and Ireland is desirous of recording its opinion that the systematic training, examination and registration of plumbers is essential to the protection of public health, and that a statement embodying this opinion should be presented as a memorial to Parliament, coupled with an expression of the further opinion of the congress that the Plumbers' Registration bill should be passed into law at the earliest opportunity in the interests of public health." Copies of the resolution were transmitted to the various State departments and chairmen of sanitary authorities throughout the Kingdom, under the signature of the Lord Mayor of London.

A GERMAN GAS JOURNAL tells the following curious story : A plumber had been doing some soldering of a gas connection and had as usual turned on the gas and applied a flame to see if any gas kindled. He observed no flame and concluded that the job was secure, and went away. But although he had not seen it, there was a flame ; gas was escaping through an extremely small orifice in the solder, and this minute escape had kindled and was burning with a minute blue flame. This minute and practically non-luminous flame continued burning for six weeks, gently widening the aperture, and after six weeks the flame was long enough to begin to char wood in its vicinity. The odor of charring was detected and the cause of the mischief removed in time.

C. H. ROSE of the Old Dominion Mfg. Company has just returned from a week's inspection of their works at Shendun, Va. He refers to business as good and prospects all that could be desired. They have 96 employees at work there and $20,000 worth of orders booked ahead. They are receiving at their New York warehouse, 242 Water Street, a carload of manufactured goods every week. They are producing a good grade of water-closet seats, tanks, bathtub rims, valves and fittings belonging to this line. Mr. Rose has sent down a foreman for the machine department and also a foreman for the bench (or carpenters') department within the past two weeks, and will start a foreman next week to assume charge of the metal department.

NICOLAS BARRY, Muscatine, Iowa, has been granted a patent on a plumbers' trap, consisting of the trap having a lateral T, adapted to extend through a wall or partition and thereby support the trap ; also a screw and cap to close the end of the T and with a central opening with an adjustable inlet pipe and suitable packing rings. The object is to provide an efficient water seal that can be placed behind the wall or wainscoting and cleansed, and with which pipe connection can be quickly made.

ALLEN P. CREQUE, New York, has been granted a patent on a new form of washbowl, one object being to dispense with the independent faucets. The bowl is provided with an auxiliary chamber communicating with the bottom portion and containing hot-water and cold-water inlet. Another feature of the invention consists in dispensing with the usual cap or plug for closing the outlet, the purpose being served by a tube inserted in the outlet pipe of the bowl.

THE TORONTO STEEL CLAD BATH & METAL COMPANY, LIMITED, Toronto, Ontario, are distributing very pretty circulars printed in gold and colored inks giving "the reasons why the Steel Clad is the best." A variety of reasons are referred to, and the article itself is shown in gilt and colored illustration.

JAMES B. CLOW & SON, manufacturers and dealers in plumbers' supplies, Lake and Franklin streets, Chicago, are making extensive alterations and improvements in their private offices on the third floor. The offices are being enlarged and the walls and ceilings handsomely decorated. The kitchen and dining room, which have long been an institution of this house, are to be removed from the third to the sixth floor, thus giving more office room. The dining room is to be finished in Georgia pine.

THE SMITH & ANTHONY STOVE COMPANY, New York and Boston, proprietors and manufacturers of the Sanitas plumbing specialties, J. A. Cunningham, Western manager, 319 Lake street, Chicago, are to furnish Sanitas traps and closets for the Marshall Field Building, Monadnock

extension, Old Colony Building and Art Institute building, Chicago. They also furnish 100 Sanitas traps for the Teutonic Building.

JAMES B. CLOW & SON, Lake and Franklin streets, Chicago, announce to the trade that they have this year established shipping yards on the north, south and west sides of that city, so that they can make prompt shipment over any railroad entering Chicago. In addition to their regular stock of cast and wrought iron pipe carried in these yards, they have added a complete stock of vitrified sewer pipe, having accepted the agency of the largest manufacturer of Akron sewer pipe in this country.

THE WELLS & NEWTON COMPANY, D. M. Quay, Western manager, 1108–1109 Monadnock Block, Chicago, are to do the plumbing in the Chicago Athletic and Art Institute buildings. Also in the following buildings at the World's Fair: New York, Victoria, White Star, Puck, Walter A. Baker, French and Kentucky. Also, Moorish Palace, Venetian Murano and Zoological Arena. The above firm also do the plumbing in the Union Trust building, St. Louis, which is the first 15-story structure built in the city.

Trouble With a Range Boiler.

A correspondent in Indianapolis, Ind., sends the following letter and drawing relating to a bit of work a tinner and stove man may be called on to do. He writes:

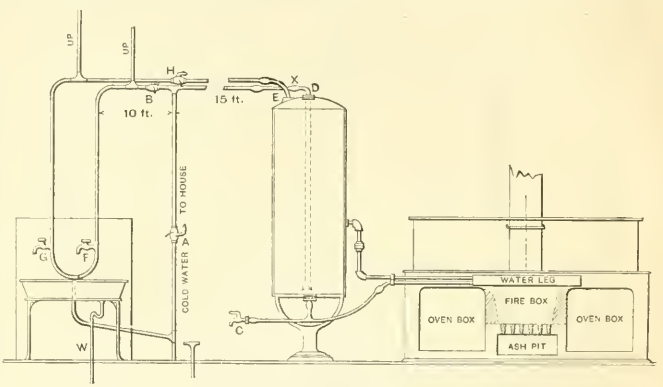
Our firm, whose principal business is in hot-air furnaces, steam and hot-water heaters, also handle an extensive line of family and hotel ranges. The usual custom when a range is sold is to send out a man from the shop to set it up. By this it is meant his work is to properly locate the range in a kitchen in relation to the smoke flue of chimney, and also to set the water back or leg in the range so that the pipes can readily be got at by the plumber who has to make the connections with the water boiler. The plumbing in our city must be done by a regular licensed firm or mechanic in that trade, and when so done, as a matter of course, they are responsible for their part of the work.

In the instance of which I write a range had been put up in the kitchen of a hotel several years ago in a locality where there has been considerable trouble with the water supply by reason of the connecting pipes filling up with hard scale, the pipes from the range in question proving no exception. Whenever this trouble occurred some plumber had been sent for, who usually remedied it by cleaning out the water leg and the connecting pipes. During the recent very cold spell, when almost every plumber was too busy to attend to any new orders, word was sent to our office that the pipes were stopped up again. In addition to this the parties mentioned that the boiler rumbled, and, in fact, made so much noise that their kitchen help were afraid of an explosion. As no plumber could be secured at the time our foreman had to send over a tinner.

To let out the water from the boiler he shut off the cocks at A and B in the cold-water supply pipe and loosened the connections at D. (See accompanying diagram.) After the water had been drawn from boiler at cock C for a time the connection at D was taken off entirely, permitting a steady flow from the boiler through the cock C. While the water was being emptied bucketful after bucketful the man had to wait and could not, of course, do any work on the pipes from the range. But, in the meantime, by judicious questioning, he obtained all the points necessary on how the plumbers did the same work on former occasions. About this time it occurred to him that the boiler ought to be empty, but judge of his surprise to find that it was nearly full, being steadily fed from the hot-water outlet E, at the top of boiler. Searching for the cause of this, he found that the cold-water supply pipe had a branch pipe to the cold-water faucet F, and from there the pipe continued upward to supply the balance of the house with cold water. I may add that the hot-water faucet G had been opened from the beginning to draw off the hot water from the building, but by this time instead of hot water cold water was running from it, proving conclusively that there was no plug or stop in the bend from F to G.

As it was not advisable to shut off the cold-water supply to the house, our man finally found a shut-off cock in the hot-water pipe at H. This he turned off, when, of course, the flow to the boiler ceased, and shortly the boiler was emptied through cock C. He then uncoupled and took off the entire connection between the boiler and water leg, also taking out the water leg.

Here he met with another surprise, the entire connections, including the water leg, proving to be entirely free from scale. And so the only thing he could do was to put back the water leg in position and couple up the connections as he had found them. He then informed the landlady that the fault lay with the plumbing work, and in fact that his labor was thrown away in so far as stopping the noise in the boiler was concerned. After filling the boiler again he, therefore, left.



Trouble with a Range Boiler.

Next morning early he reported to the foreman what he had found and done. The foreman thereupon determined to find out what really was the cause of the trouble. Taking along the necessary tools, and also the same tinner to help him, they arrived at the hotel just after breakfast was over. This gave him a chance to work, as no fire would be needed for several hours in the range. I may also mention that a plumber and helper who had been found were taken along. About this time a considerable quantity of hot water was being drawn off at G, but after the faucet G was closed for several minutes the rumbling, snapping and noise in the boiler commenced again and lasted for quite a while, when it finally stopped. Meanwhile there was still a big red-hot fire in the range. The foregoing operations of drawing hot water and shutting it off were repeated several times, always followed by the same noise in the boiler.

Weighing these facts in his mind, it occurred to the foreman that perhaps the boiler did not receive a sufficient supply of cold water to compensate for an equal amount of hot water drawn off. Having emptied the boiler, therefore, he uncoupled the cold-water supply pipe from the top of boiler. His idea was to see if there was any obstruction in the supply pipe, so, taking a piece of No. 16 gauge wire, he shoved it up into the bend D. When it had entered as far as the first wipe joint, shown at X, it stopped, but by poking and shoving for a few moments the wire finally entered somewhat further. This experiment proved to him that there must be some obstruction inside the pipe. He then took a saw and cut the pipe through about a foot away from the bend D, and found that the plumber who had made the joint had almost closed up the passage, leaving but an irregular hole from $\frac{3}{16}$ to $\frac{1}{4}$ inch in size. It was learned that several days previous a plumber had done some repairing, and put in a new piece of pipe from that very same joint to the next joint, shown in the drawing. A new piece of pipe being put in at D to where the pipe was cut—but this time properly—the pipe was again connected to the boiler. A division was also made in the bend between F and G. This work done, the boiler was again filled and a brisk fire started in the range. After the water in the boiler became heated again the same experiment of drawing hot water for a time and then shutting it off was repeated, but no snapping or rumbling noise followed.

The elevator capacity of the head of the lakes is at present 21,200,000 bushels. The only two cities in the country which have elevator capacity in excess of this amount are Chicago and New York, that of the former being 30,075,000 bushels and the latter 27,275,000 bushels. The elevators are now crowded to their utmost. To care for the surplus lines and to open new territory, elevators are now being built in Superior for an additional capacity of over 6,000,000 bushels and in Duluth of over 1,000,000 bushels, which will place Superior Duluth second in the United States in point of elevator capacity.

The shortage of cars is still a subject of grievous complaint at various Western points, but is felt with special severity at Kansas City. The superintendent of car service in that section says the trouble is caused very largely by sending cars long distances without transferring, to New Orleans and Baltimore, for example, so that they are longer returning. It requires five times the number of cars to do the business, now that they are permitted to go through.

A foreign corporation doing business in Massachusetts is not liable for taxes upon its personal property there, under chapter 11, section 20, of the Public Statutes. The full bench of the Supreme Court so decided on the 9th inst. in the suits of the Boston Investment Company and others against the city of Boston.

Philadelphia complains that she is rapidly losing her grain trade owing to alleged discriminations in favor of Baltimore.

Tricks and Manners of Syphons.

BY L. ALLEN.

To understand some of the anomalies in the action of syphon pipes for conveyance of water, a refereuce to the principles on which their action is based is necessary. All the more is this needed because the text-books that treat of syphons usually omit to speak of more than one principle, whereas there are several.

A good example of the usual mode of treating this subject is the following, from "Ganot's Physics," a treatise of high reputation and widely used in schools. The

"To explain this flow of water from the syphon let us suppose it filled and the short leg immersed in the liquid. The pressure then acting on C (surface of liquid) and tending to raise the liquid in the tube, is the atmospheric pressure minus the hight of the column of liquid D C. In like manner the pressure on the end of the tube B is the weight of the atmosphere less the pressure of the column of liquid A B. But as this latter column is longer than C D, the force acting at B is less than the force acting at C, and consequently a flow takes place proportional to the difference between these two forces. The flow will therefore be more rapid in proportion as the difference of level between the aperture B and the surface of the liquid in C is greater." This is the whole story. The writer has looked in many treatises for a better exposition, without success. To show how inadequate it is, a modification of Fig. 1 is herewith given and, without violating any definition, principle or direction laid down by Ganot, an inoperative syphon may be constructed.

In Fig. 2 every detail is shown substantially as set forth by Ganot, except that a trumpet-shaped tube is used, having its smaller end immersed in the liquid to be discharged. The discharge from the larger end being much larger than the supply entering the smaller end, the longer leg of the syphon will soon empty itself after it is filled and placed, as set forth by Ganot, and the flow will then cease immediately.

Does this not indicate that there are other principles involved in syphon action than mere difference of pressure at the two ends of the tube? Does it not point clearly to the fact that the rate of inflow to that of outflow must be always equal, or the siphon will be inoperative?

It may be said that inflow and outflow must be equal so long as the pipe is of uniform internal diameter, or at least if the two mouths are of equal discharge areas.

While this is theoretically true, it does not always hold in practice. The writer was called once to doctor a syphon pipe that supplied a penstock from a stream over an intervening rise of ground, roughly estimated as 16 feet above the source of supply. From the source the rise was very gradual for half a mile, where it reached the crest at a distance of about 60 yards from the penstock. No one had yet been able to explain the reason why this recently-laid pipe had, after apparently working well for about a week, gradually diminished its flow for a day or two, and, finally, suddenly ceased to flow altogether. Several attempts had been made to start it again by attaching a suction pump to the discharge end, and though a little water could thus be got, the flow again suddenly ceased. The pipe had been put in by a local dealer in pumps, stoves, tin roofing, &c., who, chancing to be a personal friend, solicited advice about the difficulty. After hearing his story, it was concluded that there was an obstruction in the shorter leg of the syphon, and reasoning that if any body, as an eel or a frog, had caused the stoppage, the cessa-

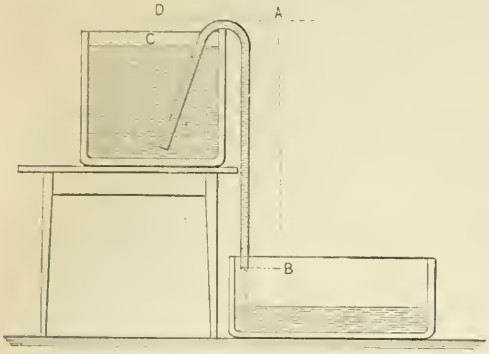


Fig. 1.—View of Syphon.

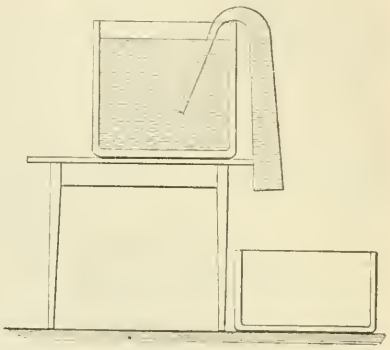


Fig. 2.—Inoperative Syphon.

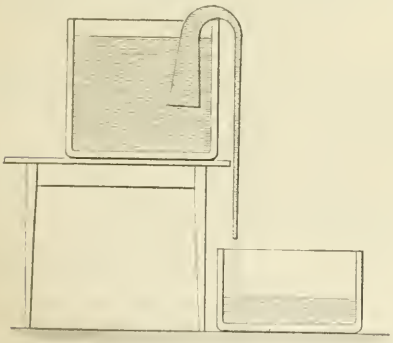


Fig. 3.—Operative Syphon.

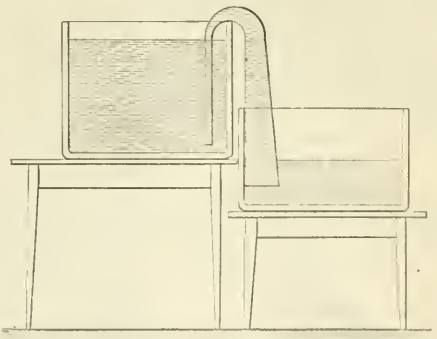


Fig. 4.—Another Style of Operative Syphon.

TRICKS AND MANNERS OF SYPHONS.

whole discussion given in this work to syphons of constant flow occupies less than a page, including two cuts used as illustrations. A short paragraph on intermittent syphons is added, and the subject is then dismissed.

First, a definition of a syphon is given as "a bent tube, open at both ends and with unequal legs." The word "leg," as applied to syphons, is left undefined, but the context must inevitably lead the reader to infer that the two parts of the pipe joined at the bend are what is meant by legs.

How a syphon is used for emptying liquid from a vessel is then described, that is to say, how to fill it and place in the vessel. By means of a cut substantially like that herewith given in Fig. 1, the adjustment of the syphon is shown, then there are 11 lines of explanation which I quote *verbatim*:

tion of flow would have been sudden and without the gradual approach described, the case was diagnosed as one of gradual accumulation of sediment in the shorter leg, reaching an extent at which the inflow was insufficient to prevent the longer leg from emptying itself. As confirmatory of this theory, considerable muddy deposit was found in the penstock. By using a force pump and forcing considerable water through the pipe from the discharge end back into the stream, thus washing out the short leg of the syphon, and extending the longer leg so as to make it always discharge below the surface of water in the penstock, and so that the longer leg could not empty itself at any reduced velocity of flow, it was found that a gradually diminishing flow through several weeks would be obtained. The stream at all times after summer rains was very muddy, and a strainer at the inflow end was therefore also recommended, but a periodical washing out of the syphon continued to be necessary.

In Figs. 3 and 4 are shown two different ways of making operative a trumpet-shaped tube, which, as arranged in Fig. 2, will not operate unless it be a capillary tube, and, as enforcing the principle that a syphon to be operative must be arranged so that inflow and outflow shall be equal, a careful study of these diagrams is recommended.

As with muddy water the clogging of a syphon by silt will be less when the velocity of inflow is small than when the velocity is great, it is always wise to use at the inflow end several lengths of pipe considerably larger than the remainder of the run, whenever the source of supply is subject to becoming soily from any cause.

To prevent any misunderstanding, it is added that without respect to the actual length of pipe extending either way from the highest point in the pipe, the longer leg is always on the discharge side relatively to that point; or, to put it in another way, the longer leg of a syphon is the one that has the greater vertical hight from its mouth, as measured from its mouth to the level of the highest point in the pipe.

Hot Pipes.

A digest, compiled by H. A Phillips, of the municipal laws relating to hot pipes in buildings, in force in some of the principal cities of the United States, appears in a recent issue of the *American Architect and Building News* They are as follows:

Boston.—1. Hot-air pipes shall be at least 1 inch from wood work.

(This may be modified by inapector in first-class buildings.)

2. Any metal pipe conveying heated air or steam shall be kept 1 inch from any wood work, unless pipe is protected by soapstone or earthen tube or ring, or metal casing.

Baltimore.—1. Metal flue for hot air may be of one thickness of metal, if built into stone or brick wall.

2. Otherwise it must be double, the two pipes separated by 1 inch air space.

3. No wood work shall be placed against any flue or metal pipe used for conveying hot air.

Chicago.—1. Hot-air conductors placed within 10 inches of wood work shall be made double, one within the other, with at least ½ inch air space between the two.

2. All hot-air flues and appendages shall be made of IC or IX bright tin.

3. Steam pipes shall be kept at least 2 inches from wood work, unless protected by soapstone, earthen ring or tube, or rest on iron supports.

Cincinnati.—No pipes conveying heated air or steam shall be placed nearer than 6 inches to any unprotected combustible material. All subject to approval of inapector.

Cleveland.—1. Hot-air conductors placed within 10 inches of wood work shall be made double, one within the other, with at least ½ inch air space between the two.

2. No pipes conveying heated air or steam shall be placed nearer than 6 inches to any unprotected combustible material.

Denver.—Metal flue for hot air may be of one thickness of metal, if built into stone or brick wall; otherwise it shall be made double or wrapped in incombustible material.

Detroit.—No metal pipe for conveying hot air shall be placed nearer than 3 inches to any wood work. Such pipes over 15 feet long shall be safely stayed by wire or metal rods.

District of Columbia—1. Hot-air pipes shall be at least 1 inch from wood work.

2. Pipes passing through stud or wooden partitions shall be guarded by double collar of metal, "giving at least 2 inches air space, having holes for ventilation, or other device equally secure, to be approved by inspector."

3. Metal pipe or otherwise double, and the space filled with 1 inch non-combustible, non conducting material, or a single pipe may be surrounded by 1 inch of plaster of paris or other non conducting material between pipe and timber.

Kansas City.—1. Any metal pipe conveying heated air or steam shall be kept 1 inch from any wood work, unless pipe is protected by soapstone or earthen tube or ring, or metal casing, or otherwise protected to satisfaction of superintendent.

2. No wooden flue or air duct for heating or ventilation shall be placed in any such building.

Memphis.—1. All stone or brick hot-air flues and shafts shall be lined with tin pipes.

2. No wooden casing, furring or lath shall be placed against or cover any smoke flue or metal pipe used to convey hot air or steam.

3. No metal flues or pipes to convey heated air shall be allowed unless inclosed with 4 inches thickness of hard, incombustible material, except horizontal pipes in stud partitions, which shall be built in the following manner: The pipes shall be double, one inside the other, and ½ inch apart, and with 3 inches space between pipe and stud on each side; the inside faces of said stud well lined with tin plate, and the outside face with iron lath or slate. Where hot-air pipe passes through partition, shall be at least 8 feet from furnace.

4. Horizontal hot-air pipes shall be kept 6 inches below floor beams or ceiling. If floor beams or ceiling are plastered or protected by metal shield, then distance shall not be less than 3 inches.

5. Where hot-air pipes pass through wooden or stud partition, they shall be guarded by double collar of metal with 2-inch air space and holes for ventilation, or by 4 inches of brick work.

6. No hot air flues or pipes shall be allowed between any combustible floor or ceiling.

7. Steam pipe shall not be placed less than 2 inches from wood work unless wood is protected by metal shield, and then distance shall not be less than 1 inch.

8. Steam pipes passing through floors and ceilings or lath and plaster partitions shall be protected by metal tube 2 inches larger in diameter than pipe.

9. Wooden boxes or casings inclosing steam pipes and all covers to recesses shall be lined with iron or tin plate.

Milwaukee. — 1. Hot air conductors placed within 10 inches of wood work shall be made double, one within the other, with at least ½ inch air space between them.

2. All hot-air flues and appendages shall be made of IC or IX bright tin.

Nashville.—1. Sheet-iron flue running through floor or roof shall have a sheet-iron or terra cotta guard at least 2 inches larger than flue.

2. Steam pipes shall be kept at least 2 inches from wood work.

3. All steam and hot-air flues and pipes must be suspended by iron brackets.

Newark.—1. Hot-air pipes shall be set at least 2 inches from wood work and the wood work protected with tin.

2. Such pipes placed in lath and plaster partitions must be covered with iron, tin or other fire proof material.

New York.—(Same regulations as noted under heading of "Memphis.")

No hot-air flue or pipe allowed between combustible floor or ceiling.

Omaha.—1. Steam pipe shall not be placed less than 2 inches from wood work unless wood is protected by metal shield; and then distance shall not be less than 1 inch.

2. Steam pipes passing through floors and ceilings, or lath and plaster partitions, shall be protected by metal tube 2 inches larger in diameter than pipe.

3. Wooden boxes or casings inclosing steam pipes and all covers to recesses shall be lined with iron or tin plate.

4. Stud partitions in which hot-air pipes are placed to be at least 5 inches wide, and the space between studs at least 14 inches.

5. Hot-air pipes shall not be placed between floor joists unless same are doubled and the joists 14 inches apart.

6. Bright tin shall be used in construction of all hot-air flues and appendages.

Providence.—1. Hot-air pipes shall be at least 1 inch from wood work, unless protected by soapstone or earthen ring, or metal casing permitting circulation of air around pipe.

2. Steam pipes must be kept at least 1 inch from wood work, or supported by incombustible tubes or rest on iron supports.

St. Louis.—1. Hot-air pipes shall be at least 1 inch from woodwork, unless protected by soapstone or earthen ring or metal casing permitting circulation of air around pipe.

2. Steam or hot-water pipes carried through wooden partition or between joists, or in other close proximity to wood work, shall be inclosed in clay pipe or covered with felting or other non-conducting material.

San Francisco.—1. Metal flue for hot air may be of one thickness of metal, if built into stone or brick wall, otherwise double, one pipe within the other ½ inch apart, and space filled with fire-proof material.

2. No wood work shall be placed against any flue or metal pipe used for conveying hot air.

3. Steam pipes shall be placed at least 3 inches from wood work, or protected by ring of soapstone or earthenware.

Wilmington.—Metal pipes to carry hot air shall be double, one inside the other, ½ inch apart; or, if single, have a thickness of 2 inches of plaster of paris between pipe and wood work adjoining same.

Henry B. Clark, Chicago, Ill., has been granted a patent on a hot water heater, being an apparatus for heating water for domestic and other purposes.

The following list shows the total mileage of new railway track constructed annually in the United States during the last ten years; the figures covering main line single track only, and not including the mileage of second, third, fourth, and other tracks laid along the main line, nor of sidings, spurs, private tracks, etc: 1883, 6743 miles; 1884, 3924; 1885, 2984; 1886, 8037; 1887, 12,983; 1888, 7028; 1889, 5696; 1890, 5671; 1891, 4471; 1892, 4062 miles. The total mileage in existence in this country at the end of 1892 is computed at 174,663 miles, of which 104,000 have been laid down during the last 20 years.

THE RETAIL STORE.

The Stove and Tin Business. III.

BY VETERAN.

After considering the subject of competition of the dry goods and furniture dealers, it is well to ask if the regular trade do not make for themselves a much worse and certainly needless competition. The work done outside of the tin shop, roofing, conductor pipes, smoke jacks, cleaning furnaces and heaters and ranges and, in fact, almost all of the repair work done, and a large part of what is done inside, is both very hard and dirty work, and calls for experience and ability to do it well, and should pay good profits. It does pay good profits, and customers seldom dispute a bill or ask for time, and yet I think I am correct in saying that there are no uniform rates for this work, and the result is that many timid men charge less than they should for fear of being too high in prices.

I had occasion lately to put on a 6-inch smoke jack with a plain flange at bottom and the ordinary pitched circular top 10 feet high. I knew it was worth $6 put up made of galvanized iron No. 26, and yet, as it happened to be a little out of my district for work, I called on a dealer near where it was to go and asked what he would make and put up the pipe for for me and he said $8. I went away satisfied that I could not be out of the way, but when I sent in my bill I was told by the owner that he had one put on of the same dimensions on another piece of property for $4, and I had to accept that price. The price should have been agreed upon before the work was done, but it was ordered by the real estate agent of the owner, who had paid some bills to me before without any disagreements, and so it was not done. This is a fair sample case of the way ordinary job work is carried on.

There is a remedy for this bad situation, but it is like taking bitter medicine to adopt it. It lies in having familiar intercourse between dealers in the same locality, and perhaps an association of retail metal workers outside of any regular trade union. I would not for a moment advise any combination with forfeit or absolute agreement not to vary a hair from a certain price for a certain job. The most that can be done is for each man to say on his honor that he will charge such a given price for stove-pipe elbows, galvanized pipe conductor, and all work that can be rated, and then a price per hour for tinner and one for helper. Make cleaning furnaces, heaters, labor putting in grates and brick, and all work of that character, time work.

The guarantee that will do the most good and bind the agreement is to find that it is kept substantially by all. Once get the confidence of each other and it will come certainly if there is fair play, and in time all will see the benefit and ease of the plan. It removes the unpleasant feeling that now exists whenever one is asked for prices, not knowing who may be called on or what other figures will be made by a competitor. Even if work is lost by cutting it is better to have your figures substantiated at the outset, and care must be had to guard against men who run back and forth with stories of what some one else will do work for to get low prices. Better to lose a job once in a while and prove the statement and then apply some remedy for it. The most difficult part of my plan is to get cranky men who are never ready for improvement to come down from their jackass and make friends and confidants of their competitors. Self-interest ought to compel what good manners will not always accomplish.

How to Avoid the Accumulation of Dead Stock.

SECOND ARTICLE.

By H. C. WISEMAN.

A common answer would be—get rid of it before it becomes "dead"—which is pretty hard to do as a regular thing.

You have seen the back-number merchant who insists he never had any dead stock, and you see every day the wide-awake merchant, who knows such goods in a larger or smaller degree must be a part of the business. Like any other business disease, it can be gotten rid of, if taken in time, without great loss. Styles change, something else supersedes. The demand falls off, and this is the time to take hold of such goods, if the business eye will only see it.

KEEPING AFTER IT.

There are merchants who don't want to see it, others will—after stock inventory. The prudent, watchful merchant is on the lookout for it at all times. When looked after but once a year, it is easy to find an accumulation, and one with a value—even as a scrap pile, or old Iron. But it must be gathered together, turned over, assorted, laid out, and made the most of. As the caption of the above is how to avoid, rather than how to get rid of, such accumulations, allow me to suggest again, that any avoidance at all comes only with eternal vigilance, and that future avoiding comes only with previous riddance, and necessarily the two are very closely allied.

KNOWLEDGE OF STOCK.

We have always made it a point to keep a separate clean-up or bargain counter, taking everything that tends to slow sale, or to depreciation in value, brightening up, remarking, and putting it here, mixing in other goods that will help it off. If one remarking will not do it we give it another.

The largest help in avoiding all accumulation is to know your stock thoroughly, from front door to back. Keep pushing it forward, never hiding it, knowing probable customers who will use such and such lines, and never losing sight of goods or customers.

Broken dozens, single pieces, odd jobs and left overs must be put out, classified and pushed. Clerks must understand when a Sash Lock, Door Bolt or Escutcheon is called for, not to open full packages, or regular goods, if there is the slightest chance of working off the other. Nine times out of ten they will go at a price, and before you are aware of it that odd stock is gone.

In making stock memoranda, to fill up or purchase for, we make it a rule to watch for goods that are not moving. As a result of such work we are able to pride ourselves on the smallness of these accumulations.

ATTRACTING ATTENTION.

On the clean-up tables or counters it is always possible to make a fairly good display. In addition a clever man with a marking brush will have saved all odd pieces of pasteboard coming in, and will use them for signs to go with the goods. Such as:

ODDS AND ENDS.
See prices.

BROKEN STOCK.
Half price.

JOB LOT.
Was 50¢, now 25¢.

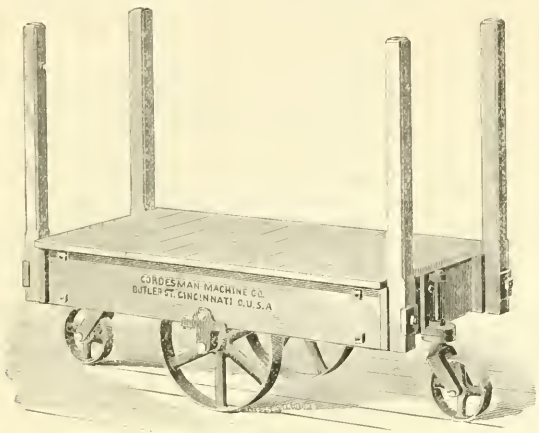
With ordinary care, and the same attention that is given to other detail, it can be kept at a minimum, and need never be a bugbear.

A PARTICULAR CASE.

As an example of what can be done in getting rid of such goods, we some time ago found a house with nearly 1500 cheap Hatchets, boys' and men's Axes (all ordinary stock for 10 years). We bought them all at half price, and for two weeks filled both large show windows, a counter and racks at the door, in attractive display, with a sign which possibly had two meanings, but which sold the goods, *i. e.*, "They won't last always," and others much like it. We were able to close out the last one in a little over three weeks. So it is with a general line, if goods are watched, the work put on them, and ordinary business intelligence used, the stock need never quite reach the absolutely "dead" point.

Factory Truck.

Cordesman Machine Company, 43–47 Butler street, Cincinnati, Ohio, are introducing a truck for factory use, as shown herewith. It has a hard wood frame of 2 x 7 inch material, the end rails being gained in the side pieces and each fastened by two bolts that are plowed in and pass through from end to end. The standards are also of hard wood 2 x 2½ inches in size and 36 inches long. These are clamped rigidly to the frame by a device, and can be detached by simply loosening a nut. The swiveled wheels are provided

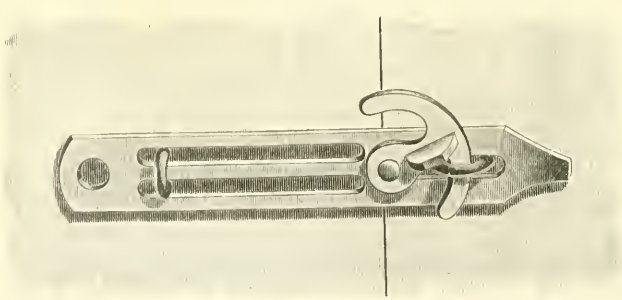


Factory Truck.

with flanges to prevent the rods from bending when striking obstructions. The center wheels are 16 inches in diameter with a 2½-inch face. They revolve on a steel axle 1¼ inches in diameter, which also revolves in boxes, resulting in a light-running truck. The point is made that all the iron parts are fitted together carefully and machined, not cored. The trucks are made in two sizes of platform, 24 x 48 inches and 30 x 60 inches. It is remarked that the use of such a truck systematizes the work in a factory as it is moved from one machine to another, keeping the floor neat and clean, and avoids the confusion incident to shops where material is placed and scattered over the floors.

Pugh's Adjustable Hook, Hasp and Staple.

A. F. Shapleigh Hardware Company, St. Louis, Mo., are introducing the above article, as shown herewith. The staple may be driven through the hole in the end, as in the ordinary hasp, or in the



Pugh's Adjustable Hook, Hasp and Staple.

slot, as shown in the cut. Using the hasp with the staple in the slot allows its adjustment to doors or gates that shrink or sag, thus giving the hasp 2 or more inches of play; while the ordinary style of hasp has less than ¼ inch play, necessitating the removal of the staple to properly adjust it to the door or gate. The hasps and hooks are right or left hand, and are made of solid steel, in regular sizes.

Henn Can Opener.

A. S. Henn & Co., New Haven, Conn., Cranston & Jennings, 80 Wabash avenue, Chicago, agents, are introducing the can opener shown herewith. It is described as all steel, made light and strong with the best of care and with a fine cutting edge. The grooved pulley working on the edge of the can allows it to be used on the top or side of can and either right or left hand. It is neat in appearance and is referred to as a fine clean cutter and sure grip. It is made with imitation ebony handle, nickel plated; also with enameled handle, polished.

Henn Can Opener.

Two Cases.

BY A. F. G.

Merchants are induced, sometimes against their better judgment, to buy a sample of something outside of the line regularly handled by them, but still a legitimate Hardware article. In many cases such investments prove unprofitable, although merchants in adjoining towns are successfully selling the same goods, and find for them an increasing demand. The

SAMPLE ARRIVES,

is examined, and commented upon by the proprietor and clerks, and then perhaps laid on a cook stove or refrigerator. In the press of business, showing and explaining and selling such goods that are called for, the sample is forgotten. Some one in showing the stove or refrigerator to customers lays the sample on the floor; next morning when the sprinkling and sweeping is done, the sample is

SHOVED INTO A CORNER OR INTO A BIN,

or behind the counter. It is later covered with other goods, and not discovered until taking inventory, when its shop-worn condition unfits it for sale. The proprietor wonders, if he does not say it right out, why clerks are so careless. He is disgusted with trying new things, and has lost confidence in the salesman who induced him to buy the sample, and with traveling men in general. Unfortunately for the merchant, this was the last trip for the traveling man who sold him the article, or on his next trip he would probably have looked around and said, So you have sold that sample already. How did your customer like it? Thus the article might have been rescued from its ignominious end.

ANOTHER CASE.

Now the question arises, How did the other merchant in the adjoining town create a demand for the same kind of goods? We will suppose the article in question to be a Lifting Weight, an athletic apparatus for home use. When it was unpacked it was nicely dusted off, the accompanying description was read and thoroughly digested, and the machine given a prominent place for actual use. It was not put so high that no one could work it, nor where things would be piled up in front of it, but where any customer could try it and see how it worked.

SIGNS.

Then the merchant had the sign maker (who owed him) paint neat signs on cardboard, one for each of the show windows, stating that such an apparatus was on exhibition, and inviting customers to come in and try it, free of charge. Then he had another card made to hang in the store over the machine, giving its name and inviting people to try it.

TALKED IT UP.

When the merchant made his deposit at the bank next day, he told the clerks what a fine thing he had at the store for them, and they promised to come in that evening and see it. He put a flea in the ear of the young man in the cigar store, and gave a similar hint to his lawyer, and spoke to others whom he thought needed and would appreciate something at home upon which to exercise. It is unnecessary to follow in detail this merchant's subsequent trade in athletic goods, or to state how from this one machine his stock of this class of profitable goods increased until his store was considered headquarters for athletic goods for that region of country.

Tin and Sheet Iron Job Workers' Unions, Nos. 61, 62 and 63, will soon establish a school for apprentices, at which instruction will be given in cutting, shaping and designing, besides other points that naturally come in the line of the trade.

Starrett's Gauges.

The gauges shown in the accompanying cuts are being put on the market by L. S. Starrett, Athol, Mass.

The gauge, Fig. 1, is referred to as having the following improved features, viz.: A joint at the base which allows the spindle jointed to this may be set and rigidly held in any position from vertical to horizontal, and the scriber placed in position to be used below its base for depth gauge, or (with bent end down) a scribing gauge. The point is made that it weighs 11 ounces and is 5 inches high, and, folding the spindle (which is 4 inches long) horizontally over the base, it may be packed in 1⅜ inches x 1¼ inches x 4 inches space in the tool chest.

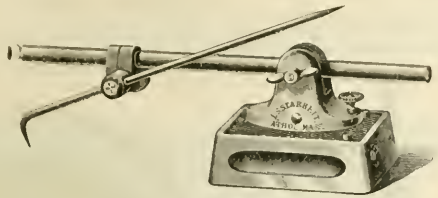


Fig. 1.—Starrett's Universal Surface Gauge.

The stair gauge, Fig. 3, is to be used in connection with any carpenter's steel square, and can be adjusted to any pitch or angle desired. It is designed for cutting in rafters, braces, stairs, &c.

spindle and scriber to be moved back and forth and placed in any position from upright to horizontal to reach over, back of and under work, while by inclining the spindle over the work its scope for long reach is increased.

The fine adjustment is obtained by the knurled screw in the rocking bracket at the base acting against a stiff spring under

Fig. 2.—Tool-Makers' Universal Gauge.

the opposite end, while the joint above with the spindle may be set and rigidly held in any position desired. Two pins through the base, frictionally held, it is stated, may be pushed down by slight pressure to form a bearing to work from the edge of, or in the slots of the planer bed for lining up work, while the weight of the gauge against the bed with a little pressure is sufficient to push them back. Grooves around these pins, against which a pointed spring plunger presses, insure

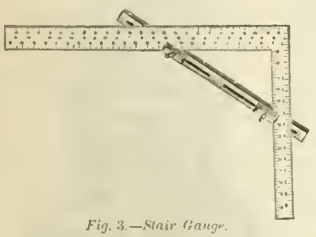


Fig. 3.—Stair Gauge.

their being held in place either up or down. Concaved depressions milled in the sides of the base are designed to make it convenient for thumb and finger to grasp.

This gauge is furnished with an improved sleeve to rigidly hold the scriber.

The gauge shown in Fig. 2 is adapted for light work and is made on the principle of the one illustrated in Fig. 1.

The base is steel, case-hardened, with depressions milled in the sides for the thumb and finger to grasp. The top side of it is slotted, and the rocking bracket is pivoted in the same. There is a stiff spring under one end of the bracket and a knurled adjusting screw in the other; the

Acme Dinner Pail.

Acme Stamping Company, East Stroudsburg, Pa., have put on the market a dinner pail, as shown in the accompanying illustrations. The feature of the pail is Strayer's bail ear and cover fastener, which is plainly shown in Fig. 1. In it is a spring brass ear and catch in one piece, designed to engage both ends of the cover or coffee can, so as to hold the same securely and not allowing it to be displaced by upsetting or falling, or from any accident which dinner pails are subject to. The makers remark that the fastener saves workmen's dinners, which might otherwise be spilled out and made unfit for eating. The pail is well made of heavy material, with a wired top edge, and with the cup inside the rim on the top of the coffee can. This rim is 3¼ inches in diameter, giving an opportunity of introducing the hand to thoroughly clean the coffee can. The can has the seam in the center, both the upper and lower parts of the can being stamped, and the projecting seam forms the rim over which the catches hold. As shown in Fig. 2, the stamped tray rests

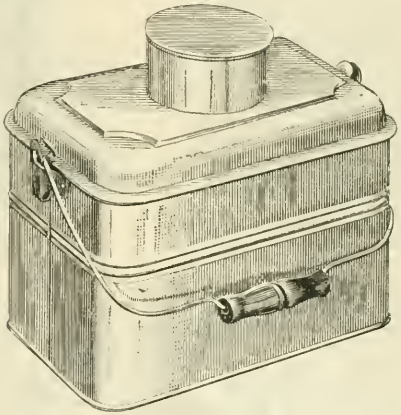


Fig. 1.—Acme Dinner Pail.

on four lugs soldered in the corners of the can just below the swage. The pails are made in three sizes, each pail separately wrapped in heavy paper and packed in

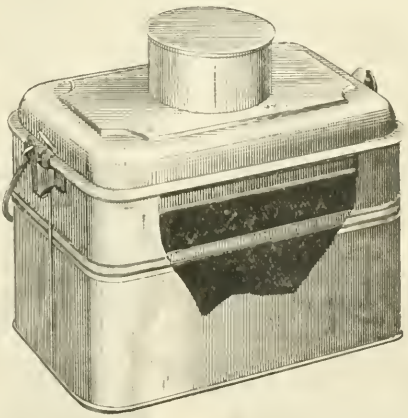


Fig. 2.—Showing Interior of Pail.

It is made in the shape of a steel angle ⅞ x ⅞, ⅛ inch thick, ground straight, nickel plated, and is referred to as a most valuable addition to a carpenter's kit of tools.

cases made especially for the purpose. The manufacturers remark that the bail ear and cover fastener is not expensive, as the pails are put on the market at a price as reasonable as other pails made similar to these.

The Perfection Mold.

Ideal Mfg. Company, New Haven, Conn., have put on the market an adjustable mold for grooved bullets only, as shown in Fig. 1. In Fig. 2 a partial idea is given of the work which can be done with the mold. It is explained that the adjustment in the mold can be varied, not only one groove at a time, but any fractional part thereof, varying the length and weight 5

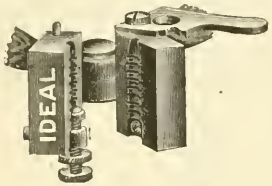


Fig. 1.—The Perfection Mold.

or 10 grains at a time, anywhere between the lowest and highest limit, thus securing any weight desired. The points of bullets of any length being the same, one adjustable chamber or seating screw answers for all. The point is made that with this mold the owner can determine for himself just what is in his rifle at all ranges, with every variety of powder charge and weight of bullets, all at the expense of one mold. The bullets in Fig. 2 are shown with a hollow base and the molds can be made as ordered, but the experience of the manufacturers lead them to prefer the flat base, as it does not gather and hold grease when lubricating. With hollow bsse bullets the grease must be thoroughly wiped off before seating upon the powder. The manufacturers state that the Perfection mold will not be made for all calibers, but only for a few of the popular sizes; neither will they be made for patched bullets, as their cylindrical mold is designed for patched bullets; also that the Perfection molds will invariably be made to cast bullets slightly above size so as to allow for shrinkage of all mixtures, and the bullets may require

Fig. 2.—Bullets Cast in Perfection Mold.

sizing, which will make them all uniform and perfectly round, &c.

These molds are made for the following calibers:

25 caliber, diameter 0.257 ; weight 56, 67, 77, 86 and 96 grains.
32 caliber, diameter 0.311, 0.379, 0.323; weight 75, 100, 125, 150, 175, 200, 225 grains.
32 caliber, diameter 0.319 (32-40 M) ; weight 80, 120, 155 grains (special short range).
38 caliber, diameter 0.375 ; weight 135, 170, 205, 245, 285 and 325 grains
45 caliber, diameter 0.457 ; weight 305, 365, 405, 465 grains No. 5, 45 Government Tool O. K.

Aluminum Cooking Utensils.

Illinois Pure Aluminum Company, Lemont, Ill., are manufacturing these goods in saucepans, frypans, washbowls, tea and table spoons. The samples of stamped saucepans which we have seen show the goods well and neatly made, with aluminum handles riveted on, and an entire absence of solder. These are made in 1, 2 and 4 quart sizes, and weigh as follows;

1-quart saucepan.....3¾ ounces
2-quart saucepan.....8 ounces
4-quart saucepan.....17 ounces

The manufacturers claim for these goods freedom from poison, lightness, great heat conductivity, heat-retaining properties, cleanliness, impossibility of rust and absence of all solder. They state that under no circumstance can poison be extracted from aluminum, and that these utensils possess all the virtue of porcelain-lined utensils in cooking delicate food, such as milk or fruits. The goods, we are advised, are meeting with ready sale.

Screw-Base Fence Post.

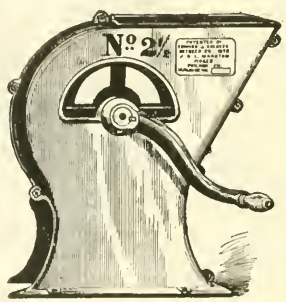
Capital City Fence Company, Indianapolis, Ind., are offering a screw-base post, as illustrated herewith. The post is described

Screw-Base Fence Post.

as having the base cast from gray iron with two spiral flanges extending along opposite sides of the base, at a right angle from the center and at a uniform angle of 45° on the plane of the post. This construction enables the posts to be screwed into the ground instead of being driven or set in holes, and the manufacturers claim that after the post is in position the flanges give a direct and effectual resistance to the heaving action of frost, to the pulling of the wires over unequal ground surfaces and all other usual strains. It is stated that the post can be used successfully in any kind of soil and that it will remain substantially as placed.

Creasey Ice Breaker.

Jos. S. Lovering Wharton, Germantown Junction, Philadelphia, Pa., is introducing a new style and design of the Creasey ice breaker, as herewith shown. The picks or teeth used on the drum are of forged steel, while the general construction is referred to as tending toward compactness and strength. The machine is arranged for bolting to a wooden stand, which forms a receiver below for the broken ice. The breaker is recommended by the makers for use in hotels, restaurants, and for caterers and ice cream manufacturers.



Creasey Ice Breaker.

Ideal Roller Base for Oil Stove

The Huette-Barler Mfg. Company, 111 and 113 Lake street, Chicago, have devised a roller base for their Ideal oil

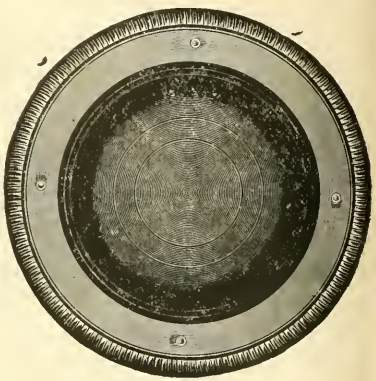


Fig. 1.—Ideal Roller Base.

heater, which they are now manufacturing for the trade. Fig. 1 is an illustration of this base. It is circular in form, made wholly of metal, has a nickel rim and curved fluted edge, a hard-baked japanned

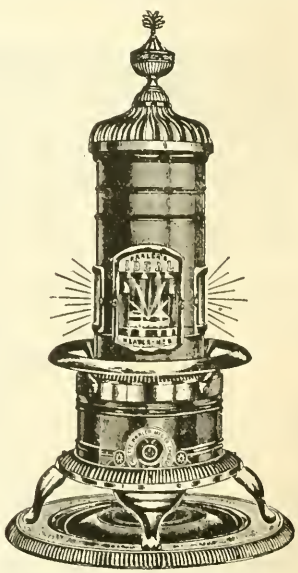
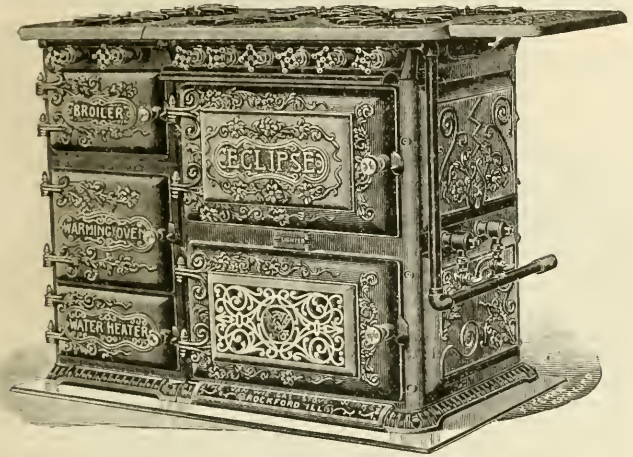


Fig 2.—Roller Base in Use.

center, and is mounted on lignumvitæ wood wheel casters, on which the heater can be easily moved about. Fig. 2 is an illustration of the roller base in use. The legs of the stove are set immediately over projections on the base, securing a firm hold and covering the projections from view. The rim is deeply curved, so as to hide the caster from view also.

The Eclipse Gas Range.

In the accompanying illustration we present a general view of the Eclipse gas range, which has been brought out by the Van Wie Gas Stove Works of Rockford, Ill. The stove here shown is provided with six burners in the top plate, a large oven, broiler, warming closet and water heater, and is presented to the trade as first-class in every respect. The manufacturers state that the beauty of this range is in the size of its ovens. These are 19 inches wide, 17 inches deep and 12 inches high, while the hight of the range itself is only 32 inches, thus making it very convenient for cooking purposes. It is claimed to be lower than any range on the market. The construction is such that the square top range with four burners in the cooking surface can have the broiler, warming oven and water heater with the two burners in the top, added at any time without disconnecting the stove from the gas supply. The ornamentation, as may be seen from an inspection of the accompanying cut, is neat and effective, and the company confidently expect for the Eclipse a hearty welcome and an extensive demand at the hands of the trade.



Eclipse Gas Range.

Protection to Merchants.

A retail hardware merchant of Iowa referring to this subject expresses his views as follows:

While I may be, and am, among the little fish as a merchant, yet I am able to think, and my thoughts on this subject are summed up in a few words. If the manufacturers wish to be fairly dealt with and wish the patronage of jobbers, and through the jobbers the retail trade, the manufacturers should see to it that their goods are placed in the hands of the regular jobbers and not in the hands of retail jobbers. For instance, I will mention one line of goods especially which are being sent out to our should-be customers at prices about as low as I can buy the same goods from my jobber. The goods I refer to are a line of Firearms, manufactured by one of the largest concerns in the country. A customer comes into my store, asks the price of one of their Rifles or Repeating Shot Guns. I name him a close price for cash. Well, he answers, I can get those goods of Messrs. ——— for much less money, &c. My advice would be that manufacturers protect the jobbers, and that jobbers protect the retailers.

He remarks in closing that Firearms were selected as an example, as a case of this kind had come up during the day, but that the entire Hardware business is becoming demoralized on account of jobbers quoting low prices to consumers.

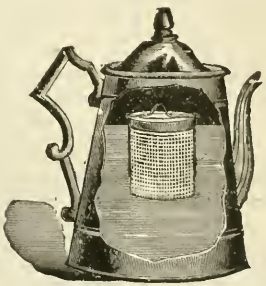
A New Ice Chopper.

A. M. Ross & Co., Ilion, N. Y., are putting the ice chopper illustrated herewith upon the market. It is made from one piece of steel, so formed as to make the handle socket identical with the chisel blade, the handle being self-tightening by use. The two pieces, blade and handle, complete the chopper, except for those who like more weight, a cast-iron socket head in ball form is provided. This is attached to the end of the handle, thus making a heavier chopper.

A New Ice Chopper.

West's Percolator.

T. G. Ellsworth, 85 Chambers and 67 Reade streets, New York, is offering the percolator, as illustrated herewith. It consists of a perforated metal basket, with a hollow air-tight cover, which causes the percolator to float. Lugs fastened on the edge of the cover turn under stationary ears soldered to the basket, holding the cover in place. A ring is soldered on the cover by which the percolator is removed from the hot liquid. The sheets of which the basket is made are tinned after being perforated, thus covering the raw edges and avoiding rust and discoloration of the coffee. The basket has a swage a little more than half way up to indicate how much coffee should be put in, the space above being left for the water to percolate through. It is explained that in use the float holds the percolator at the surface, where the agitation of boiling water is the greatest, and that the action of the water forces out all the strength of the coffee. The point is made that the percolator saves the trouble and cost of eggs for clarifying, keeps the grounds from sticking on sides of the pot, clogging the spout, coming into the cup, and a thousand and one annoyances there are in putting the coffee loose into the pot. The percolator is made in four sizes, to make from 12 to 36 cups of coffee.



West's Percolator.

MEMORANDA.

James K. McGuire of Syracuse, N. Y., has become a member of the wholesale hardware firm of Bradford, Kennedy's Sons & McGuire. Mr. McGuire had been confidential man in the firm for many years, and is deserving of the promotion that has come to him.

Frank Ricker, 69 Warren street, New York, is making a specialty of One Minute and The Boss Coffee and Tea Pots and Urns. These are designed to be used with pulverized coffee or tea, and it is claimed effect a large saving in the quantity used while producing superior results.

Lumber combines are forming North and South to secure control of the largest possible amount of growing timber. At Toronto a syndicate is in course of formation which will include some of the largest operators in Michigan and Canada, and options have been secured on several thousand square miles. The name of Governor Alger of Michigan is prominently mentioned.

A new treaty between France and Canada is designed to promote the interchange of a variety of products, but the list affected is comparatively small. The arrangement follows the same lines as that between France and the United States, the reductions of duty being limited to a certain number of articles, the trade in which is of about the same amount on each side.

STOVE TRADE NOTES.

Meeting of the Defense Association.

A meeting of the Stove Founders' National Defense Association was called for Thursday, the 16th inst., at Chicago, for the purpose of considering an advance of 15 per cent. in the wages of molders. The matter was brought to the attention of the Defense Association the latter part of February by the Molders' Union, under an agreement entered into some time since between the two bodies, which stipulates that where an increase of wages is requested thirty days' notice shall be given, the advance in wages asked for to take effect on April 1. According to the call, the Association met on Thursday at the Auditorium Hotel, Chicago, the session being held with closed doors. The decision reached will hardly be made public until it is submitted for approval to a general meeting of the stove manufacturers, which was to be held in the same hotel on Friday, the 17th inst. The molders have not made the demand for an advance, but have put it as a business proposition, claiming that stoves are now sold too cheap and that they should be advanced to a more profitable rate so as to enable manufacturers to pay better wages to their workmen.

(*By Telegraph.*)

We received the following dispatch from Chicago Friday, March 17:

The meeting of the Defense Association yesterday was very fully attended, members being present from all sections of the country. A thorough discussion of the request of the molders for higher wages resulted in the opinion that the condition of the trade does not warrant an advance. Final decision was, however, reserved until the matter should be considered by the general meeting of the manufacturers to-day.

WE ARE INDEBTED to the Quick Meal Stove Company of St. Louis, Mo., for a copy of a circular which was issued by them for distribution among the Western trade some eight years ago, when the care and operation of vapor stoves was not so well known as at the present time. The circular tells what gasoline is, and explains why the Quick Meal gasoline stove is not dangerous. It also tells the work that can be done on a Quick-Meal stove, setting forth its advantages over a coal stove, and gives the expenses of operation. It is illustrated with numerous engravings of gasoline stoves, accompanied by ample descriptive letterpress. This circular is now reissued for distribution by the Eastern agents of the company, the S. M. Howes Company, Boston, Mass.; and the fact that trade literature used eight years ago in the West is considered proper for the Eastern trade at the present, illustrates very forcibly the relation between the two sections of the country in the matter of using gasoline for heating and working purposes.

Claims for Castings Broken in Shipment.

(*Concluded.*)

FIRE CRACKS.

The question of fire cracks, for which claims on the stove manufacturer are so often made by the dealer, is one that can hardly be brought under one rule like that of the responsibility for breakage of castings in shipment. In the absence of any special agreement by the wholesaler to deliver goods to destination in perfect condition, a general rule or custom in the stove trade obtains, and the dealer must look to the transportation company for redress when breakage in transit occurs. In this case, although small country dealers, not well informed, often consider it an injustice of the wholesale merchant, and decline to bear the loss when breakage occurs, the rule is not, however, open to any reasonable complaint against its fairness to both buyer and seller, because the shipper's goods must first stand an inspection at the freight depot or shipping wharf before the agent of the carrying company will give a receipt in good order. After obtaining such receipt it must be plain to the dullest understanding that the shipper has made delivery of perfect goods and his responsibility is at an end.

In the case of fire cracks, however, the manufacturer cannot be always free from responsibility, although the times when he is responsible are few as compared to the number of times demands are made upon him for free castings to replace some cracked by fire.

It is not exaggerating to say that nine times out of ten, when fire cracks occur, the stove wholesaler is asked to replace the casting free or the new piece is ordered in such a way, with indignation or reflecting upon the quality of the plate, it being plainly intimated that it ought to be free and is expected free, no matter to what the crack or break may have been due.

The stove business is one which the dealer embarking in it too often seems disinclined to pay to learn. He is apt to blame the castings for any and every accident that befalls a stove from natural causes.

If a man in the furniture business puts an article too near the fire and the wood becomes warped, or if water from a leaky pipe falls on a bedstead, thereby starting the varnish and the glue, he does not berate the manufacturer and demand that the damage be made good to him: but if a stove dealer neglects to loosen the bolts of a range when putting it up and the top cracks when the plate expands from the heat, he insists that the stove is no good and demands a new top free of expense, and is quite apt to charge the maker for the time occupied in putting it on.

SOME CAUSES OF CRACKS.

He will drive 10 miles in winter with the mercury at zero with a stove whose plates are as brittle as glass from the extreme cold, and after putting it up leave an ignorant housemaid to start a booming fire in it with the resultant cannonading of the top and oven plates, and then turn around and curse the stove to the manufacturer of it.

He will write to the maker for a set of covers which ought to be free, as the ones they are to replace cracked in a very short time after he sold the range—the range itself too being the same style of which he has sold dozens without any similar complaint, when he knows all the time that his customer ordering the covers has a slovenly housekeeper who slams the vessels on the stove and slops the cold water in all directions, which is sure to split the red-hot covers. Or he will tell you that his customer thinks he ought to get a new set of fire fixtures free, because those in the range cracked all to pieces, all other possible causes to such a result being unworthy of consideration, and it is taken for granted it must be the fault of the stove.

But there are times when he is not to blame and when the cracking of plates by fire is in consequence of faulty pattern making and the plates bear too snugly against each other to stand the expansion of the iron when the stove is fired up. But this only happens with new stoves when first introduced, and there must be very few manufacturers who would not promptly recognize their responsibility in such cases and send the new plates free, and even be liberal in reimbursing the dealer for the expense or loss incurred. In fact, the manufacturer is specially desirous of knowing of any weakness developing in a new construction, and nobody can be more deeply interested in making the defect good and having the dealer satisfied at any reasonable cost.

The Littlefield Stove Company.

Among the concerns engaged in the stove industry in Albany, N. Y., is one to which peculiar interest attaches by reason of the prominent part which has been played by its proprietor in the production of coal and wood burning constructions. It is probable that few men have done more to develop and extend the stove industry of the United States than D. G. Littlefield of the Littlefield Stove Company. He and his work are the subject of a column article in a recent issue of an Albany periodical, entitled "Every Saturday." It gives a brief history of the life of Mr. Littlefield and his connections with the stove trade, illustrated by an excellent portrait. We make the following extracts from the article, which may prove of interest to many of our readers:

He was born in Wells, Maine, in 1817, and is the eighth in direct descent from Edmund Littlefield, who with his large family, settled in Wells in 1638 and was called the founder or father of Wells. At an early age he was apprenticed to the tinsmith trade, served his time, and made and saved enough money to start in business on his own account by the time he was 21 years old. He was quite successful for ten or 15 years, and during his spare moments invented the base-burning stove. Up to this time stoves were close, ugly affairs, put up by their owners in the fall at the last moment and taken down as early as possible in the spring. His invention revolutionized the whole industry and made chestnut coal the most expensive grade,

where previously it was a drug on the market. The Morning Glory parlor stove, the first of the base burners, was a handsome affair for those days, and for years it was almost impossible to satisfy the demand.

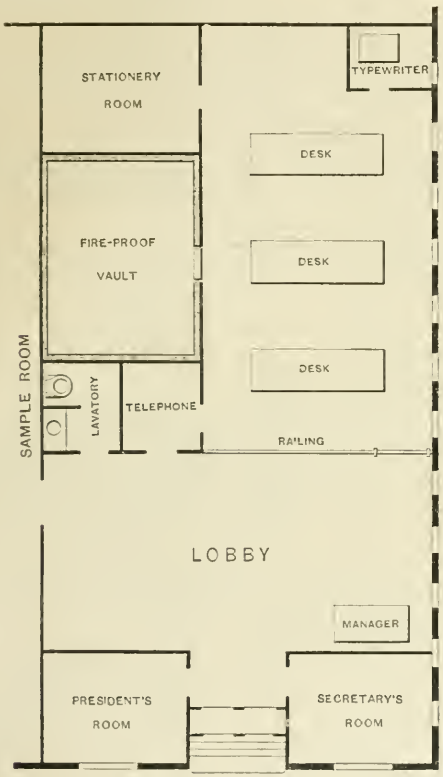
Mr. Littlefield came to Albany in 1851, and was with Treadwell, Perry & Norton for a few years; then with Erastus Corning from 1855 to 1861; then with Ira Jagger from 1861 to 1871, and since that time with his son, Henry C. Littlefield.

For years the Littlefield Stove Company occupied the old Warren foundry on Montgomery street, and when that property was purchased by the Central-Hudson railroad people, the present plant was established at the corner of North Pearl and Pleasant streets, where the company have been making stoves since 1870. From 1851 until 1872 the company confined themselves exclusively to manufacturing the Morning Glory parlor stove, double heaters and brick and portable furnaces. When the parlor stove patents expired Mr. Littlefield turned his attention to improving cook stoves and ranges, and to-day the extensive plant is taxed to its utmost capacity in turning out the large number of West Shore ranges needed. To show the popularity of this range it is only necessary to state that there are now over 5000 of them in use in Albany alone.

The molding room of the foundry is under the eye of foreman John G. Watkins, while Mason I. Croker has charge of the mounting department. The business office is in charge of Henry C. Littlefield, assisted by a force of clerks and traveling men.

The Brand Stove Company.

Some of the stove manufacturing concerns which have always been grouped among the small establishments have, within the past few years, grown with remarkable rapidity, and are now assuming considerable prominence in the trade. Among these may be named the Brand Stove Company of Milwaukee, Wis., whose works were started in a modest way, but have now grown so that they occupy almost the whole of a city block, while their sales extend throughout a very large part of the United States. They have come to the front, not only in their capacity for production, but also in the variety and quality of goods which they manufacture, now making almost every kind of stove demanded by the peculiarities of the trade. They turn out coal and wood cast-iron ranges, cooks and heaters, gas and oil stoves, hot air furnaces and steel ranges, but do not handle gasoline stoves. They have recently been giving more attention to high-class goods, and are putting out base burners of very handsome design to meet the demand for artistic productions in this line. Within the past year their facilities for the transaction of business have been increased about 50 per cent.



Plan of Offices of the Brand Stove Company.—Scale, 3-32 Inch to the Foot.

The works of the company extend 300 feet on Perry street, having a width of over 250 feet on Sixth and Seventh streets. Their mounting shop, nickel room, polishing room, &c., occupy a building 100 feet square, four stories high, with a basement. Some parts of the upper stories of this building are used for storage. The nickel room is of large capacity, and so well equipped that considerable outside work is done, as well as all the nickel work for the company's stoves. In the rear of this building is the molding room, which is 200 feet long by 100 feet wide, having a cupola in the center which melts from 15 to 18 tons daily. A new foundry is being built as an L, which will be 160 feet long by 75 feet wide. Pattern shop, fire-proof storage vault for patterns, engine room, fuel sheds, &c., are located in the center of the group of buildings, to which access is gained by convenient alleys. A new building has just been completed on the corner of Sixth and Perry streets, which is being used for offices, warerooms and storage purposes. This building is a very handsome structure, 150 x 102 feet, four stories high, with basement. It is built of cream-colored brick, on heavy cut-stone foundations, with large plate glass windows along the sample room on the first floor, and is most substantially constructed so as to easily carry the weight of an enormous stock of stoves. The sample room is 120 feet long by 102 feet deep, and is unusually well lighted, has a high ceiling, and is admirably suited to its purpose. A shipping room is located at the side of the sample room, which is 30 x 102 feet; two elevators run from the shipping room to the upper floors, which are connected by means of bridges across an intervening alley with the upper floors of the mounting shop.

The office, which is located in the northeast corner of the new building, is so handsome and so nicely planned that it is herewith illustrated. It is large, well arranged, finished with oak trimmings and oak ceiling, and is furnished with hard wood floors in the bookkeepers' department and private rooms, but with tile floor in the lobby or public part of the office. The entrance is by means of a recessed doorway, the vestibule being provided with double doors as a protection against cold weather. Private rooms are arranged for the president and secretary. The manager's desk is placed in the lobby, easily accessible to customers. The bookkeepers' desks are so arranged as to secure an abundance of light from the north. Lavatory and telephone rooms are placed very conveniently. In the rear of these is a large fire-proof vault, fitted up by the Hoffman-Keefe Office File Company of Milwaukee. The fitting consists of metal shelving, with rollers for the easy handling of heavy books; a large number of lock drawers and file cases, and separate locked compartments of large size for the use of each of the company's officers. This fire-proof vault is so large, being 10 x 12 feet in the interior, that it gives ample space for everything needing fire protection, and also includes a burglar-proof safe. The office will be lighted by electricity. It is heated by a large furnace in the basement. Separate fire places with artistic mantels are arranged in the officers' private rooms. All the appointments are first class in every respect, giving the officers and clerical force of the company accommodations of a superior order, very much beyond anything usually seen in connection with stove foundries. Sebastian Brand is president of the company, and devotes his time to the manufacturing details of the business. Julius Goldschmidt is vice-president, but is now in Vienna, Austria, where he has served for the past four years as Consul-General; he is expected home this summer, still retaining his interest in the company. Fred. G. Brand, the secretary, is at present residing at Colorado Springs, where he has been sojourning four months for the benefit of his health. E. W. Kasten is acting manager. D. W. Van Evera manages the Chicago branch.

The company now have five salesmen covering the territory from Ohio to the Pacific Coast, on the general product of the company. The eastern part of the United States is also covered by the operations of the company on oil and gas stoves. Gas stoves were sold in Sweden last summer through the medium of the company's advertisements in *The Metal Worker*. The Phillips & Buttorff Mfg.

Company of Nashville, Tenn., are general agents in the South for the company's oil stoves, which the Smith & Anthony Stove Company of Boston also represent as Eastern agents.

The Excelsior Steel Furnace Company

of 110–114 South Jefferson street, Chicago, Ill., have just issued from the press a complete and very interesting catalogue of heating specialties which they manufacture and sell. The volume is made up of 192 pages of letterpress, printed on good paper and profusely illustrated. It is bound in paper covers of a reddish-brown color, bearing as a gilt side title the single word "Excelsior." In bringing out this catalogue it has been the effort of the company to give to the dealer all information necessary for the intelligent handling of their specialties, while the work contains much special matter of value in this connection. In their announcement to the trade the manufacturers state that all their goods have been thoroughly tested and can be relied upon to do the work claimed when properly put in and operated. Particular attention is invited to a line of furnace fittings, which, it is claimed, are used by the leading furnace houses in the world, and are furnished at prices which cannot fail to be appreciated. The first thirty odd pages of the volume are devoted to a brief treatise on hot-air heating, numerous illustrations being presented in order to emphasize some of the points to which attention is directed. Following this is a chapter on furnace fittings manufactured by the Excelsior Steel Furnace Company, and which are carried in stock, ready for prompt shipment at all times. These fittings, we are informed, are made by special machinery designed by the company for the purpose. The material employed is said to be the best quality of bright IC steel stamping plates, of superior finish. The machinery is operated by power and the goods produced are claimed to be satisfactory in every respect. Illustrations are given of register boxes, bonnets and casing, safety thimbles, elbows and slip joint hot-air pipe, in connection with which is to be found ample descriptive letterpress. The next subject considered is the line of furnaces made by the company. These are carefully illustrated and fully described, the matter being presented in such a way as to render all points readily comprehensible. Tables showing the dimensions of the different styles and sizes of furnaces, as well as dimensions and prices of casings, form a feature of the catalogue. The Excelsior Unique Hot Water Boiler and the Excelsior Combination Heater are illustrated and described, following which is a chapter on radiators containing illustrations of several varieties, including the Brown Patent Improved Flue Radiators with all-cored surface. Another chapter gives attention to registers, while the catalogue closes with a list of heating specialties and sundries, either made by the company and controlled by them, or sold by the company as jobbers. An exceedingly interesting feature of the volume is a chapter entitled "Pointers," in which explicit directions are given to properly care for a furnace. The catalogue gives evidence of great care in the arrangement and preparation of the matter contained and will prove not only interesting, but valuable to all in the trade into whose hands a copy may come.

The Fischer Leaf Company of Louisville, Ky., favor us with a copy of a large catalogue which they have issued, showing marbleized iron and steel mantels, Eastlake and half low down grates, together with Eastlake half low down and portable grate baskets. The publication measures 9½ x 12½ nches in size and is bound in stiff board covers with gilt side title. This is the seventh catalogue which the company have issued and in it is presented a number of new designs of mantels. It is stated that in each mantel made by the company can be used the Brecher dumping and folding basket, for which many claims are made. The designs illustrated are of a varied character and cover a wide range of treatment. In connection with a sectional view of a mantel and grate are presented directions for setting the Brecher new patent basket, together with directions for laying tile hearths.

Old Stoves.

It is probable that many long established stove manufacturers occasionally hear of cases where certain of their stoves are continued in use much beyond the ordinary length of life of any good stove, and such items are always interesting reading to the trade.

It is probable, too, that the interest in antiquities which the World's Fair is apt to create has this year brought to light many such stoves, whose existence the manufacturer would otherwise never have known about.

The Union Stove Works lately received a letter offering them as an exhibit at the Fair one such old stove of their manufacture, and the letter, which speaks for itself, is given below:

Milt's Mill, Cal., February 13, 1893.
Messrs. R. R. Finch & Sons (the Union Stove Works), Peekskill, N. Y.:
Sirs: I have a No. 8 stove cast at your foundry, designed and patented in 1854. It was shipped to Crescent City, and in 1856 was bought for the small sum of $300 by my father-in-law and sent by mule back to me at Henley. The packing cost $50. This stove has been in constaut use ever since by me, and is a good stove today. I thought, perhaps, you might like to exhibit it at the World's Fair in Chicago. I have been in Siskiyou County since 1852, and am engaged in farming and quartz mining. My address is Coles P. O., Siskiyou Co., Cal.
Yours respectfully, Mrs. P. E. Milt.

The name of the stove, though not given in the letter, the firm know by the date of patent to be their Rival range. The letter would seem to indicate two things—that the Rival range was a good one and that Mrs. Milt has taken good care of it.

In thanking the lady, the company stated that it proved that their stoves, with good care, would last an ordinary lifetime; but they told her also that her stove was antedated by another of their manufacture, for which they had but a short while before furnished pieces to repair—namely, a stove made by them, called the Wood Cottage, and sold by them about eight years before the Rival.

Regulator for Gas Stoves.

A new regulator for gas stoves has lately been invented by Herr Porges of Vienna, and has been made by the firm of Robert Kutscher of Leipzig. According to an issue of the *Journal fur Gasbeleuchtung*, it depends upon the differing pressures of saturated vapor (that is, vapor in contact with its liquid) at different temperatures. A little closed metallic vessel contains a liquid which boils at a predetermined temperature, say 54° F. If the temperature of the room exceeds this the liquid begins to boil, the vessel dilates and works certain mechanism which shuts off the gas. The flames burn low until the temperature falls below 54° F.; then the liquid in the vessel condenses, the vessel itself returns to its former dimensions, and the gas again flows freely. But by the use of a regulating screw the tension upon the vessel can be modified, or pressure put upon it, so that the contained fluid will now boil at some other predetermined temperature. Then the room will have to attain the new temperature before the gas is shut off. In practice the flame comes to a size at which it is just able to keep the liquid in the vessel at the boil, and no more; so the flame remains of constant size (this size being larger in cold weather than in warm), and the temperature of the room is maintained uniform.

ODD PLATES.

The Cleveland Foundry Company, Cleveland, Ohio, have opened an Eastern office and salesroom at 82 North street, Boston, Mass., which is under the charge of Messrs. McMann & Brainerd, both of whom, we understand, are well and favorably known to the trade.

The Chicago Stove Works of Chicago, Ill., are sending to their customers a sheet printed in two colors, showing their new Gold Coin range. This is a six-hole construction, attractively ornamented and made in 12 different styles. We understand that it is meeting with a ready sale, and the company are confident that it is destined to be the most popular range ever brought out. The circular calls attention to many improvements and conveniences which are incorporated in the Gold Coin range.

Sam S. Utter and his wife are at present sojourning at the Hygeia Hotel, Fortress Monroe, where, we understand, they will remain several days. Mr. Utter has been giving very close attention to his business interests, and he deemed it the part of wisdom to seek a change of scene and air, together with a relaxation from business cares.

George M. Clark & Co. of Chicago state that the trade they are now doing in gasoline stoves and ranges exceeds anything ever experienced in the past. The demand is running very largely to new process stoves, although there is still a very respectable contingent of adherents to the old style single generators. If trade during the season keeps up to the current gain over preceding years, 1893 will be a banner year. The company have been obliged to greatly increase their teaming facilities in order to make shipments fast enough to satisfy their customers.

Evan A Edwards of Toledo, Ohio, has patented an oil burner or stove embodying several interesting features of construction. The burner consists essentially of a pair of parallel plates, one of which is provided with openings, the two plates being separated in such a way as to form a restricted air-draft space open on all sides between them and having a central oil feed. The lower plate is constructed with a central boss through which the supply pipe enters and projects beyond the apertured plate, and a surrounding oil receptacle or tank system of an absorbent material or a depression or both. Over the projecting end of the oil supply pipe is a vaporizing dome which rests upon the base and communicates with the second oil tank through spaces formed by serrations in its lower supporting end. The upper plate is supported by the base of the stove, the base having a bracket for holding the reservoir in convenient relation to the oil supply tube. The stove body consists of two concentric drums resting upon the base and forming a central combustion chamber over the burner. There is also a surrounding air flue open at the bottom for the free admission of air and a hot-air chamber between the drums at the top. This is supplied by the air flue, and has a restricted opening at the top. The combustion chamber has near its top an outlet with an upwardly-opening flue, formed by passing a pipe through the adjacent walls of the two drums and terminating at the opposite wall of the inner drum, an opening being made in the upper side of

the pipe. The effect of this particular form of body, the inventor states, is to supply pure air through the air flue to the hot-air chamber, causing it to linger until heated and thus facilitate the heating of the air in the chamber by insuring the impact of the gas and the products of combustion against the top of the chamber, which forms the bottom of the hot-air chamber, before they can escape.

THE HOWARD FURNACE COMPANY, now at 254 Water street, New York, have leased a portion of the premises at 210 Water street, where they hope to see their friends after May 1. They will have one-half of the office and showroom floor, the cellar for storage, and the top loft for shop work in connection with their hot-water and hot-air furnaces, giving them facilities for setting furnaces anywhere in New York or vicinity. They are about to bring out a new line of furnaces, including hot air and combinations of hot water and hot air, both brick set and portable. They expect to carry 10 to 12 carloads of these goods and are arranging for handling a largely increased business.

THE PUBLICATION in these columns a week or two since of a novel advertisement has called out a letter from Miles Strevell & Ulmer of Ogden, Utah, in which they inclose a transfer ticket for use on the Ogden City Street Railway Company. We understand that the firm have furnished the railway company with 23,000 of these tickets, one side of which is lettered and marked in the usual manner of documents of this character, while upon the other side is the name and address of the company, a *fac simile* of the Garland trade mark, and the statement that the firm deal in hardware, culinary appliances, stoves and ranges, lawn mowers, sprinklers, garden hose, &c. The firm have in each street car a Garland heater with a fine, large nickel name plate inscribed "Miles Strevell & Ulmer, Ogden, Utah." This brings the name Garland before the eyes of hundreds of people every day and constitutes a decidedly effective advertisement.

THE MAGEE FURNACE COMPANY of Boston, Mass., state that the sales of the Magee Boston heater have increased every year since it was first introduced into public use in 1884. None but the best materials and the highest grade of skilled labor are employed in its manufacture and every furnace is warranted to give entire satisfaction in every respect if properly put into use. The company have branches at 242 Water street, New York, 86 Lake street, Chicago and 27 New Montgomery street, San Francisco.

THE ART STOVE COMPANY of Detroit, Mich., have just completed for this year's trade a new base heater for soft coal or wood, which is confidently expected to prove a valuable addition to their already extensive line of stoves and ranges. The new heater has been designed with a great deal of care, is artistic in its decorative features, and will be known under the name "Parlor Laurel." The manufacturers inform us that there will be found many points of improvement over the old style of stoves, and it is in more than one way a new departure in this class of goods. We have a four page circular bearing illustrations of the Home Laurel range, which has recently been placed upon the market. It is a six-hole construction of a high order of merit, and is ornamented in a pleasing and artistic style. The picture on the first page of the circular is reproduced directly from a photograph of the stove.

THE KERNAN FURNACE COMPANY, of Utica, N. Y., propose erecting a new plant for which Architect James Constable, Jr., has already completed the plans. It is to be located on the north bank of the canal, just west of Clay street, in East Utica, upon the plot of ground recently purchased by the company for the purpose. It is expected that the contracts will soon be let and that the work will be commenced at an early day. The plans call for a most complete and convenient plant, which will be under one roof of graveled asphalt, 468 feet in length. The dimensions of the mounting room will be 60 x 161 feet on the ground and 13 feet 10 inches in the clear. The roof will be supported by wooden posts. The mill room will be 40 x 80 feet on the ground and 13 feet 10 inches in the clear. The molding shop will be 67 x 204 feet on the ground and 28 feet in the clear. The roof will be supported by 60 foot trusses. Leading from the molding room will be the cupola or melting room, 20 x 36 feet. The upper floor about the cupola will be supported by iron girders. The carpenter shop will have ground dimensions of 20 x 32 feet each. Under the floor of the molding room will be a tank of 14,000 gallons capacity in which will be stored the water running from the roof. A switch from the New York Central and Hudson River Railroad will run the full length of the plant. The cupola will be 6 feet in diameter and 35 feet in hight. The plant will be built on the mill-construction plan. The floor, consisting of sleepers resting in ashes, will be laid with pine boards dipped in tar, with matched spruce boards laid on top. The company are now considering the project of increasing the capital stock from $20,000 to $50,000. With the new plant the company will be admirably equipped for their extensive and constantly growing business.

A HOT AIR HEATER having converging air-heating flues over the combustion chamber, and means for heating the sides and rear of the device so as to provide additional surface for warming the cold, and also fresh air, forms the subject of a patent granted to William J. Jackson of Philadelphia, Pa.

RATHBONE, SARD & CO. of Albany, N. Y., have just issued a handsome 12-page special catalogue of Acorn ranges. The covers are of orange, handsomely printed in black, and the central ornament is the familiar acorn trade mark. The pages are finely printed in black and carmine and are well illustrated. The advantages of the Acorn range are set forth in the pages while the National Acorn is illustrated, as well as its system of oven ventilation and the "removable grate bars" feature. The Penn Acorn, the popular range, the Home range and the Duplex Acorn are shown by engravings, as well as the Eureka and Citizen ranges. The whole is most artistically gotten up and will prove interesting to the trade.

THE EXCELSIOR MFG COMPANY of St. Louis, Mo., have just placed upon the market a new wrought steel range known as the Monarch. In offering this construction the company say that they do not withdraw any of their claims heretofore made, that the Charter Oak cast iron range is far more desirable in point of operation and lasting qualities than any wrought steel or wrought iron range that has ever been, or will be, produced, but that the Monarch is the best wrought-steel range made. It is claimed to embody all the most desirable features of the best steel ranges heretofore offered, is well made of the best material, and by men who are skilled in this class of work. The circular which the company have issued illustrating and describing this stove bears an announcement in the closing paragraph of which we find the following: "In anticipation of our being asked why we have not added the valuable feature of the wire gauze oven door to the Monarch, we will say the inventor of the gauze door, who is also the inventor of the Charter Oak stoves and ranges, desires the Charter Oak alone to have the advantage of the gauze door, which makes the only 'specialty' in the way of a cooking apparatus on the market, and far ahead of any stove or range."

THE RAYMOND & CAMPBELL MFG. COMPANY, Middleton, Pa., contemplate making several changes in their line of stoves and ranges. They are redressing their Grand Perfect in a very neat and handsome style, and are confident that it will prove popular with the trade. They are also introducing a large oven range having a capacious ashpit, and adapted in its general make up for the New York and Western trade. This range will be known as the Model Perfect. For the purpose of augmenting their line of heating stoves they have just completed patterns for three sizes of a very attractive, yet cheap, square stove to be called the Perfect. It is the expectation of the company to have ready by May 1 a square stove of a higher grade. We understand that some changes and additions are also contemplated in connection with their line of egg stoves. The company are now giving employment to 180 men, and have been running their factory full time for some years with the exception of a few stoppages for repairs, stock taking or other special purposes.

IN THESE COLUMNS a week or two since we presented a *fac simile* of a rather unique advertisement made use of by the firm of Evenson Brothers of St. Peter, Minn. In connection with this matter our readers may be interested in knowing how the author of the advertisement referred to conducts his system of advertising. The first of the year he purchased for 12 months, a number of inches of space in the different local papers, to be used in single or double column as may be desired. One week an advertisement like the one presented in *fac simile* in these columns a short time ago is used and the following week the space is occupied by a short story, which winds up with a reference to the firm named.

THE BOYNTON FURNACE COMPANY, 195–197 Lake street, Chicago, are making a number of changes in the arrangement of the first floor, putting themselves in order for the better entertainment of visitors this summer to the World's Fair city. The office has been removed to the rear, thus affording ample space in front for the display of heaters and ranges manufactured by the company. On a platform near the front windows are placed three heaters, which being painted red, white and blue present a patriotic appearance.

A HEATER FOR FIRE PLACES which shall economize in the amount of fuel consumed yet will produce from a given amount of fuel an increased quantity of heat, has been patented by Albert E. Lytle, of Chicago, Ill. The device is so arranged that with slight modifications it is applicable to stoves, furnaces and the like and is arranged to supply rooms with fresh pure air, rendering it wholesome and healthful by the addition of moisture or a limited amount of steam. The inventor claims that by the arrangement of parts a number of rooms may be furnished with heat from the same grate or fire. Mr. Lytle has assigned his interest in the patent to Simeon D. Overtt of Chicago.

THE HOWARD THERMOSTAT COMPANY, Syracuse, N. Y., have recently opened a branch at 166 Upper Thames street, London, England, for the purpose of pushing the sale of their Thermostat, which has met with such success in this country. This device is designed for regulating the temperature of buildings at any desired point in connection with house or other furnaces. They have secured letters patent in Great Britain, and the United Kingdom will be thoroughly canvassed by travelers and the sale of this article pushed in every way.

TRADE REPORT.

The Iron Market.

The condition of the Iron market in different parts of the country has not been of a uniform character during the past week. In Eastern markets a somewhat improved condition of trade prevails, which is equally true of some portions of the West. Chicago and Southern markets show less encouraging features, both in the volume of demand and in the matter of sustaining prices. Eastern markets are showing a greater activity and also more of a uniform steadiness. No especial weakness in prices is noticed, while in some cases they are a shade better and in others steady to firm. There is nothing to cause any buoyant feeling, but it is something to note that there is less depression, and at least a semblance of improvement. Whether this will be carried any further or not is for the future to determine. The starting point of the improvement appears to have been in Bessemer Pig, from that to Steel Billets, and so on to material in its more advanced condition.

The trade are now waiting to see what the future developments will be, more especially in Ores, Pig Metal and Billets. The next movement in these will probably decide the course of the general market for some time to come. Finished Material is already too low compared with the price of Billets, and, as these are developing increased strength, manufacturers of Plates, Shapes, &c., will be compelled to stiffen their prices in proportion. The question in the meanwhile is whether the movement is genuine, or whether it is a little spurt.

The true inwardness of the thing will have to be developed naturally. There is no such thing as speculation these days. What a consumer needs will be bought, what is not needed (in a speculative sense) will not be bought. Hence all will depend upon the actual relation of supply and demand. Judging from the course of events during the past couple of weeks, it may be assumed that a further moderate improvement is not improbable, and in any case there is very little prospect of a relapse to the low figures quoted a month or six weeks ago. Meanwhile, as we said before, consumers are in no mood to buy very far in advance of requirements, although in some instances prices are quoted lower on that class of business than for deliveries within 30 to 60 days.

In the Pittsburgh market, developments in the Iron and Steel trades within the past week indicate that the situation has considerably improved within the last month. Commencing with Pig Iron, it can be stated that Bessemer is in fair demand with a majority of furnaces refusing to sell at less than $13.50. The Steel market is in excellent shape, with mills well sold ahead and prices about $1 per ton higher than a month ago and a probability of still further advances before this month is out. Plates and Structural Material are in better demand, with no improvement in prices. Rods, which have been dull and neglected for some time, are looking up, with a better understanding among makers regarding prices than has existed for some time. Wire and Wire Nails are undoubtedly in the lead as far as improvement in demand and prices is concerned. An advance of fully 15¢ per keg in Wire Nails has occurred, while Plain and Galvanized Wire is from $2 @ $3 per ton higher. Connellsville Coke is also reported as slightly improved in price. In Merchant Steel and Pipes and Tubes the situation is not satisfactory, but now that spring trade has opened up so auspiciously an improvement in demand and prices for both is probable. It will then be seen that the situation as a whole shows considerable improvement, particularly as regards tonnage, and, while prices on some lines are very close to cost, there has been some improvement in this direction with prospects of further betterments in the near future.

The threatened strike of all the switchmen on the railroads at Chicago has been postponed. A conference was held Monday between railroad managers and representatives of switchmen, at which the latter withdrew their demands and stated they would not press them until some time in future when railroad earnings were improved and the demand for higher wages would seem more reasonable All classes of business men hope that this menace to Chicago business has been removed. The delivery of freight is still retarded by other inconveniences and the event of good weather, which was expected to improve the situation, has as yet made very little difference. Complaints are very numerous over the non-arrival of freight from Eastern points, which has been on the way for a month or more. Inadequate motive power, scarcity of cars and the very heavy movement of freight are the principal reasons assigned for the trouble.

In Southern markets there has been but a moderate volume of business in Pig Iron during the week, and the tone of the market is anything but strong. There is no quotable change in prices, but rumors of concessions having been made are numerous, and when sifted down it appears that it was by some furnaces which are so situated that they have the advantage of a lower freight rate than that from Birmingham. There are abundant offerings of Iron for almost any delivery this year, but buyers seem to prefer to buy only for short delivery, say three or four months ahead, thinking that any probable change in the market will be in their favor. All sales stipulate for prompt delivery, and there are urgent applications for prompt delivery on previous contracts, showing that buyers are not allowing a sufficient margin for ordinary vicisaitudes in making their purchases.

Sellers report more activity in the New York Pig-Iron market, and quite a number of large transactions, both in Northern and Southern Iron, are reported to have been closed during the past week. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 25 @ $14.75 for No. 1; $13.25 @ $13.75 for No. 2 and No. 1 Soft.

The Philadelphia Pig-Iron market, without being strong, is firm and steady. The best brands are well taken up, and at the moment there is not the slightest appearance of weakness in any direction, although makers are not bold enough to hint at even a trifling advance. In the event of a round lot of several thousand tons a buyer would require special inducements, but the offerings of this kind are either very few, or they are closely guarded, as we hear of nothing at less than $12.50, Philadelphia, and in some cases consumers find it difficult to secure anything worth while even at that figure. Taking the market as a whole, it may be said to be steady at unchanged prices, with a good demand, and also a pretty good supply—one about balancing th other.

The increase in the output, as shown by the last monthly statement, is at the rate of about 5000 tons per week, which for the time being, may have a tendency to check any upward movement in prices.

Sales usually at prices about as follows for Philadelphia and equivalent deliveries, with 25¢ to 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X.....	$17.00	@ $17.25
American Scotch, No. 2X.....	16.00	@ 16.25

The demand for local Coke Iron at Chicago fell off considerably during last week and the general Pig Iron trade has therefore been comparatively quiet. The price on No. 1 Local Coke has for some time been relatively low as compared with other grades, resulting in very heavy business, which led to such scarcity that manufacturers have found it expedient to advance prices about 50¢ ₱ ton. Quotations are revised accordingly. Southern Coke Iron

has sold a little more freely, but not in sufficient quantity to make trade active. Competition among sellers of Southern Irons is very keen and all transactions are still being made at cut prices. No. 2 Foundry and No. 1 Soft are known to have been sold at least 25¢ below our quotations. Lake Superior Charcoal remains quiet but steady at old rates. We revise our quotations as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	$16.50 @ $17.00
Local Coke Foundry, No. 1	13.75 @ 14.25
Local Coke Foundry, No. 2	13.00 @ 13.25
Local Coke Foundry, No. 3	12.75 @ 13.00

In Southern markets there appears to be something out of joint in the Iron trade, for in spite of the reported reduction in stocks and the large consumption which is evidently in progress, all changes are in the direction of lower prices. In fact the entire line is in a partially demoralized condition from which it seems impossible to extricate it. Furnacemen claim to be selling Iron at cost, and we know of one or two cases where preparations are in progress to "blow out." This seems to be the only solution of the question. Stocks of Iron on the furnace banks are large and increasing, and the immediate future does not contain anything of an encouraging nature, so that there is no inducement to continue, whereas to "blow out" seems the only thing to do. Quotations unchanged.

Foundry.	
Southern Coke, No. 1	$13.25 @ $13.50
Southern Coke, No. 2	12.00 @ 12.25
Southern Coke, No. 3	11.25 @ 11.50
Ohio Soft Stone Coal, No. 1	16.00 @ 16.25
Ohio Soft Stone Coal, No. 2	15.00 @ 15.25
Mahoning and Shenango Valley	14.75 @ 15.00
Hanging Rock Charcoal, No. 1	19.00 @ 19.25
Hanging Rock Charcoal, No. 2	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 1	15.50 @ 15.75
Tennessee and Alabama Charcoal, No. 2	14.50 @ 14.75

Metal Market.

Copper.—There have been no new developments the past week in the market for Ingot. Buyers manifest the same indifference and reserve that they have displayed since the beginning of the year, while sellers maintain a remarkable exhibition of firmness, considering the somewhat adverse circumstances against which they have had to contend. Present appearances are that the market would be in a thoroughly demoralized condition at the present time had not the scheme of restricting production been carried to a successful issue. As matters stand, it seems difficult to market outside lots at prices ⅛¢ below the minimum rates quoted by the producers. About 11¼¢ @ 12¢ for Lake Superior Ingots and 10¾¢ @ 11¢ for common Casting Copper would appear to fairly reflect market value at the moment. Late on Wednesday there were rumors of sales having been made to consumers at 11⅛¢ for Lake Superior Ingot and 10¾¢ for common Casting Copper.

Pig Tin.—The advance in prices that was established at the close of the period covered by last week's review has been followed by a reaction of about ¼¢ ₱ lb in the face of higher average quotations from London. Official records show transactions in the meantime involving several hundred tons, and it was rumored that quite as much, or more, Tin changed hands privately in a speculative way. There was some diversity of opinion regarding the volume of movement into the channels of consumption, but evidence was mostly to the effect that the distribution will lose nothing by comparison with the average for this season of the year. That this should be the case is not surprising in view of the fact that several holders have, directly or through convenient agencies, urged their customers to stock up before the proposed 4¢ duty goes into effect, and thus prevent the transfer of neat sums of money from the pockets of the consumers to those of the importers during the next three months. Evidence is wanting, however, of anxiety on the part of those operators to buy more Tin than they are inclined to sell, despite the glowing arguments they present for others to buy immediately and freely. Shipments from the Straits during first half of March were advised as having been 1500 tons to Great Britain and America, and 150 tons to the Continent. There was a sale on the Metal Exchange on Wednesday of 10 tons for April delivery, at 21.05¢. Bids of 21¢ were made for March and April, and 21.10¢ for May and June.

Pig Lead.—Prices have been held quite firmly at the higher level established last week, but buyers have manifested extreme indifference, as though perfectly content to let the future take care of itself, and confident in the opinion that supplies will be quite full enough to meet the demand. Hence a quiet, although apparently firm, market at the present time, with the range of 3.90¢ @ 3.95¢ quoted for carload or larger lots.

Spelter.—There are liberal offers from the West to sell for April and later shipment at 3.97½¢ there. At present rail freight that price is equivalent to 4½¢ @ 4.27½¢, delivered in the East. Few orders have passed through this market at the rate named, however, and Eastern buyers seem disinclined to purchase at all freely until after the opening of navigation. Spot stock is quoted at 4.30¢ @ 4.35¢, according to size of lot.

Antimony.—Demand has been only fair. Prices have shown some little irregularity, yet no radical change. Current quotations are 10¢ @ 10½¢ for Hallett's, 10½¢ @ 10¾¢ for LX and 10½¢ @ 10¾¢ for Cookson's.

Tin Plate.—Slightly higher prices rule for ordinary Cokes on the spot, and the foreign market for that class of Plate is firm also. Very fair sales have been made, but nothing transpired in the way of unusual dealings. Ternes are somewhat lower, as are Wasters, with only a moderate business passing. Bright Charcoals without change in price and selling rather slowly. In a retail way there is no change in prices and but a small increase in demand. The recent cold and more recent rains have brought to notice weak points in gutters, spouting and roofs, which will have to be repaired, thus filling the gap before new outside work is ready.

Coal.

The Coal sales agents, at their meeting in this city on Tuesday, made a substantial drop in prices, to take effect at once. The comparison of spring opening prices for two years stands as follows, all f.o.b :

	Free Burning.	Broken.	Egg.	Stove.	Chestnut.
1892		$3.65	$3.75	$3.90	$3.65
1893		3.90	3.90	4.15	4.15

A more active movement will be expected, now that consumers have no motive for holding off for a break. There is plenty of Coal of all sizes except Pea and Buckwheat. Spot cargoes may be quoted as follows : Pea, $2 50 @ $2.75 ; Buckwheat, $2 @ $2.15. The trade are much interested in the election of directors for the New England road, held on Tuesday, showing that McLeod is "on top" and will have much influence on prices.

A dispatch from Pottsville says that 17 collieries in that section were closed by the floods.

The Bituminous Coal market has "no starch" in it, there being Coal in abundance, and sellers are competing to an extent that makes prices very irregular. Some sales are made at the lowest mark. The big contract for the Long Island Railroad, to be closed at once, excites much curiosity, for the terms agreed upon, if they can be ascertained, will to some extent control other contracts to be renewed at this season. There is also a question about railroad tolls for the coming year. The association prices take effect in April.

The amount of Anthracite shipped from the mines last week was 884,000 tons, an increase of 173,500 tons compared with the same week last year. The comparison since January 1 is about the same for the two years.

The Pennsylvania Railroad Company is about to order 2000 Coal cars, which will cost nearly $1,000,000.

Financial.

The currency situation operates to discourage expansion in trade, but confidence is felt that a wise course will be pursued by the Government in seeking to extricate itself from present difficulties. Perhaps the least satisfactory of all is the continuance of enormous imports, but the amount of produce awaiting shipment is so great that a change for the better in the relative amount of exports must soon take place. The total imports at the port of New York for February, exclusive of specie, is $52,000,000, an amount nearly $8,000,000 in excess of the corresponding month last year, which up to that date was the most active February in the history of the past. The shipments, on the other hand, showed a marked decline in the total of produce and merchandise for the month, $22,769,856, which is $8,000,000 below the corresponding total of last year, and is less than any previous total for a similar period since 1887. Touching the future augmentation of exports, the report of the Agricultural Department just at hand confirming suspicions that estimates made heretofore of the last yield

of wheat were to low by 31,000,000 bushels, is hopeful. The extraordinary receipts from farmers' hands during the winter are thus partially explained.

The demand for sterling exchange and higher rates for money, led to a sharp decline in rates. The selling of stocks for London failed to check the drooping tendency. Posted rates were $4.86½ @ $4.88½.

Bar silver closed in London at 38 5/16d. per ounce. The commercial price of bar silver in New York was 83¼¢ per ounce.

The first steps toward a permanent organization of the transcontinental lines were made by the freight agents in session in Santa Barbara, Cal. They agreed to form an association to be called the "Transcontinental Freight Rate Committee," in which all transcontinental lines except the Great Northern, Northern Pacific and Canadian Pacific will be parties.

The general markets were quiet owing to quetions in finance, stringent money and unfavorable weather. The Treasury was understood to be in an easier position, but Mr. Carlisle was reported to have resolved to say little respecting the policy to be adopted, choosing rather to act as the best interests of the public may seem to demand. The wheat market was again lower, May wheat touching 77⅛¢, the lowest point on the crop. Corn also declined. Provisions dull, cotton without change. Coffee very dull.

Chicago Report.

Scrap.—Dealers report Cast Scrap in good demand but Wrought very quiet, and quote the following nominal buying prices:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12 00	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	6.00	....
Horseshoes	13.00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	3 ¢

Anthracite.—Quotations are unchanged at the following rates on carload lots of 12 net tons:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

CONDITION OF THE

Hardware Trade.

THE HARDWARE MARKET throughout the country is characterized by a fair activity, and in some sections the demand is exceptionally good. Trade has to a certain extent been held back in some parts of the country by floods and severe weather, which have had the effect of considerably diminishing the activity. All the indications point to an excellent demand as the season advances, with the prospect of a large trade during the next few months. In some lines, such as Nails and Barb Wire, there is an improvement in the tone of prices, and in some other goods also there is a reaction from extremely low quotations. Shelf Hardware in general remains without important change, except in a few lines, to which reference is made below. The most important advances which have taken place are in Augers and Bits and Jack Chain. The new Cut Nail card is in general use, and while, on the whole, meeting with approval is criticised by many in the trade. The feeling in regard to this is reflected in the correspondence published on another page. Manufacturers as a rule are well occupied on orders, and in some lines there is difficulty in obtaining goods as fast as called for by the trade. With this heavy demand it is matter of surprise that more strength is not shown in prices, for in some lines, where manufacturers are more or less behind their orders, prices are low and demoralized. Some difficulty is experienced in collections, which are especially slow in some sections.

Advices from Chicago.—Heavy Hardware is in much better demand, and consumers of all kinds are ordering liberally. The city trade has picked up considerably of late, while Nail orders from the country are much in excess of what they were two or three weeks since. The demand for Bar Iron and Steel from stock is especially large, and stocks have to be frequently replenished.

Shelf Hardware has also improved, but the volume of trade in this line is still below what it should be for March.

The country roads are now in extremely bad condition through the West, mud blockades being reported from nearly every quarter Inundations in Western rivers and ice gorges are seriously interfering with operations of railroads further West, and thus restrict trade below its seasonable proportions. Jobbers here are looking forward to an exceedingly good trade this summer, as foreshadowed by advices from their traveling men. Merchants all over the West expect to visit the World's Fair this summer, and will defer heavy purchases as much as possible until they can attend to their trade here in person.

The Brass houses report an unusually heavy demand. The managers in some cases say they were never before so busy as they are now. Prices on Brass goods are somewhat stiffer on large quantities, but the advance has not yet affected smaller lots. Collections have not improved, and the financial outlook, therefore, continues rather discouraging.

Notes on Prices.

Cut Nails.—The Cut-Nail Market is in substantially the same condition as last week, and prices are quite regularly maintained on a basis of $1.25 for carload lots, f. o. b. factory, but concessions are made in some cases. Manufacturers, without exception, as far as heard from, are using the new card and are making their quotations from it. It is also in general use throughout the trade, though some houses have not yet adopted it. Carload lots on dock are quoted at $1.40, and the usual advance is made on small lots from store.

Advices from Chicago.—A very fair trade is reported by manufacturers of Cut Steel Nails. New contracts have recently been coming in better. Specifications are being freely made on old contracts, and shipments from the local factory are now very heavy. Prices are unchanged at $1.42½. Chicago, for carload lots on the new card. Small lots from stock are selling at $1 50.

Wire Nails.—The recent advance in the price of Wire Nails has had the effect of checking purchases to some extent, but the demand is referred to as fair. The volume of business during the past month or two was exceptionally heavy, and the prospect for a large business during the remainder of the season is excellent. Prices are characterized by a firm tone and are strictly maintained on a basis of $1.50, f.o.b. factory, Cleveland being the point of equalization for the West and Pittsburgh for the East. Small lots from store in New York are quoted at $1.75 to $1.80.

Advices from Chicago.—Manufacturers of Wire Nails are in session here with representatives reported in attendance from all the factories of any consequence. Members of the trade who have been interviewed state that the Wire-Nail business this spring has been phenomenally large. Specifications coming in on contracts taken would clean out the warehouses if it were possible to get enough cars to make prompt shipments. They look forward not only to a maintenance of present quotations of $1.65, Chicago, from factory, but feel confident that better prices will prevail before long. There is some reason to believe that a new Wire-Nail card is in course of preparation. Jobbers have been taking some of the business that usually goes to manufacturers, but they are now apparently convinced that higher prices will be maintained and are making their quotations for carload shipments on the same basis as manufacturers, or a trifle higher. Some of them have been cutting this rate and giving their customers the benefit of low purchases made some time ago. The situa-

tion has decidedly improved of late and the sanguine views of manufacturers seem to be well founded. Small lots are selling from stock here at $1.70.

Barb Wire.—The volume of business is good and prices are firm. Without any quotable change the market is characterized by a better tone and more regularity. In the present condition of things, with the good understanding prevailing among the manufacturers and the increasing demand, it would not be surprising if somewhat higher prices prevailed. Quotations are on the basis of $2.40 @ $2.45 for carload lots of Four-Point Galvanized at mill. Small lots from store in New York are held at $3.10, an abatement of 10 cents being made in carloads.

Advices from Chicago—Manufacturers of Barb Wire are now in session in this city, and it is possible that before they adjourn they will make an advance in prices. The condition of trade has so greatly improved of late that, while the price of steel has also advanced, the conditions are believed to be opportune for an upward movement of quotations on Barb Wire. The cheap stocks in jobbers' hands have also been so nearly exhausted that little is now heard of their competition with manufacturers. Quotations from factory are still $2.20 and $2 60 for carload lots of Painted and Galvanized respectively, while jobbers are quoting $2.35 and $2.65 for small lots.

Tackle Blocks.—The Tackle Block market continues to be characterized by much irregularity and low prices are being quoted. Toledo Block Works, Toledo, Ohio, advise us that their present price on regular blocks is 80 per cent. discount, f.o.b. Toledo, and we understand that other manufacturers are making a similar price.

Discount Sheet.—William Johnson, agent, Newark, N. J., issues a revised discount sheet to apply to his catalogue B, 1890, together with supplementary sheets of additional goods. The line of goods manufactured and illustrated in this catalogue includes carpenter tools, Plumbs and Levels, Saw Sets, Pinking Irons, Garden Trowels, Tinners' Hammers, Blacksmiths' Tongs, Plumbers' Tool Bags, &c.

Screen Doors, Window Screens, Etc.—We give below quotations on Screen Doors, Window Screens and Window Screen Frames, manufactured by A. J. Phillips & Co., Fenton, Mich. As the company deliver to many points, and as the freight is an important item, there is necessarily considerable variation in their prices in different parts of the country. Those named below fairly represent the prices at which the goods are sold·

	Per cent.
Phillips' Screen Doors	50 @ 50–5
" Fancy Screen Doors	50–10 @ 50–10–5
" Bonanza and Perfection Window Screens	50–5 @ 50–10
" Extension Window Screens	50 @ 50–5
" Window Screen Frames	50 @ 50–10

Augers and Bits.—The manufacturers of Augers and Bits have during the past week been in conference, with a view to forming an association which would put this line in a more satisfactory condition and correct the demoralization and unprofitably low prices which have characterized the market in these goods for some time. As the result of their deliberations an organization entitled the AUGER AND BIT ASSOCIATION has been formed, composed of the following manufacturers:

SNELL MFG. COMPANY,
JAMES SWAN,
JENNINGS & GRIFFIN MFG. COMPANY,
ROCKFORD BIT COMPANY,
HAMDEN MFG. COMPANY,
NEW HAVEN COPPER COMPANY,
HUMPHREYSVILLE MFG. COMPANY,
CONNECTICUT VALLEY MFG. COMPANY,
PECK, STOW & WILCOX CO.
CHESTER MFG. COMPANY.

JOHN H. COMER, of the New Haven Copper Company, New Haven, Conn., was chosen president, and W. C. SMITH, president of the Rockford Bit Company, Kokomo, Ind., vice-president.

The firms named above are, it will be observed, the leading manufacturers of the following lines: Double Twist and Side Lip Cast-Steel Auger Bits, Cast Steel Nut Augers, Boring Machine Augers, Millwright Augers, Short and Long Eye Augers, Cuban Augers, Long Rafting Augers, Post Augers, Short Bright Augers, Long Bright Augers, Cast-Steel Car Bits, and Jennings' Pattern Auger and Car Bits.

As the result of the conference a strong organization was formed with a view to maintaining prices on an equitable basis which will afford a fair margin of profit and put an end to the extreme competition and cutting of prices which has been a feature of the business for a long time. It was of course deemed necessary to make an advance in the goods, and the following revised prices are announced:

	Per cent.
Common Auger Bits	70
Nut Augers 1 to 2¼ inch, inclusive	70
Boring Machine Augers	70
Nut Augers over 2¼ inch	50 and 10
Millwright and Rafting Augers	50
Short and Long Eye and Cuban Augers	50 and 10
Short and Long Bright Augers	50 and 10
Post Augers	50 and 10
Double Spur Car Bits	50
Jennings' Pattern Car Bits	40
Jennings' Pattern Auger Bits	60
Snell's Bits	60 and 5

Revolving Table Bell.—This article is manufactured by the Hardware Specialty Company, for whom C. F. Guyon Company, 99 Reade street, New York, are agents. The list is as follows, subject to a discount of from 50 to 50 and 10 per cent.:

	Per dozen.
3-inch Nickel Plate	$26.00
4 " " "	32.00
3 " Quadruple Silver Plate	36.00
4 " " " "	48.00

Machine Bolts.—The Machine Bolt market is irregular and prices are ruling somewhat lower than a few weeks ago. Some of the manufacturers are refusing to meet the extreme quotations of their competitors. The volume of business is excellent, and there is some complaint of delay in filling orders.

Jack Chain.—The manufacturers of Brass and Iron Jack Chain, Safety Chains, Plumbers' Chains, &c., have adopted a revised list, which is printed below. The object of the revision is to correct inequalities in the list which has been in use for more than 20 years, the former list having been adopted January 1, 1870. At the same time an agreement was reached in regard to discounts, the result of which is something of an advance on prices which have recently been ruling. The revised list, which bears date March 9, 1893, is given below, and is subject to a discount of from 50 to 50 and 10 per cent.:

Jack Chain.

Per Box, 12 Yards in Each Box.

No.	Brass Single.	Brass Double.	Iron Single.	Iron Double.
5	$8.00	....	....	....
6	7.00	....	$1.60	....
7	6 60	....	1.40	....
8	5.70	....	1.30	....
9	5.00	....	1.20	....
10	4.00	$4.50	1.00	$1 30
11	3.30	3.70	.80	1.10
12	2.40	3.20	.70	1.00
13	2.00	2.60	.60	.90
14	1.50	2.00	.50	.80
15	1.10	1.60	.40	.70
16	.90	1.40	.36	.60
17	.70	1.20	.32	.50
18	.60	1.00	.30	.44
19	.54	.90	.28	.40
20	.50	.80	.28	.40
21	.44	.70	.26	.38
22	.40	.60	.24	.36
23	.40	.60	.24	.36
24 and smaller	.40	.60	24	.36

For tinning Jack Chain, the following net additions are to be made to the net price of Jack Chain which is to be tinned:

Nos. 15 and 16.....add 5 cents net.
" 13 " 14..... " 6 " "

For nickeling or silvering Jack Chain, 25 per cent. net is to be added to the net price of brass Jack Chain of the number nickeled or silvered.

Safety Chains.

Per Box, 12 Yards in Each Box.

No.	Brass.	Silvered.	Nickeled.
000	$1.20	$1.35	$1.45
00	1.30	1.45	1.55
0	1.50	1.65	1.75
1	1.80	1.95	2.05
2	2.40	2.55	2.65
3	3.60	3.75	3.85

Plumbers' Chains.

Per Box, 12 Yards in Each Box.

No.	Brass.	Silvered.	Nickeled.
00	$1.05	$1.20	$1.30
0	1.25	1.40	1.50
1	1.65	1.80	1.90
2	2.05	2.20	2.30

Plumbers' Chains.

Per 100 Feet, on Reels Containing 500 Feet.

No.	Brass.	Silvered.	Nickeled.
00	$2.85	$3.30	$3.55
0	3.40	3.85	4.10
1	4.60	5.05	5.30
2	5.70	6.15	6.40

Cordage.—An advance has been made in the price of Sisal Rope, which is quoted by the National Cordage Company at 7¾ cents, an advance of about ½ cent on former quotations.

Star Lawn Rakes.—The Star Lawn Rakes, manufactured by Syracuse Specialty Mfg. Company, Syracuse, N. Y, for whom Surpless, Dunn & Alder, 97 Chambers street, New York, are agents, are quoted at the following prices:

	Per dozen.
Star Self-Cleaning Rakes	$5.50
Star Plain Rakes	5.00

Economy Saw Vises.—These goods, which are manufactured by Syracuse Door Hanger Company, Syracuse, N. Y., are quoted at the following prices, subject to a discount of 50 and 10 and 10 and 5 per cent.:

	Per dozen.
No. 110, 9½-inch Jaws	$10.00
" 120, 10-inch " self-opening, extra heavy	15.00

Glass.—While there is no perceptible increase in the local demand for Glass, the market on American Glass is firm, and the outlook encouraging. The nearer approach of weather when building operations can be resumed, and the absence of any building trade troubles at the present time, are conditions favorable to a larger demand in the future. Reports indicate that stocks are low in makers' hands, and that the movement in Glass is active. There has been no change reported in the National Window Glass Company's prices, and these are being adhered to by members of the association, as far as heard from. The French Window Glass market continues in an unsatisfactory condition, as no agreement as to sustaining prices has been reached. The condition of the Plate Glass market is slightly improved, as prices are somewhat firmer. Quotations are as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount to 80 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	@	.05
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔ lb	@	.04½
Wringer Wire Rolls, ℔ lb.	@	.02
Syringes, ℔ lb.	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb	10¢
Light and Tinned Copper	℔ lb	9¢
Heavy Brass	℔ lb	7¢
Light Brass	℔ lb	6¢
Lead	℔ lb	3½¢
Tea Lead	℔ lb	3¼¢
Zinc	℔ lb	2¾¢
No. 1 Pewter	℔ lb	14¢
No. 2 Pewter	℔ lb	7¢
Wrought Scrap Iron	℔ gross ton,	$17.00
Heavy Cast Scrap	℔ gross ton,	10.00
Stove Plate Scrap	℔ gross ton,	7.00
Burnt Iron	℔ gross ton,	5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags	℔ lb	4 ¢
No. 2 White Rags	℔ lb	3 ¢
Mixed Rags	℔ lb	1½ @ 1¾¢
Blues and 3ds	℔ lb	1¾ @ 2 ¢
Hard Sized White Shavings	℔ lb	2¾ @ 3 ¢
No. 1 White Book Shavings	℔ lb	2½ @ 2¾¢
No. 2 White Book Shavings	℔ lb	1½ @ 1¾¢
Light Book Shavings	℔ lb	⅞ @ 1 ¢
No. 1 Mixed Shavings	℔ lb	1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @ ⅞¢
No. 1 Printed Books	℔ lb	1¾ @ 1½¢
Ordinary Mixed Books	℔ lb	¾ @ ⅞¢
Newspapers	℔ lb	⅝¢
No. 1 Manila Paper	℔ lb	1½ @ 1¾¢
No. 2 Manila Paper	℔ lb	⅞ @ 1 ¢
Bogus Paper	℔ lb	⅝ @ ¾¢
Common Paper	℔ lb	½ @ ⅝¢
Straw Chips	℔ lb	½ @ ⅝¢
Binders' Clippings	℔ lb	½ @ ⅝¢
Jute Butts	℔ lb	1¼¢
No. 1 Jute Bagging	℔ lb	1¼ @ 1¾¢
Mixed Bagging	℔ lb	1 ¢
No. 2 Bagging	℔ lb	¾¢
Hemp Twine	℔ lb	2½¢
Manila Rope	℔ lb	2¼¢
Jute Rope	℔ lb	1¾ @ 2 ¢
Mixed Rope	℔ lb	¾ @ ⅞¢

Criticisms on the New Cut-Nail Card.

WE HAVE RECENTLY received several letters in which criticisms are expressed on the card now in use for Cut Nails and some of its inequalities are pointed out. One of these letters is from a representative Hardware merchant in the West, whose inquiry we submit to our readers:

It seems to me that the card adopted is altogether impracticable. The objection to the old Nail card has been, that the average of advance had to be ascertained before prices could be quoted—the higher the average the lower the rate—showing that the advances were too high. Now, to equalize this, the advance should have been reduced, and it seems to me that the National card (or list) adopted January 31, 1893, was about right—at any event, it was a move in the right direction. This last card, February 15 and 21, increases the defects of the old card: to show more clearly, take 6d Common Nails, which are medium price, and I think more of them sold than any other number.

Advance on 6d Common Cut Nails:

Old card.	List Jan. 31.	List Feb. 15.
$0 40	$0.20	$0 75

Now, if in practice 40 cents advance was too high, how about an advance of 75 cents? Would like to hear what others have to say about this.

Another correspondent favors us with the results of his figuring and arrives at some interesting results by comparing the average cost of different assortments of Cut Nails; also the cost of fancy Nails on the old and new cards, as follows:

Having a little time one day, between calls, I did a little figuring on the Wire Nail card, as shown below, to see what advantages would be gained by ordering different assortments of Cut Nails by this card. While the assortment of Nails given would not suit my trade, it answered to arrive at results. As the new card was adopted to do away with figuring on averages—that is, of decreasing the base price in proportion to the advance of the average, I figured on a $1.25 base price irrespective of the high or low average of the assortment. The price of the 250 kegs of Nails was $466.50, as here shown:

No.			Extra.		
8,	Fine	10 kegs	$1.60	=	$16.00
4,	Flat	5 "	.90	=	4.50
4,	Common	5 "	.90	=	4.50
5,	"	5 "	.90	=	4.50
6,	"	25 "	.75	=	18.75
8,	"	60 "	.60	=	36.00
10,	"	70 "	.50	=	35.00
12,	"	30 "	.45	=	13.50
20,	"	10 "	.35	=	3.50
40,	"	5 "	.25	=	1.25
60,	"	5 "	.00	=	0.00
8,	Finishing	10 "	.90	=	9.00
10,	"	10 "	.75	=	7.50
		250 "			$154.00
250 Kegs at $1.25				=	$312.50
					$466.50

I found that the average cost per keg of the 250 kegs, at $466.50 for the lot, was $1.86⅔. Then from curiosity I divided the sum of extras, $154, by the number of kegs to find the average, which proved to be 61 $\frac{8}{10}$ cents.

It is interesting to note that the same assortment of Nails on the old Cut-Nail card was a 35-cent average. Now, I thought if I should sell out my Common Nails and have to replace them to enable me to get rid of the fancy Nails, I would see how much they would cost me all around, and if I would be losing money if I sold my first lot of Common Nails proportionately to their cost, with possibility of my next lot costing me more, so I took out the 3 Fines, 4 Flat, 5 Common and 8 and 10 Finishing. This left me 210 kegs, costing on a $1.25 base, $375.

		Kegs.	Extra.	
4,	Common	5	$0.90	$4.50
6,	"	25	.75	18.75
8,	"	60	.60	36.00
10,	"	70	.50	35.00
12,	"	30	.45	13.50
20,	"	10	.35	3.50
40,	"	5	.25	1.25
60,	"	5	.00	0.00
		210		$112.50
$2.10 @ $1.25 base				262.50
				$375.00

I found that this assortment was about a 53-cent average, and so the order would be accepted, as it averaged 50 cents above the base price. I also found this assortment brought the average cost per keg to $1.78⅛, against $1.86⅔ as before, so that I could sell them at the same price as I did my first lot and make a larger profit. I came to the conclusion that there were great possibilities in this new card. Of course the last lot of 210 kegs was not up to the usual carload quantity of 250 kegs, but the quantity could be increased by the addition of Common Nails without materially increasing the average price. I also found that while some sizes of the Common Nails cost more on the new than on the old card, some sizes of fancy Nails cost less, as follows:

	Old card.	New card.
8, Fine	$2.90	$2.85
8, Finishing	2.40	2.15
10, "	2.25	2.00

This result was reached by taking $1.40 as a base price on the old card and $1.25 base price on the new card.

Trade Notes.

THE GLOBE VENTILATOR COMPANY, Troy, N. Y., have made a recent shipment to the Johnson Steel Rail Company, Johnstown, Pa., of six 60-inch Globe Ventilators, and to the Chicago, Rock Island & Pacific Railway of three 72-inch Ventilators.

THE ECONOMY HEATING DEFLECTING COMPANY of Columbus, Ohio, are distributing an oblong pamphlet of 16 pages devoted almost exclusively to testimonial letters from those who have used their Economy Heat Deflecting Damper, which is claimed to effect a large saving in the consumption of fuel. The construction of the device is said to be such that the draft is not obstructed, but rather increased, so that the smoke and gases pass freely through the pipe or chimney. It is also claimed that the damper will not burn out, and that when hard, soft, cannel coal, coke, wood or natural gas is used, the damper produces the same results and can be adjusted to a light or heavy draft chimney.

WE ARE INFORMED by the McDaniel & Harvey Company, Philadelphia, that there is a growing disposition among many leading consumers to use the old fashioned

Charcoal Bloom Galvanized Iron, notwithstanding its slightly greater cost. Sales during the past few weeks and inquiries from new sources are reported very satisfactory. The McDaniel & Harvey Company furnish either Iron or Steel, and have a record on the former extending back into the last century, their plant at Northeast Maryland having been in operation before the Revolution of 1776.

That portion of the plant of Wallace, Banfield & Co., Limited, manufacturers of Tin and Terne Plate, and operating the Irondale Rolling Mill at Irondale, Ohio, which was destroyed by fire in December of last year, has been rebuilt. A new iron building, 90 feet wide x 160 feet long and 22 feet in hight, has been erected, and also an annex 30 x 160 feet in size. This main building contains the tin-plate rolling mill, cold rolls, engines, boilers and shears. The building was erected by Riter & Conley of Pittsburgh, the engines being furnished by Mackintosh, Hemphill & Co., Limited, of that city, while the vertical trimming shears were furnished by the Lloyd Booth Company of Youngstown, Ohio, and the doubling shears by the Leechburg Foundry & Machine Company of Pittsburgh. This concern turn out Tin and Terne Plates, and in addition market a large part of their product in the shape of Black Sheets, of which they have a daily capacity of 30 tons. Their main office is located at the corner of Third avenue and Wood street, Pittsburgh.

The Novelty Stamping Works of Bellaire, Ohio, have been equipped with new machinery and will shortly be started up with a full force of men.

Bramhall, Deane & Co. 264 266 Water street, New York, are just completing an apparatus for sterilizing drinking water, dressings, apparatus, &c., for hospitals and kindred institutions. It consists of an automatic boiler similar in principle to that used in their various cooking apparatus.

Bellaire Stamping Company, Harvey, Ill., are now manufacturing a kitchen ware which they call the Columbian Enameled Steel Ware. It is of a bright gray color, attractive in appearance, and the company claim that the shapes and trimmings are in many cases an improvement on similar goods now on the market. Their factory is thoroughly equipped and in splendid running order and they are turning out a large quantity of this ware daily. The capacity being quite large, they are in a position to take care of all the business offered them and can make prompt shipments.

The Bronson Supply Company have recently increased their staff, enlarged their showrooms and offices at 72 Beekman street, New York, and materially increased their storage accommodations to enable them to meet the demand for a larger stock in New York of the various factories whose output they control. In addition to their factory at Cleveland, Ohio, for the manufacture of their Never-Break ware, the Bronson Supply Company have assumed the entire output and sale of the following manufacturers: Eustis Mfg. Company, Bayonne, N. J., Puritan Ware; M. F. Koenig & Co., Hazleton, Pa., Excelsior Baking and Roasting Pans; Fillgrove Bros. & Co., Ironton, Ohio, Drip Pans, and the products of the Bellaire Stamping Company of Harvey, Ill., for the eastern half of the United States. The line of Puritan Ware includes Cereal, Fruit and Vegetable Cookers, Chafing Dishes, Five o'Clock Tea Kettles, Multiple Cookers, Egg Poachers, Baking Dishes, Coffee Pots, Universal Measures &c.

Fred. J. Meyers Mfg. Company, Covington, Ky., notwithstanding their disastrous fire recently, have already begun to manufacture seasonable goods pending the re-establishment of their permanent plant, having secured temporary facilities. They announce they have a stock of goods at 69 Beekman street, New York, F. J. Mattison, Eastern agent, where customers can be supplied in a small way until they are in better shape to meet demands. They will rebuild at once.

Matthai, Ingram & Co., Baltimore, manufacturers of Tinware and Sheet-Metal goods, were visited by fire, March 14, causing an estimated loss of $75,000. The main buildings and storage warehouses were saved. The boiler and engine are intact, the stamped ware, pieced ware, galvanizing, japanning and tin-plate departments are all right, the main trouble being in the retinning department, where the fire started. They expect to be in operation in two or three days. In sending out a circular to the trade announcing the occurrence they ask the indulgence of customers and friends for the slight delay that may ensue in shipping Sheet Iron Ware and retinned goods. They will commence rebuilding at once, and hope to be in full running order in a short time.

The Millers Falls Company, 93 Reade street, New York, advertise elsewhere their Star Power Hack Saw for cutting metals. A general view of this machine is shown, its usefulness referred to and points of advantage noted.

E. Aspinall, 98-100 Beekman street, New York, is calling attention to the English Enamel for home decorations, for which he is proprietor in this country. It is made in 150 brilliant shades, and is said to have achieved success in Great Britain, France and the Continent. It can be applied to any surface, and is suited for interior or exterior work. It is recommended for household furniture, baskets, tables, bedsteads, cabinets, mantels, walls, iron work, bicycles, or anything which it is desired to paint. He has also a special Enamel for baths, bathtubs, bathrooms, hot-water vessels, &c., and it is claimed it will resist the action of boiling water or dry heat. Both are guaranteed non-poisonous, and will not chip off.

In our advertising columns the Geuder & Paeschke Mfg. Company, Milwaukee, Wis., the well known manufacturers of Tinware, call attention to one of their specialties, the Fairmont Cream Can Gauges. These goods are now regularly used in all the dairy districts in the United States and Canada, and, we understand, are indorsed by dealers and consumers alike for their many points of superiority.

At the Salford Iron Works, Manchester, England, the proprietors, Messrs. Mather & Platt, have lately inaugurated a new system of working time by reducing the hours of labor per week for their employees from 53, as heretofore, to 48, without any reduction in wages. The experiment is made in the hope that the concession will result in greater energy and improved work on the part of the men, and that consequently no loss will ensue. The time is made up by five days of eight and three quarter hours and one day (Saturday) of four and one-quarter. The curtailment of the day has been effected by striking off the before breakfast work, the day's labor beginning at a quarter of eight in the morning. The new arrangement will be in force experimentally for 12 months, and the results at the end of that time will guide the employers as to its permanence or otherwise. Should the reduction of hours not fulfil their expectations the firm hold themselves free to revert to the old system at the end of the period.

The newest type of ocean liner, the "Gigantic," which is about to be built for the White Star Line, at Belfast, Ireland, will have no masts, except a pole for signaling purposes.

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Metal and Miscellaneous Prices.

See Standard Lists on Following Pages

CHICAGO, MARCH 16, 1893.

Tin—

Straits pigs.....23¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland and Melyn Grade	IC, 10 x 14.....@ $6.75
	IC, 12 x 12.....@ 6.75
	IC, 14 x 20.....@ 6.75
	IX, 20 x 28.....@ 13.50
	IX, 10 x 14.....@ 8.75
	IX, 12 x 12.....@ 8.75
	IX, 14 x 20.....@ 8.75
	IX, 20 x 28.....@ 17.50
	DC, 12½ x 17.....@ 6.50
	DX, 12½ x 17.....@ 8.50
Allaway Grade,	IC, 10 x 14.....@ 6.50
"	IC, 12 x 12.....@ 6.50
"	IC, 14 x 20.....@ 6.50
"	IC, 20 x 28.....@ 13.00
"	IX, 14 x 20.....@ 8.00
"	IX, 20 x 28.....@ 10.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14.14x20	@$6.00
IC, 14x20.90 ℔	@ 5.75
IC, 14x20, 100 ℔	@ 5.85
10 x 20	@ 9.00
20 x 28	@12.00
IX, 10x14, 14 x 20	@ 7.50
BV Grade.—IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—

IC, 14 x 20	@ $5.62½
20 x 28	@ 11.25
IX, 20 x 28	@ 14.25

Worcester Brand and equal.—

IC, 14 x 20.. 6.12½	@ .....
IC, 20 x 28..12.25	@ .....
IX, 14 x 20.. 7.62½	@ .....
" 20 x 28..15.25	@ .....

American Tin Plates

Charcoal Plates.—Bright.

Irondale, A. A.—IC, 14 x 20	$7.00
" " IX, 14 x 20	9.00
" " IXX, 14 x 20	11.00
" " IC, 20 x 28	14.00
" " IX, 20 x 28	18.00
" " IXX, 20 x 28	22.00

Florence.—

IC, 10 x 14, 12 x 12, 14 x 20..$7.00
IX, 10 x 14, 12 x 12, 14 x 20.. 9.00

Palma.—

IC, 10 x 14, 12 x 12, 14 x 20..$7.50
IX, 10 x 14, 12 x 12, 14 x 20.. 9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, IC, 14 x 20	$9.25
Royal, extra, IC, 14 x 20	7.25
Merion, IC, 14 x 20	6.75
Almond, IC, 14 x 20	6.50

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (205 ℔), 20 x 28	@$11.50
Crescent, IC, 20 x 28	@ 12.00
" IX, 20 x 28	@ 15.00
Hickory, IC, 20 x 28	@ 13.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20 x 28	@$14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.00
" IX, 20 x 28	@ 18.00
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@$21.50
Merchant's Old Method (extra heavily coated), IC, 20 x 28	@$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	$23.60
Irondale A:	
IC, 14 x 20	$6.25
IC, 14 x 28	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Kensington:	
IC, 14 x 20	6.62½
IC, 20 x 28	8.12½
IX, 14 x 20	13.25
IC, 20 x 28	16.25
Scott's Extra Coated, Stamped and Resqured, IC, 14 x 20	$9.50
Scott's Extra Coated, Stamped and Resqured, IX 14 x 20	11.00
Scott's Extra Coated, Stamped and Resqured, IC, 20 x 28	19.00
Scott's Extra Coated, Stamped and Resqured, IX, 20 x 28	22.00
Neville, Stamped, IC, 14 x 20	6.25
" " IX, 14 x 20	7.50
" " IC, 20 x 28	12.50
" " IX, 20 x 28	15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resqured)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resqured)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resqured)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resqured)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
Globe, IC, 14 x 20	5.75
" IC, 20 x 28	11.50
Miami, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
" IX, 20 x 28	15.00
" (Redipped), IC, 20 x 28	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50
	Per box of 56 sheets.	
X, 14 x 56	29.50	16.50
XX, 14 x 56	32.50	18.20
X, 14 x 60	31.50	17.65
XX, 14 x 60	35.50	20.90

Sheet Iron—

Black.

Nos.	Common American	Refined.
10 to 16	℔ 2 7-10¢	3 3-10¢
17 to 20	℔ 2 8-10¢	3 4-10¢
21 to 24	℔ 2 9-10¢	3½¢
25 and 26	℔ 3¢	3 6-10¢
27	℔ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ A, 10¼¢; B, 9¼¢
" dis. 5%
Craig Polished Sheet Steel.....℔ 8½¢

Galvanized.

List on following page.
Juniata, or first quality.....dis. 70&2½%

Copper—

Ingot.

Lake.....13¢ @ 13¼¢
Casting Brands.....12¢ @ 12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 ℔.

Above 5-16 inch to 3 inch inclu	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ¼ inch	60¢
Plain, 3-16 inch	$1.00
Plain, ⅛ inch	$1.50
Fancy Tubing, Brass; to No. 20 inch	43¢ ℔
Bronze Tubing, 3¢ ℔ more than Brass	

35 @ 40%

Roll and Sheet Brass.

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 ℔ casks.....7¢
Less than Casks, ℔ ℔.....6¼¢

Lead—

Soft Pig Lead.....4¢
Bar.....4½@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10¢

Solder—

½@½.....13¾¢@13½¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....13¢@13½¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain	60&10%
1¼ and under, Galv	52½&10%
1½ and over, Plain	70&10%
1½ and over, Galv	60&10%
Boiler Tubes, list Oct. 24, 1892	65%
Casing, list Nov. 16, 1892	52½%
Inserted Joints Casing, list Nov. 16, 1892	47½%
Steel Boiler Tubes	57½%
Cold Drawn Seamless Steel Tubing	50%

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendrath's Galv. Spiral Riveted	55%
Austin's Corrugated	60%
Gordon & Gilbert's Corrugated	55%
Ritchie's (Galv. Iron only) Cor'd	55%
Ritchie's Spiral Lock Seam, Galv'd	50%
Austin's Spiral Ribbed Pipe	55%
Plain Adjustable Elbows	55%
James A. Miller Bros. (Galv'd Iron only) Corrugated	55%

Steel Roofing—

Perfection	$3.75 square
Climax	$3.50 square
The Lloyd Spanish Tiling	$4.50 square

Metallic Shingles—

Cushman's	$3.25 square
Merchant's Spanish Tiles:	
Copper, 14 oz.	$30.00 square
Steel, painted	$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	℔ ℔, 2 ¢
" " Brown	℔ ℔, 1½¢
" " Purple	℔ ℔, 2½¢
" " Ground in oil, B. Red	℔ ℔, 6½¢
" " Ground in oil, Red	℔ ℔, 6½¢
" " Ground in oil, Brown	℔ ℔, 6½¢
" " Ground in oil, Purple	℔ ℔, 6 ¢
Linseed Oil, Boiled, in bbls	58¢
Linseed Oil, Raw, in bbls	56¢
Mineral Paints	2½@4¢
Orange Mineral	10¾¢
Pure White Lead in Oil	6¾@7¼¢
Dry White Lead in bbls	6½@6¾¢
Red Lead, American	6½@7½¢
Red Venetian, English, dry	$1.65@$1.70
Red Venetian in oil; asst'd cans, 8½¢; kegs	7¾¢
Sienna, Italian Oil, in bbls, ℔ gal	34¢
Spirits Turpentine, in bbls., ℔ gal	39½¢
Asphaltum, Trinidad Refined, ℔ ton	$45
Coal Tar, Felt, 1 Ply, ℔ 100 ft	$1.65
Coal Tar, Felt, 2 Ply, ℔ roll 108 sq. feet	$1.50
Coal Tar, Felt, 3 Ply, ℔ roll of 108 sq. feet	$2.00
Roofing Pitch, ℔ bbl. of 300 ℔	$3.20

NEW YORK, MARCH 17, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots..℔ ℔, $0.75
No 1 (guaranteed to be 98 % pure and over), in ton lots .....℔ ℔, .90
Lots less than 1 ton, 10¢ ℔ ℔ additional.

Antimony—

Cookson .....℔ ℔, 12½¢
Hallett's.....℔ ℔, 10¾@11¢

Brass—

Planished—

List on following page.....net

Roll and Sheet—

List on following page.....35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per ℔.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above 3 inch	45
Plain, 5-16 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu	43

35&40%

Copper and Bronze Tubing—

3¢ ℔ ℔ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¼ to 3½ inches inclusive....17¢ ℔ ℔
Over 3½ to 5 inches inclusive....18¢ ℔ ℔

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ ℔
Over 3½ to 5 inches inclusive....19¢ ℔ ℔

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $2.50 per doz.....10&10%

Conductors—

Corrugated. Round or Square—

Lists on following page.
Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—

List on following page.
Galvanized.....50

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.

List on following page.....15@25%

Ingot.

Lake.....12½¢
Ansonia Grade Arizona.....12¢
Ansonia Grade Casting.....11¾¢

Planished.

List on following page.....net

Sheet and Bolt.

List on following page.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering*, in Current Hardware Prices.

Damper Clips, Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

List on following page.
Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

List on following page.
Lap or Slip Joint.....list, net

Elbows—

List on following page.

Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four-Piece.

4½	5	5½	6	7 inch,
$0.78	.87	.00	.90	1.20 per doz..20 %

Elbows and Shoes—

List on following page.

Flat Crimp.

Tin.....35%
Galvanized.....65%

Corrugated.

Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ ℔, 12@13¢
Patent Planished....℔ B, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ ℔, 8½¢

Galvanized.

Nos.	B. B.
10 to 16	℔ ℔, 4 2-10¢
17 to 22	℔ ℔, 4¾¢
23 to 24	℔ ℔, 4¾¢
25 to 26	℔ ℔, 5¢
27	℔ ℔, 5¼¢
28	℔ ℔, 5½¢
29 and 30	℔ ℔, 6¼¢

Filter Joints—

List on following page.
Lewis.....33⅓ %

Lead—

American Pig.....4¼@4½¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....15¢, 20%
Block Tin Pipe.....27½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ ℔.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ ℔, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ℔, .05¾¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Door Mats, Galvanized	25%
Window Guards, Paneled	15%
Tree Guards, Paneled	15%

Mitres, Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.—

Lead, Amn. White, Dry or in oil:	
Kegs, lots less than 500 ℔	7 @ 7¼¢
Kegs, lots 500 ℔ to 5 tons	6¾ @ 6¾¢
Kegs, lots 5 tons to 12 tons	6¾ @ 6¾¢
Kegs, lots 12 tons and over	6¼ @ 6¾¢
Lead, White, in oil, 25 ℔ tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price	@ 1
Lead, Red, bbls. and ½ bbls	6 @ 7
Lead, Red, Kegs	6¼ @ 7¼
Usher, American	½ @ 1½
Red, Venetian, American	℔ 100 ℔..1.00 @ 1.10
Linseed Oil:	
City, raw, ℔ gal	@ .48
City, boiled	@ .51
Western, raw	@ .48
Spirits Turpentine:	
In recoopered bbls	@ .35
In machine bbls	@ .35½
Putty:	
In barrels and ½ bbls	.01¾ @ .01¾
In tubs	.01¾ @ .01¾
In tin cans	.01½ @ .02½
In bladders	.01¾ @ .01¾
Roofing Material, &c.:	
Asphaltum, Trinidad Refined, ℔ ton	$30.00@$35.00
Asphaltum, Rock, ℔ ton	$14.00
Coal Tar Felt, 1 Ply, ℔ ℔	.0¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft	$1.85
Roofing Pitch, ℔ bbl	$2.24

Pipe, Drain—

List on following page.....50%

Pipe and Fittings, Cast Iron Soil—

List on following page.
Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive.....60@60&10%
Other sizes.....55@55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 inches.....60@60&10%
Other sizes.....55@55&10%

Pipe, Spiral—

List on following page.
Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

List on following page.

For discounts see Current Hardware Prices.

Rivets and Burrs—

List on following pages.

For discounts see Current Hardware Prices.

THE METAL WORKER.

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A Sunshine Heating Apparatus.

It is said that a certain professor down in New England, which is credited with being a pretty cold part of the country, warms his house during the daytime in clear weather by the heat of the sun alone. A southern exposure of glass and a northern exposure of wall without windows, together with open fires for nights and cloudy days, is the primitive and, as reported, efficient means of securing a comfortable indoor temperature during the winter months. This original plan of house warming is not likely to interfere to any large extent with the trade in heating apparatus, for the curious design of the house, not to speak of the attention to grate fires made necessary by clouds and nightfall, would prevent the general adoption of the system. It is worth while to inquire, however, whether this ingenious householder has not secured by his sunshine apparatus the most agreeable and wholesome warmth that is possible under any conditions; or, to put the question in another way, is not the direct heat from the sun possessed of certain thermal qualities that neither stoves, steam nor hot water will give forth? The small boy who in early spring spreads himself out on a cellar door in the southern angle of the house is as thoroughly contented as a Chinaman in an opium joint. He is no warmer than he would be sitting on the parlor radiator—and the cellar door is a great deal harder than his feather bed—but he feels the sunshine soak into him and warm the very cockles of his heart—an effect that no artificial heat could give.

Properties of Sun Heat.

The boy knows nothing of the chemistry of heat, but nature has taught him without any study on his part that a patch of sunshine on a cellar door is worth more than all the radiator sections in the world so far as solid comfort is concerned. If when the boy grows up he takes a notion to study the little understood subject of heat he will learn that the sun's rays have certain chemical or life-giving properties that he will look for in vain in the heat that is radiated from a stove plate. If he wants proof of what the books tell him let him try to raise a pumpkin vine in a dark room heated by a steam coil, and then after his unsuccessful attempt, if he concludes that light and fresh air are all that are needed, let him repeat the experiment in a ventilated room, heated by the indirect method and brilliantly lighted with lamps or gas. After wasting a good deal of time and work he will come to the belief that he can't fool a pumpkin seed with artificial sunshine, and will give up indoor agriculture, unless he decides to go into the business of raising mushrooms. The New England professor may never have idled away a morning in springtime on the cellar door of his father's house, or wasted any of the springtime of youth in attempting to raise pumpkins in the dark; but in some way or other he must have learned how good a thing the sunshine, is for he has gone to no little bother to have it about him as fully as the clouds permit.

The Sale of Heating Boilers.

A mistake is often made by the manufacturers of heating boilers which injures their trade much more than can be recompensed by any profit realized on the sale. This mistake consists in selling a boiler without restriction to a man who has neither skill nor experience in the erection of steam or hot-water heating appliances, yet who, notwithstanding, purchases the boiler intending to set it himself, and to use it in carrying out some heating contract. Complete or partial failure is the result of the large majority of such attempts. Both the parties to the contract will then be dissatisfied. The unwise owner who has rashly given the contract to the incompetent fitter becomes impatient, then clamorous for the fulfillment of the guarantee. The contractor will not readily admit that failure has resulted from his want of knowledge and skill; but he immediately seeks to impress the owner that the boiler is insufficient. He is near at hand, while the manufacturer is at a distance. He has the ear of the owner, and ten to one will succeed in making the owner believe that the boiler is solely at fault.

An Opportunity.

Now comes along the expert salesman of a rival house. He is quick to perceive his opportunity. Without hesitation he confirms the contractor's statements with reference to the boiler that has been set, and guarantees success if the boiler he now offers for sale be substituted. At the same time he looks over the whole job; shows the contractor how to correct his mistakes; warns him that unless he makes the corrections the job will not work satisfactorily, even with a good boiler—of course, the one already set is pronounced not good—and sells his boiler on the condition that the alterations required be made. When the time arrives for the change to be made this salesman takes good care to drop around again, or have some one do so who knows, to see that mistakes are not repeated, and when the boiler is fired up, presto, the job works. Both the owner and the incompetent fitter are now ready to testify that the boiler thrown out is worthless, and just as ready to swear that the new one is the best boiler made, although with an equally fair trial the rejected one might prove the better of the two.

The Final Result.

The final result, commercially, is that the manufacturer, who sold his boiler to the incompetent fitter without restrictions or conditions as to the way the contract for which the boiler was to be used should be executed, has indirectly sold a, perhaps, inferior boiler for a rival house, and has got at least a locally bad reputation for that of his own make. Very likely he will refuse to have his boiler returned and will sue the party to whom it was sold for payment if, as is also very likely to have been the case, he did not sell it for cash. To recover the payment, even if he obtain a final judgment in his favor, his bother and expense will be more than the boiler is worth, and there are many chances that he will fail to recover at all, because both the owner and the contractor will pull together on the witness stand, and there are always unpleasant contingencies in this sort of litigation. In any event, he is sure to be convinced in the end that it was not good business policy to sell a boiler in this way; and yet, especially if he is endeavoring to introduce a boiler new to the market, the chances are he will repeat the blunder several times before he has burnt his fingers enough to teach him thereafter to keep them out of the fire.

The Recent Boston Fires.

It is rather curious that Boston, wherein the construction of slow-burning buildings, fire-proof buildings and fire insurance problems have been made subjects of investigation, study and debate, to an extent rivaled by perhaps no other city in the world, should, after all its efforts, still prove to be the city supplying the history of conflagration with some of its most startling and voluminous chapters. Edward Atkinson resides in Boston, and is known far and wide by his contributions to the literature of fire prevention and obstruction. Around him are gathered numerous disciples; and it must be admitted that the teachings of this school commend themselves to common sense and apparently accord with scientific principles. Yet, in Boston, fires are not less numerous nor less destructive of life and property in proportion to its size than in other towns not particularly noted for special attention to the subject of fire prevention. Indeed there are few cities that can furnish a record of two such fires as Boston has supplied this winter and spring. It seems from published ac-

counts of fires culled from various authoritative sources that metal studding and lathing supporting walls of ordinary lime and sand mortar affords one of the most resistant obstacles to the rapid and uncontrollable spread of fire known to modern builders. Presumably, as this innovation in its most approved methods of application is of comparatively recent date, the valuable buildings burnt in Boston were not constructed with such interior walls. This kind of partition is finding increasing favor, and the time may come when new buildings in city blocks will not be permitted to be erected without them.

The Atmosphere of Cities.

If city dwellers, and particularly those in the larger manufacturing centers, could witness under the microscope a sample of the impurities contained in the air they breathe, they would probably experience a similar shock to that felt by the teetotaler who once viewed at a church entertainment the stereopticon picture of a magnified drop of water with its various living denizens, and thereafter permanently abjured the internal use of that element to the great scandal of his temperance friends. The city dwellers aforesaid could not, however, take so short a course with the atmosphere, so long as they remain city dwellers. The air of large industrial centers of population, on account of natural causes, can never be anything but injurious to a considerable extent. The only thing that can be done toward mitigating the evil is to endeavor by all means in our power to remove, so far as possible, the causes which contribute most largely to the vitiation. Among these causes stands pre-eminent the volumes of smoke which, to a greater or lesser extent, pollute the atmosphere of all large cities. Even Paris, whose position in this respect has heretofore been very enviable, on account of the large use of wood in that city as fuel, is now, we learn from a French scientific journal, becoming dingier yearly as bituminous coal is more widely employed in factories and other industrial establishments. Although municipal regulations prescribe the use of smoke-preventing methods for these chimneys, it has been found impossible to enforce the law on account of no really efficient system of smoke prevention having yet been devised. The only remedy the journal referred to can for the moment suggest is that a fine should be imposed on all obstinately smoky chimneys, and a premium be awarded for those which do not smoke. By this means it is believed that owners will be driven to devise means for reducing the evil, by the use of clean flues, good fuel, and careful firing. This might bring some slight mitigation, but would be hardly a remedy.

Coal and Fogs.

The avoidance of coal which contains a large amount of sulphur is specially recommended. This substance it is which, almost more than anything else, works harm to the lungs of those breathing city air. The sulphur is given off in the smoke, and descends again in the form of sulphuric acid, mingled with rain and fogs, with the result, as has been strongly put, of absolutely "vitriolizing" all coal-consuming centers, with their surroundings. The "pea-soup fogs" of London, for instance, where soft coal if universally used, are unquestionably due to this cause. Hundreds of tons of unconsumed matter are daily thrown into the atmosphere with the smoke of the city. In the British capital, indeed, this nuisance has risen to a pitch happily inconceivable in our more favored cities. The harm to life and health wrought there by the fog fiend every winter has become so alarming that scientists are at their wits' end to devise some method of mitigating the evil. Meanwhile, the use of hard coal is being strongly advocated in some quarters as one mode of lessening the plague of fog.

Impurities in Dust.

The impurities discharged into the air we breathe by smoke are not, however, the only ones which penetrate the atmosphere of cities. The dust caused by traffic, street sweeping, and the general motion which is always going on, pours into the air a mass of deleterious organic matter, which is inhaled by those passing along the streets, and is blown into the houses. At the Observatory of Montsouris, in Paris, experiments of a most interesting nature have recently been made with the air and dust of that city. A sample of the latter, for example, weighing $\frac{1}{15}$ grain, taken from the third story of a house in one of the principal Paris streets, on being collected and analyzed, was found to contain lime, silica, plaster, coal, pulverized stone of various kinds, hairs and fibers, and vegetable debris of all descriptions, together with some 3,000,000 bacteria. Now, it has been found that a gramme, or 15½ grains, of ordinary Paris street dust contains about 130,000 bacteria.

Germs in House Dust.

The experiment therefore goes to prove that there are infinitely more of these germs in-doors than out of doors. This is explained by the fact that the dust which penetrates the interior of a building is generally divested of the heavy mineral atoms which form part of road dust and make it so much weightier. Consequently the cloud of dust which blows in one's face on a windy day is less harmful to breathe than the more subtle substance put in motion in our rooms by the broom or duster. A distinguished foreign authority on domestic hygiene has argued vigorously against the use of the broom or feather brush in-doors, as most unsanitary, in displacing dust charged with dangerous germs. He recommends the use of one of the modern carpet sweepers for the floor, and a rag or sponge for cleaning the remainder of the room and the furniture. The germs found in Paris dust by the observatory scientists have been cultivated and developed with the object of investigating their nature prior to devising means for their suppression. This matter is now occupying the time of a number of eminent French scientific experts.

According to the *Street Railway Journal*, the mileage of street railways in the United States at the close of 1892 was 11,665, and the number of cars operated on the same date was 37,399. Of these the electric roads aggregated 5,939 miles with about 13,400 cars, an increase during the year of 1878 miles, or nearly one-half the increase of the mileage of the steam railroads in the same time. The street railways now have several thousands more passenger cars than the steam railroads of the entire country possess.

Insurance Against Laboring Accidents in Germany.

It is about seven years since the German Government instituted a system of compulsory insurance for all those engaged in labor in that country. The report of the Central Insurance Bureau, which regulates the working of the entire system, has been recently presented to the Reichstag. It contains some interesting features in the tabulated results, shown for the first five years of the system, and the deductions drawn therefrom. It appears that at the end of 1890 64 workingmen's associations, organized under the insurance law, and comprising about 5,000,000 of workers, shared in grants and pensions for accidents. Of these perhaps the most important were the associations representing artisans in iron and steel and metal workers generally, which, we find, included 583,000, or 11 per cent. of the whole number of workers. When we come to consider, however, the amounts paid out for accidents, we find that this class absorbed more than 17 per cent. of the total disbursements for accidents in all classes of labor. Further, it is shown that, while the average proportion of individuals in all trades killed or injured while at work during the five years under review was 4.2 in 1000, the proportion in the metal industries was 6 in 1000. These figures clearly prove the fact that workers in metal run far greater risks than those engaged in other industries. To show how regular this proportion has been, we present the following figures for each of the five years under review:

Average of Accidents for 1000 *Individuals Insured.*

Years.	For all industries.	For metal working industries.
1886	2.83	3.64
1887	4.14	5.04
1888	4.35	5.85
1889	4.71	6.71
1890	5.34	7.44

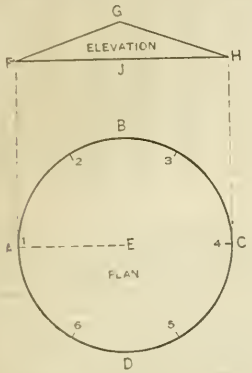
INCREASED NUMBER OF ACCIDENTS.

Another feature which cannot fail to strike the reader of the above figures is the steady increase in the number of accidents, which leads us to ask whether it is possible that one of the results of obligatory insurance is the multiplication of such fatalities, in consequence of less care being taken by the insured workman. Such a result was certainly not contemplated by the advocates of the system, and it gives food for thought as to whether the compulsory insurance of workers has proved a success or not. When we take the figures for German workmen in the metal industries who have survived after accidents, and have been indemnified or pensioned for them, we find the total number for the first year to have been 1521; in the following year 3363; while in 1890 it had attained the largely increased total of 11,853. As is very wisely remarked by *Le Génie Civil* of Paris, in contemplating these figures: "We think that the adoption of every means to prevent accidents should be carried out before arranging to repair the damages caused by them." And this we find is now being done by the insurance associations, for it is stated that an aggregate of $14,000,000 of profit which has accrued during the five years has been placed in the reserve fund, a considerable proportion of which is to be devoted to the organization of special means for the prevention of accidents.

THE TIN SHOP.

Pattern for Steamer Cover.

From H. J. B., *Milwaukee, Wis.*—There may be some of the apprentice or other readers of *The Metal Worker* who would like to see how the pattern for an ordinary steamer cover is obtained. In Fig. 1 let A B C D represent the plan of cover, which is struck from the center E. We will suppose the radius A E to be 6 inches. It is well known that the radius of a circle can be spaced about the circumference six



Pattern for Steam Cover.—Fig. 1.—Plan and Elevation.

times. This gives us a convenient method of obtaining the circumference of the circle when the radius used for obtaining the pattern is near that used for striking the plan, as is the case with a steamer cover. F G H is the elevation of cover, the distance J G being 2 inches. To obtain the pattern of cover from plan and elevation, set the compasses to the slant hight G H,

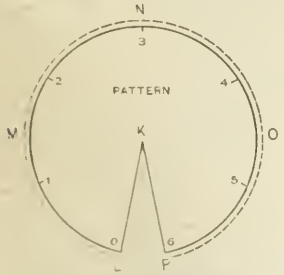


Fig. 2.—The Pattern Shape.

and with any point, as K in Fig. 2, as center, strike the arc L M N O P. Draw the line K L from the center K to end of arc L. With the compasses set to the radius A E of plan, Fig. 1, and starting from L in Fig. 2, space off six of these divisions about the arc L M N O P, as shown by the small figures. From the last point 6 draw a line to the center K, as shown by K P. Such allowances for edges as may be required can be made about the net pattern, as indicated by the dotted lines.

The pattern can be obtained by the use of the square and compasses, thus doing without the drawing of plan and elevation. In Fig. 3 let S R represent the half diameter of cover and S Q the hight. Set the compasses as indicated, with one point at R and the other at Q. With this radius and any point, as K of Fig. 2, as center

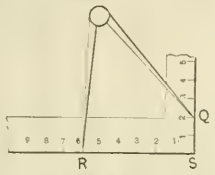


Fig. 3.—Obtaining Radius from Square.

strike the arc L M N O P, and from the center K draw the line K L. With the compasses set to the distance S R, the half diameter of cover, and starting from point L of pattern, space off six of these divisions, as shown. From the last point obtained draw a line to the center, as shown by P K, which completes the net pattern. The allowance for edges to be made as previously described.

Galvanized-Iron Vase.

We are indebted to W. A. Wittbecker, Lansing, Iowa, for a photograph of an interesting piece of sheet-metal work that he has completed. The following brief description is taken from his letter accompanying the photograph:

Galvanized Iron Vase.

I send you a photograph of a lawn vase I built during the dull days of winter, which may be of interest to some of the "boys." The total hight of the vase is 50 inches; diameter of base, 18 inches; diameter of top, 24 inches, with a tube running down inside the stand to drain off any surplus water. The vase is made of No. 26 galvanized iron, principally of scraps such as unfortunately accumulate in every tin shop. I believe that with a little study and application of odd hours that would otherwise be wasted, a great many ornamental and beautiful articles could be made in sheet metal at very small cost. The total weight of this vase is about 25 pounds, which makes it much easier to handle than a cast-iron vase of similar size.

Wash-Boiler Former.

A correspondent recently asked for a method of forming wash boilers, and in reply we received a circular from C. A. Wilbraham, Poquonock, Conn., of a device for the purpose which he manufactures. The article is illustrated in the accompanying cut, and consists of a bed

Wash-Boiler Former.

plate with a suitable peg on the underside to fit into a bench plate. There is also a former block with bands around it and a clamp operated by a screw crank for holding the body of the boiler to be formed against the bands. The desired width of the boiler is obtained by adding or removing the bands, as may be necessary.

It is a great mistake, says *Le Génie Civil*, of Paris, to employ acid for cleaning brass. It becomes dull again in a very short space of time. In order to polish it so that it will retain its luster, the brass should first be rubbed with a mixture of olive oil and fine rotten stone, or tripoli, and then washed with soap and water. When it is desired to "frost" an article of brass in order to give it a decorative appearance, it is well to boil it at first in potash, rinse it with fresh water, and then plunge it into nitric acid, after which it should be rinsed again with water, and finally dried in warm sawdust, and while the metal is still warm it should receive a coating of varnish.

Fourteen Austrian iron workers, bound to Joliet, Ill., were returned to Europe from this port last week, under the Contract Labor law.

The seven trunk-line railroads from the West which terminate at this port have contracted for over 1,000,000 bushels of grain, to be transferred by rail from Buffalo to New York on the opening of navigation, at 6 cents for wheat, 5½ cents for corn and 4 cents for oats. An effort by these railroads to avoid the severe cutting practiced last year appears to be in favor of the canals.

House Warming.—VII.

RELATIVE SOURCES OF HEAT.

Having now considered in an elementary manner the three sources of loss or diffusion of heat, it may be well to ascertain by comparison their relative effect in connection with our subject of house warming. As by conduction the transmission of heat is confined to solid and liquid bodies, it is impossible for it to have any direct influence upon the temperature of the atmosphere, although indirectly it is an important element in the calculation. For instance, if the material of which the heated body is composed were of so low a degree of conductivity as to transmit the heat through its thickness less rapidly than it is given off by the surface, it is manifest that the external surface must become cooled down below the temperature of the other side exposed to the source of heat, in proportion to the comparative rapidity of the conduction and surface loss. As an extreme case let us consider, by way of illustration, a plate, 1 foot square by 1 inch thick, of gray blotting paper, exposed on one side to a constant temperature of 100°, and the other side to the atmosphere at 60°, the difference, therefore, being 40°. By Table XII we find the conductivity to be 0.274 heat unit per square foot per hour for each degree of difference in temperature of the two sides; or, $0.274 \times 40 = 10.960$ heat units as the total conducted heat. Now, supposing the external surface to have been protected from loss of heat until the entire thickness had become uniformly heated to 100°, and the protection then removed. There would immediately occur a certain rate of loss by radiation and contact of air. Referring to Table XIII, we find the loss from radiation for paper to be 0 7706; and by Table XIV, by contact of air for any material, 0.5945 heat unit. Then, $0.7706 + 0.5945 = 1\ 3651 \times 40° = 54.604$ as the loss by the surface, against 10.96 transmitted by conduction under similar conditions, or almost exactly five times as much. In this instance it is clear that the loss or diffusion of heat must be calculated from the conductivity alone.

Now let us consider clean cast iron under the same conditions. Table XII gives the conductivity as 233 heat units for each degree, and $233 \times 40 = 9320$ total heat units per hour. By Table XIII the radiating power is 0.648; and Table XIV, contact of air, 0 5945. Then $(0.648 + 0.5945) \times 40° = 49\ 7$ heat units per hour as the total loss or diffusion by the external surface, against 9320 heat units conducted through the 1 inch thickness of metal to supply such loss. In this case there can manifestly be no reduction in temperature of the external surface. From this we see that it is always necessary to consider the conductivity of the material of which the heated body is composed, although so long as it is so greatly in excess of the surface loss it need not enter specifically into our calculations.

The comparison between the loss or diffusion by radiation and that by contact of air is important, in order to enable us to compare their relative efficiencies, as in some forms of heating apparatus there will be a predominance of one, and in others, the other source of diffusion. For instance, a grate fire heats by radiation only, a hot-air furnace by contact of air only, and a stove by both. It may also be important to know the relative amounts of diffusion from the stove, due to radiation and contact. By the tables (XIII and XIV) we find for cast iron a loss of 0 648 by radiation, and 0 5945 by contact of air, a difference of 0.0535, or but 8¼ per cent. less for the latter. For this material, then, they may be considered as of substantially the same efficiency. Any other material will, of course, give a different ratio. We may compare the two quantities for brick, plaster, &c., as they are important in being the materials of house construction. By Table XII we find the conductivity sufficiently in excess of surface loss that it need not be considered. Table XIII gives the radiation as 0.7358; and if we assume the case of a wall 10 feet high, we find, by Table XIV, that the loss by contact of air will average 0 4347. Here, then, we find considerable difference, the radiation being $0\ 7538 - 0.4347 = 0.3191$ units, or over 73 per cent. greater than the loss by contact. These two comparisons may be borne in mind, as they will be useful in connection with our later calculations.

LOSS FROM OUTSIDE WALLS.

In the foregoing consideration of this portion of our subject, reference has been made to "loss of heat" from the three sources, principally as a means of heating the air of rooms. It is clear, however, that the same data will apply equally to the losses by walls, windows and other exposed surfaces which operate against the maintenance of the desired atmospheric temperature. In the latter application—except in extreme cases—the simple rules and tables given will be sufficiently correct for all practical purposes. Where the difference in temperatures, however, exceeds from 20° to 30°—as in case of 70° in the room and zero or below outside, or between the heat of a grate fire or stove and that of air in the room—there are certain allowances necessary in order to obtain even approximately accurate results. But this is not the only cause for which corrections must be made.

It is shown as the result of experiments by Dulong, and also by Péclet, that the degree of temperature of the heated body, as well as the difference between it and the absorbent, has a very important effect on the rapidity of transmission of radiant heat, and that while at ordinary temperatures the loss may be considered as that due to the difference only, yet at high temperatures it greatly exceeds the amount by previous calculations, and by a constantly increasing ratio. At very high temperatures the ratio of increase of loss amounts to many times the quantities given for ordinary cases, and Péclet and Dulong have formulated rules by which the calculated ratios agree very closely with the results of their experiments. These rules, however, are too complicated for use in this connection, or for ordinary application, and for this reason Box has calculated, from the experiments and formulæ of Dulong, the following tables of the ratios of the increased loss at given temperatures, and differences between that of the heated and recipient bodies. In Tables XVIII, XIX and XX these ratios are given in the order named for radiant heat and contact of air, and for both at very high temperatures.

Table XVIII.—Ratio of Loss for Radiant Heat.

Difference of temperature between bodies Fahr.	Temperatures of the body receiving the radiant heat.											
	32°	50°	59°	68°	86°	104°	122°	140°	158°	176°	194°	212°
18	0.997	1.075	1.12	1.165	1.254	1.355	1.467	1.580	1.702	1.848	1.994	2.150
36	1.032	1.083	1.16	1.206	1.299	1.403	1.520	1.680	1.763	1.914	2.064	2.227
54	1.071	1.155	1.20	1.251	1 348	1.449	1.576	1.700	1.830	1 985	2.142	2.310
72	1.115	1.202	1.25	1.302	1.403	1.515	1.640	1.760	1.900	2.068	2.230	2.400
90	1.163	1.254	1.31	1.360	1.463	1 580	1.710	1.840	1.980	2.164	2.330	2.510
108	1 212	1.307	1.36	1.416	1.525	1.648	1.784	1.920	2.070	2.280	2.425	2.615
126	1.26	1.36	1.42	1.48	1.59	1.72	1.86	2.00	2.16	2.34	2.52	2.72
144	1.32	1.42	1 48	1.54	1.65	1.79	1.94	2.08	2.24	2.44	2.64	2.83
162	1.37	1.48	1.54	1.60	1.73	1.86	2.02	2 17	2.34	2.54	2.74	2.96
180	1.44	1.55	1.81	1.68	1.81	1.95	2.11	2.27	2.46	2.66	2.87	3.10
198	1.50	1.62	1.69	1.75	1 89	2.04	2.21	2.38	2.56	2.78	3.00	3.24
216	1.58	1.69	1.76	1.83	1.97	2.13	2.32	2.48	2.68	2.91	3.13	3.38
234	1.64	1.77	1.84	1.90	2.06	2.28	2.43	2.52	2.80	3.03	3.28	3.46
252	1.71	1.85	1.92	2.00	2.15	2.33	2.52	2.71	2.92	3.18	3.43	3.70
270	1.79	1.93	2.01	2.09	2.22	2.44	2.64	2.84	3.06	3.32	3.58	3.87
288	1.89	2.03	2.12	2.20	2.37	2.56	2.78	2.99	3.22	3.50	3.77	4.07
306	1.98	2.13	2.22	2.31	2.49	2.69	2.90	3.12	3.37	3.66	3.95	4.26
324	2.07	2.23	2.33	2.42	2.62	2.81	3.04	3.28	3.53	3.84	4.14	4.46
342	2.17	2.34	2.44	2.54	2.73	2.95	3.19	3.44	3.70	4.02	4.34	4.68
360	2.27	2.45	2.56	2.66	2.86	3.09	3.35	3.60	3.84	4.22	4.55	4.91
378	2.39	2.57	2.68	2.79	3.00	3.24	3.51	3.78	4.08	4.42	4.77	5.15
396	2.50	2.70	2.81	2.93	3.15	3.40	3.68	3.97	4.28	4.64	5.01	5.40
414	2.63	2 84	2.95	3.07	3.31	3.51	3.87	4.12	4.48	4.87	5.26	5.67
432	2.76	2.98	3.10	3.23	3.47	3.76	4.10	4.32	4.61	5.12	5.33	6.04

The use of Table XVIII is very simple. Knowing the temperature of the heated body and that of the absorbent or receiving body, we ascertain the difference between the two. Find the temperature nearest to this difference in left-hand column of table, and in the line of temperatures of recipient body, in top line, the one nearest that of the desired figure.

For instance, we wish to find the ratio for a difference of 200° and a recipient of 100°. By vertical column we find 198° to be the nearest to 200°, and in the horizontal line 104° is the nearest to 100. The ratio for these two numbers is 2 04, and as both numbers are very close to the actual temperatures, the slight variation may be disregarded. The ratio found is to be used by multiplying the decimal found in Table XIII for radiant heat, corresponding to the kind of surface of the radiant body in question. We have then only to multiply by the number of square feet of surface and the difference in temperature between the two bodies to ascertain the total loss from radiation in one hour.

For example, we may use the above temperatures, and assume both the surfaces to be black sheet iron, which we find by Table XIII to lose 0.5662 heat unit per square foot per hour for each degree of difference in the two temperatures. Then $0.5662 \times$ ratio number, $2.04 = 1.156$; and the difference of temperatures, as above, being 200°, we have $1.156 \times 200 = 231.2$ heat units per square foot per hour; and if there be, say, 100 square feet of surface, the total loss per hour will be 23,120 heat units. While the above applies to radiant heat only, it is known from the experiments of Dulong that the loss by contact of air increases more rapidly at high temperatures than would be due to merely the difference between the air and heated body, although not nearly to the extent as we have seen to be the case with radiant heat. This difference, as will be seen by reference to Table XX, is very marked at excessively high temperatures, but the increased ratio of loss by contact, even at temperatures within the range of our subject, is sufficiently large to make it an important element in our calculations.

In Table XIX these ratios are given for a range of temperatures sufficient for ordi-

nary purposes, while in Table XX are given those relating to extreme cases. The use of the ratios found in these tables is precisely the same as that described for ratios of Table XVIII.

Table XIX.—Ratios of Loss for Convection.

Difference in temperature of heated body and the air in contact.	Multiplier or ratio of heat.	Difference in temperature of heated body and the air in contact.	Multiplier or ratio of heat.
Degs. F		Degs. F.	
18	0.94	252	1.742
36	1 11	270	1.774
54	1 22	288	1.800
72	1.305	306	1.827
90	1.372	324	1.852
108	1 438	342	1.874
126	1.486	360	1.897
144	1 533	378	1 920
162	1.575	396	1.940
180	1 615	414	1.960
198	1.650	432	1.980
216	1.684	450	2.000
234	1.720	468	2.0 7

Table XX.—Ratios of Loss for High Temperatures.

Temperature of heated body.	Temperature of surrounding air in contact.	Difference of temperature.	Ratio of heat.	
			Radiation.	Contact of air.
Deg. F.	Deg. F.	Deg. F.		
480	60	420	3.10	1.980
600	60	540	4 19	2.085
780	60	720	7.17	2.290
900—Red; just visible....	60	900	12.68	2.348
1140—Red; just visible.....	60	1080	23.01	2.450
1320—Dull red...	60	1260	42 70	2.540
1500—Dull cherry red	60	1440	80.67	2.620
1680—Cherry red	60	1620	154 50	2 693
1860—Clear red..	60	1800	299.70	2.760
2220—Clear orange.....	60	2 60	1159.00	2.880
2580—White. ...	60	2520	4904 00	2.985

Box expresses some doubt as to the applicability of these formulæ of Dulong and Péclet to extremely high temperatures, and cites the ratio thus found (Table XX) for a white heat of 2580°, which is given as 4604, in confirmation. He suggests, however, in support of their correctness, that the great rapidity with which a white hot mass cools down to orange and red may fully agree with the ratio given.

If we suppose, for instance, a mass of white-hot iron, which at atmospheric temperature will measure 1 cubic foot (weighing say 480 pounds), it will contain at 2580° a certain number of heat units, calculated as follows: By Table IX we find the specific heat of wrought iron to be 0.11379, and for 480 pounds there will be 0 11379 × 480 = 54 6182 heat units for each degree of temperature. The difference in temperature between the iron and air at 60° is 2520°, and 54 6182 × 2520° = 137,638 heat units, total. Now we have seen that unless there be contact with some solid or liquid body there is no loss of heat by conduction, and that radiation and contact of air are the only sources of loss. Also, that such loss is directly proportionate to the amount of surface of the heated body. Let us say, then, that our cubic foot of iron is in the form of a plate 1 inch thick, 3 feet wide, and 4 feet long. The amount of surface, then, will be the two sides containing (4 × 3) × 2 = 24 square feet, and the edges 1 inch wide by (4 + 3) × 2 = 14 feet long, or 1⅓ square feet, making the total surface, say, 25 square feet. There is not much question but that such a plate—if placed vertically on end upon supports which permitted a free circulation of air—would cool down to a cherry red heat in say 6 minutes, or one-tenth of an hour. Assuming this to be true, we may easily calculate the ratio by which the loss would exceed that due to the calculation by the simple rules we have considered.

First, to ascertain the loss in one tenth hour from 2580° to cherry-red or 1500°. The difference is 1080°, which, multiplied by the loss per degree, as above found—say 54.62 heat units, = 58,989, or multiplied by 10 = 589,890 as the rate of loss per hour. Now, to find the calculated loss by the simple rules, we have for radiation (Table XIII), by sheet iron, a loss of 0.5662 · and by Table XIV, from contact of air, 0.4780 for 4 feet high, vertical plane. Adding these two quantities and multiplying by the number of square feet of surface, and by the average difference between the temperatures of the air and the iron, we have (0 5662 + 0.4780) × 25 square ft $\times \left[\left(\frac{2680^\circ + 1500^\circ}{2} \times 2090^\circ\right) - 60^\circ\right] =$ 52,993 heat units as the total loss per hour.

As we have calculated the actual loss to be 589,890 heat units per hour, it is as 11 3 to 1, which is the ratio of loss from the combined causes, due to the high temperature. By Table XX, however, we find that the calculated ratio for contact of air is but 2.985, as against 4604 for radiation, and therefore to ascertain the individual ratio for the latter we must eliminate the quantity of loss by contact of air—assuming that the ratio 2.985 is correct. The simplest method of doing this will be to multiply the actual loss—589,890—by 0.4780 and divide by 0.5662, and multiply this amount by the ratio. We have then $\frac{589,890 \times 0.4780}{0.5662} \times 2.985 =$ 148,551 total heat units lost by contact of air. And 589,890 — 148,551 = 441,339 heat units lost by radiation. As we have found the uncorrected loss by contact of air to be 24 258 heat units, we deduct that amount from the uncorrected total, and the difference will be the amount due to radiation, from which we may calculate the ratio. Then 52,993 — 24,258 = 28,765 heat units per hour, by radiation. And 441,339 ÷ 28,765 = 15.343 as the mean ratio of loss at the range of temperatures between 2680° and 1500°. As the average of this range, as above, is 2090°, and the table gives a ratio of 80 67 for 1500°, it would appear from the above calculation that there is a good reason for Mr. Box's doubts as to the rule holding good for such extreme temperatures. For such as are necessary to consider, strictly within the range of our subject, however, the ratios as given in the tables may be safely used, they being accepted as correct in ordinary practice.

(To be continued.)

August Miller, Burlington, Iowa, has been granted a patent on a new form of hot air pipe, the invention relating to double pipes to use in partitions. A special feature is that each section of the hollow pipe is so made as to be adapted easily to the next one, while at the same time the walls are so braced as to hold their shape and yet not interfere with the transmission of cold air between them.

A Polish statistician has recently published some interesting data in relation to the working days of various nations. The days in the year on which the different populations labor are given as follows: Interior Russia, 267; Canada, 278; Scotland, 275; England, 278; Portugal, 283; Russian Poland, 288; Spain, 290; Austria and the Russian Baltic Provinces, 295; Italy, 298; Bavaria, Belgium, Brazil and Luxembourg, 300; Saxony, France, Finland, Wurtemberg, Switzerland, Denmark and Norway, 302; Sweden, 304; Prussia and Ireland, 305; United States, 306; Holland, 308, and Hungary, 312.

Molding Sand.

A valuable tract of molding sand, writes a correspondent, has been discovered near Buffalo, N. Y., which, it is estimated, contains at least half a million cubic yards. Heretofore the fine sand beds in the vicinity of Albany, N. Y., have had almost a monopoly in supplying molding sand. Iron founders pay from $1.25 to $6 per cubic yard for sand in different grades, the rule being that the farther West the sand goes the higher the price. In Buffalo alone it is estimated that in the neighborhood of 50,000 cubic yards are used every year, the greater part of which comes from Albany. Buffalo has a fine location for distributing her newly-discovered sand, and bids fair to become a formidable rival of Albany in this industry. Manufacturers of car wheels, cast-iron pipes, structural iron, machinery, stoves, castings, and numerous other kinds of iron work, are all large consumers of this sand.

The important discovery was made some months ago, and arrangements are being made for working the beds. There are said to be all the grades of molding sand, which have a firm quality, adhesive and elastic, and must not contain over a certain percentage of lime. Lime burns the iron, and the less lime there is the better the sand. The sand is also said to contain considerable iron, a point in its favor. Professor Vandenburgh has made an analysis of it and found only 1½ per cent. of lime. The deposit lies between Buffalo and Tonawanda, not far from the New York Central & Hudson River Railroad. A stock company will be formed and a plant established. The projectors of the enterprise expect to open the tract in May and begin moving sand at once. They think it will be a benefit to Buffalo's industries and will bring new manufactories to that city. It is estimated that the deposit will last at least ten years.

A New Way to Treat Sewage.

One of the most recent plans, says an exchange, for treating sewage in a manner to conserve the public health is that described by Dr. Burghart before one of the English engineering societies. This is an electrical process, the active agent, iron, being derived from iron plates placed in cells, through which the sewage constantly flows; one set of cells is positive and the other negative. Only the positive plate is acted upon and dissolved upon its surface, hydrated ferrous oxide being produced by the action of the nascent oxygen—liberated by the decomposition of water at this pole—acting upon the metallic iron. This hydrated ferrous oxide, which is a solution, then acts upon the organic matter, becoming, first, hydrated ferric acid by absorption of oxygen from the air, giving up this oxygen again to the organic matter and becoming the lower oxide—the operation being repeated for a considerable time until the carbonaceous matters which are oxidizable have been oxidized, when no further reduction of the ferric hydrate can take place, and it remains insoluble and suspended in the effluent as a yellowish precipitate. In order to cause the plates to wear off or dissolve equally the poles are reversed on alternate days, a plate being positive on one day and negative on another day.

What is said to be the heaviest phosphor-bronze casting on record has recently been turned out by John Abbott & Co., Gateshead, England. It is a stern post, weighing 13 tons, for the Elswick Works of Armstrong, Mitchell & Co., the great English constructors.

WORLD'S FAIR NOTES.

English Schemes for Traveling Expenses.

English mechanics have evolved a novel scheme for visiting the fair. In many of the big factories of the Midland districts of England the employees are organizing lotteries for holiday trips to Chicago. The experiment was tried with success during the Paris Exhibition, but the distance being shorter clubs did not procure such wholesale reductions in rates as they will this summer.

Twenty or thirty operatives pay 1 shilling per week to a treasurer, who is chosen by ballot. These payments have been kept up during the winter and now amount to a considerable sum, to which has been added the forfeited subscriptions of those members who have been delinquent. About April 1, when a given sum has been attained, the club will open negotiations with some tourists' agency. The agent is told how much money is on hand, and is asked for estimates as to the number of persons who can be transported and cared for during the fair for the given amount. He may decide that the money in hand will suffice for six persons from Birmingham to the World's Fair, including, of course, hotel accommodations while in Chicago. Then the six men who are to make the journey are selected by drawings. Those who hold the lucky numbers are given certificates good for the trip, while those unlucky in drawing blanks must stay at home. The holder of such a certificate may dispose of it as he desires, as it is transferable. A great many have gone into such schemes as an investment and will sell their certificates if they draw prizes at an advance. Lottery schemes of all kinds take well in England, and it is reported that the World's Fair lottery projects are patronized to a great extent.

Of course this method does not mean travel *via* fast steamers and express trains. But a general good time is promised, and comfort and convenience so far as is possible has been guaranteed. More attention is paid to cheap excursions for workingmen in England than in any other country. There are many firms there who give very low rates to such parties and make money. These firms keep many agents abroad arranging special rates at hotels and boarding houses for excursionists. Their representatives have been in Chicago during the past month securing quarters in the second-class hotels for their patrons, and the indications are that during the summer many such visitors will enjoy the sights at Jackson Park.

Hotel Accommodations.

A recent count by a local journal disclosed the fact that up to that time work had begun on no less than 279 structures, containing about 34,000 rooms, in the World's Fair district, comprising the territory south of Fortieth street, north of Seventy fifth street, and east from the boundaries of the south parks and the Washington Park Club. In securing the totals no attention has been paid to any hotel projects which thus far exist solely on paper. Some of the latter will doubtless be built, but they are too uncertain to be considered in cold figures and tables. Nor have any hotels been included which will cater directly to World's Fair trade, but which were constructed prior to six months ago. It is immaterial for what purpose the buildings will be used after the fair. Some will be torn down and others given over to residences and flats. Just at present they are all hotels, and must be counted in when Chicago's capacity to entertain next summer's visitors is being computed. Private residences, where one or more rooms will be rented, and hotels built before the World's Fair period will increase the number of available rooms in the exposition district to nearly if not quite 50,000. Hotel men state that visitors will average two to a room. If this be correct, 100,000 people can walk to the exposition from the quarters provided for them and walk back in the evening. The total capacity of the hotels in the business district of Chicago has been more than duplicated in about six months in the immediate vicinity of the fair. It is claimed by the Chicago people that no World's Fair ever before made such ample preparation for the accommodation of visitors.

Sweden at the Fair.

Arthur Leffler, the chief commissioner of Sweden to the World's Columbian Exhibition at Chicago, and Axel Welin, assistant secretary to the Royal Swedish Commission for the Chicago fair, have arrived in this country. Being interviewed, they said that the Swedish exhibit would be one of the finest at the fair. Mr. Leffler said the Government had appropriated 350,000 crowns, or about $100,000, for the exhibit to be sent to Chicago, and that that amount, in proportion to the population of other countries, was the largest appropriation made by any European country. "The Swedish Government is taking more than ordinary interest in the fair," said Mr. Leffler, "and it has done something in the way of appropriating that no other country has thought of. In addition to the 350,000 crowns for the exhibit, the kingdom has appropriated 50,000 crowns to be used in sending the mechanical engineers of the country to the fair. Sweden regards the exposition as a great educational institution, and it wants its mechanical engineers to get the benefits of a visit to Chicago, and the 50,000 crowns is for the purpose of assisting them to get there. The exhibit left Sweden on March 2, and the articles will be in their place in our building at the fair grounds by April 1. The most prominent articles of the exhibit will be of iron and steel. The other articles will be in clay, cement, wood pulp, porcelain and wick. Our art exhibit will be comparatively small, but it will prove to be a surprise to the judges in the art department. There are only about 75 exhibitors in this department, but some of the most celebrated artists of Europe have contributed, and among the 200 works in oil, pastel and water colors some superior work will be seen. Two of our great sculptors, Kasselberg and Borjesson, have contributed some of their skill to the exhibit."

Europe at the Exposition.

Theodore Stanton, resident commissioner of the fair in France, has collected reports from the various European commissioners as to the part that their respective countries will take at the coming exposition. From these reports, Mr. Stanton says, "One is readily convinced that the artists, inventors, manufacturers and farmers of the Old World will carry off many and signal honors at Chicago." Germany, France, Russia and Denmark in particular will make a great showing at the fair, while Sir Henry T. Wood writes that while machinery will not be so good as in previous British sections, "it is expected that Great Britain will quite maintain the position she has always occupied at the international exhibitions," despite the fact of "a certain disinclination on the part of her manufacturers to take part in any more exhibitions." The collection of pictures will be "extremely good;" scarcely any of the best known artists will be unrepresented, and in view of the great exhibit Germany is preparing in manufactures, it is fair to presume that Great Britain, however averse some of her manufacturers may be to incur the expense, will be sufficiently awake to her commercial and manufacturing interests to make every effort to hold her own in Machinery Hall with a rival that has been pressing her close of late years. The markets of the world are open to the winners of the Columbian awards, a fact that every manufacturer fully appreciates, whether in Europe or in America. Supremacy in manufacturing, like supremacy in politics, in art, in literature, in everything in fact in life, is never conferred once for all. The prize medaliats of Paris in 1889 in commercial and manufactured articles must add to their record "Columbian Exposition, 1893," or make way for their latest and more enterprising competitors. Championship in every article of manufacture or art, like the championship in pugilism, can be held only on the ground of being able to hold the field against all comers.

There is no reason to fear, therefore, that in all the infinite variety of articles that enter into commerce between the different nations of the world, or in the higher realm of art and artistic manufacture, the progressive nations of the world will not be adequately represented. The eager demands for space in the various departments of the exposition long ago gave evidence of this interest in the fair, and if any further testimony were needed it is supplied by the reports of the commissioners of the respective countries of Europe.

The Canadian Pacific Exhibit.

Five of the finest cars manufactured by the Canadian Pacific Railroad were hauled into Jackson Park on the 15th and installed in the Transportation Building as the exhibit of that railway. Every car is of mahogany. The wood for the exterior comes from the foresta of Honduras and is polished to the smoothness of plate glass. The interior is of light mahogany known as prima vera. The engine which ran at the head of the train did not have steam up, as the exhibit was hauled by another engine. The train is 400 feet long. The entire display was manufactured at the Montreal shops.

General Passenger Agent McNicoll witnessed the installation of the cars and said:

"The train is not purely for exposition purposes. It is a perfect representation of the standard cars in service on the Canadian Pacific. All of our latest passenger coaches are of mahogany, and the engine is a type of half a dozen which are now employed on the line. This particular train will be run between Chicago and Montreal when the exposition closes."

The coaches will be landed on the track alongside the passenger train of the London & Northwestern of England. It was the intention of the Canadian Pacific to institute a comparison between the railroad accommodations on this side of the water and those furnished in Great Britain.

The baggage car is of the standard type, and its length is 63 feet 8 inches. It weighs 59,000 pounds, and has plate glass wherever glass is used. Its exterior finish is mahogany, the same as the coaches.

Next to it is a second-class car. It looks, however, as fine as the others. It is intended for sleeping purposes as well as being a day coach. The furnishings are of leather and the second-class passengers who ride in it—the capacity is 64—will be furnished with a smoking compartment as well as lavatory and other modern accessories.

Next to the second-class is a first-class coach. When it was run over the scale at Montreal, it weighed 32½ tons and has a capacity for 56 passengers. Here begins the work of E. Colona, the architect of

the company. He has designed the interior of the coach after the early Italian Renaissance and the furnishings are of copper red plush with white mahogany and old oak, upholstered with olive corduroy. To break the tunnel-like appearance of the interior of the average coach this one has two arches, giving an air of coziness and comparative seclusion. There is a smoking compartment at one end capable of accommodating six passengers, and at the other another compartment of like size for a sitting room.

In the dining car "Savoy," which is 70 feet 10 inches long, and weighs 42¾ tons, there is a capacity for 30 passengers. The Italian Renaissance prevails in the architecture, and the leather work is of yellow brown with carpets of old India rug pattern.

The last car in the train is a sleeper and bears the title "Satsuma." This is the heaviest coach of the lot and weighs 47 tons. Forty-four people may sleep in it. The plush trimmings are of sage green color. The ceiling is paneled and the interior architecture is of the Spanish Renaissance. The staterooms are *en suite*. Old bronze is the finishing of the metal work.

When the engine which heads the train is fired up it will be capable of hauling ten coaches at the rate of 60 miles an hour. The drivers are 5 feet 9 inches in diameter, and when the machine is loaded up with water and fuel it will weigh 106 tons. It has six drivers.

From one end of the train to the other there are mahogany bronze and brass finishings. It is vestibuled throughout, electrically lighted, steam heated, and has all the latest signal, brake and coupler devices. The cost of the exhibit is estimated at $70,000.

Mines and Mining Far Advanced.

The Mines Building, which will contain iron and steel products, is in the hands of exhibitors. Some of them moved in weeks ago and commenced to build the pavilions in which their metals will be shown, but the big crowd came last week. Seventeen States, seven foreign nations and dozens of individual exhibitors have laborers on the floor and in the gallery getting their shows ready. Chief Skiff says: "Every exhibit for this building will be in place before the opening of the fair. Most of the exhibitors have assured me that they will have all their work done by the middle of April—two weeks in advance of the opening. Some of them may be a little later. They may not get their displays arranged until a few days before the opening, but most of the States, nations and individual exhibitors will be ready before the required time. During the last few weeks we have received many requests for space in the Mines Building—in fact, as many as came in during the preceding three months. Many of them were very desirable displays, perhaps as good as we will have, but the space had all been assigned, every inch of it, and we could not take the late comers in."

Five of the greatest colleges of Germany have united in sending a collection from their mineral museums. "It is a superb exhibit," Mr. Skiff remarked, "perhaps the finest that has yet been sent to this country. We reserved 5000 square feet for it in the galleries."

An interesting display for the Mines Building that came last week was the model of a quicksilver mine from New Almaden, Cal. J. P. Randol, superintendent of the mines, made the model some time ago and gave it to the Government Museum. The managers loaned it to Mr. Skiff, to be shown in connection with the exhibit of mercury which is being prepared by Professor Christy of the University of California. By a system of glass panes, arranged carefully, the complete workings of the quicksilver mine are shown in this model.

The American Tin Plate Association have telegraphed Chief Skiff that a good showing would be made. The members have been given the entire south gallery for their exhibit, and are now arranging a division of the labor of putting the plate in attractive array.

An oil well supply company will make an extensive showing of all the machinery used in sinking oil and artesian wells. This will be in a special building near Machinery Hall, although a part of the mines show. The company propose to put their machinery to practical use, and during the fair it will sink a well 4500 feet deep.

West Virginia, Virginia, Utah and Montana have their pavilions well under way. Michigan and Missouri have been working nearly a month. The Ohio board have sent in several carloads of building stone recently to be used in the mineral house of the Buckeye State. All the Colorado displays are in the building.

Promenade on the Roof.

Around the lofty roof of the Manufactures' Building there is to be a promenade for visitors. An unsurpassed view of the grounds and buildings will be afforded and it will probably be the most extensive lofty promenade in the world. Up to the hight where the wall is to be is a distance of 250 feet. But when the sightseers have reached the landing it will not be to find themselves in a narrow coop but on a broad walk, and if the proposed plan is carried out the visitor can travel nearly one mile in rounding the roof of the building. The Hale Elevator company have been awarded the contract for four elevators to run to the roof, and a fee will be charged for the ride.

Feature of the Allis Exhibit.

The E. P. Allis Company of Milwaukee will have in their exhibit at the World's Fair a contract made by James Watt and his partner for the construction of an engine. In 1796, some years after Watt had built his first engine, the Birmingham Flour & Bread Company wanted an engine and the firm of Boulton & Watt, consisting of Matthew Boulton and James Watt, agreed to build it. A contract, as long and formal as a State document, was accordingly drawn up and signed and sealed. The contract, which has been carefully preserved, passed into the hands of Sir John Benjamin, a wealthy mill owner of Birmingham, Eng., who desired it to be exhibited at the World's Fair, and he loaned it to the Allis Company, in whose vaults it now is. It is insured for $2,500.

Items.

The exposition management has made arrangements to supply electric lights at night in all buildings where night work will be required to complete the installation in ample time for the opening May 1. Nothing will be permitted to interfere with the rapid progress of installation work, and the exposition will be opened as advertised, and as the act of Congress requires.

The exhibit from Funchal, Madeira, has arrived, and is being installed in the transportation exhibits department. It consists of a bullock car, yoke and tongue, sledge hack, mountain sled, hammock and two discodels.

Several steam yachts were received last week from the Gas Engine & Power Company of New York for installation in the transportation department. This firm are building two steam launches for the use of the Director General and Lieutenant Baker.

An "anthracite needle," which required two cars for its transportion, reached the Park last week. The only other needle known which compares with it in size is Cleopatra's. The anthracite column came from Pennsylvania as a sample from its hard coal mines.

Russia's exhibit was shipped March 11. That Government has abandoned its intention to erect a characteristic national house as headquarters. The house was entirely framed and set up in St. Petersburg, but the ice blockade in the River Neva prevented its being shipped in time to reach Chicago May 1.

Mr. Ferris is rushing rapidly skyward the construction of his big wheel on the Midway Plaisance. Four towers to be used as false work are completed, and their tops are 235 feet above the ground. The making of foundations has proved an unexpectedly difficult task. The foundation stones, or, rather, concrete, had to be placed 40 feet below the surface of the ground.

Peter Wright & Sons, an English firm, have sent 120 anvils for exhibit in the machinery department.

Laird Bros. of Birkenhead, who are among the leading shipbuilders of Great Britain, have sent to the fair 65 cases of models of ships, including sailers and steamers.

The price of admission to the grounds has been raised to 50 cents to discourage visitors, who have latterly grown so numerous as to impede the work of preparation.

The following table extracted from an article in the *Chautauquan* makes a showing of the world's yearly coal product, not all for the same year, but the nearest approximation obtainable:

	Tons.
Great Britain (1891)	185,479,126
United States (1891)	168,566,669
Germany (1891)	84,347,156
France (1891)	26,199,645
Belgium (1891)	19,865,345
Austria (1889)	8,592,873
Russia (1889)	6,307,800
Sweden (1888)	300,000
Spain (1891)	1,314,147
Italy (1889)	390,320
Total	501,263,081

It may be added that, of the amount given above for the United States, 50,665,431 tons were anthracite mined in Pennsylvania. The total value of the coal output of this country for 1891 is estimated at $191,092,718.

W. H. Preece, the chief electrician of the British general post office, and one of the greatest authorities upon all matters connected with electricity, delivered a deeply interesting inaugural address as president of the Institution of Electrical Engineers of Great Britain, on January 26. He spoke at length upon electric lighting, and predicted a great future for this means of illumination. Some of his statements were remarkable. It would be possible, under certain conditions, he averred, to produce electrical energy at a price equal to coal gas at four cents per 1000 feet. The patent of glow-lamps, or as they are more frequently termed, incandescent lamps, will be "out" in a very short period, and they would then cost about 25 cents as compared with 90 cents, the present price. As regards telephones (the first practical pair of which Mr. Preece himself brought from the United States in 1877), he declared that there was no theoretical reason whatever why we should not converse between London and every capital in Europe, while it was not impossible to speak even across the Atlantic. Heating and cooking apparatus worked by electricity had not, he said, a very favorable outlook.

THE LETTER BOX.

Corroded Lead Tank Lining.

From P. F., *Atlantic Highlands, N.J.*—Last June I lined a tank with 6-pound sheet lead, and now the lead is just like a honeycomb, especially in the bottom. I would like to know if any of the readers of *The Metal Worker* can enlighten me as to the cause of it.

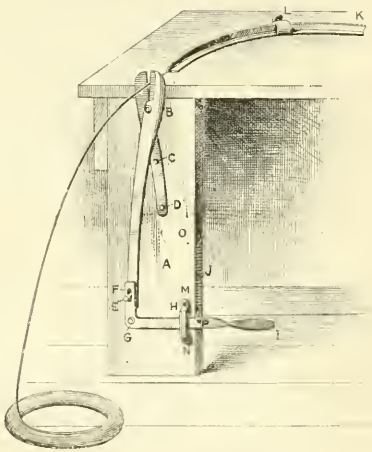
Note.—This is a matter that has been discussed in former issues, and it is an accident, if we may so term it, that sometimes occurs with sheet lead. If any of our readers can throw any further light on the matter, describing the cause and suggesting a remedy, it would be a favor to many.

Better Education of Tinner Apprentices.

From J. D., *St. Louis, Mo.*—I think something should be done to better the standard of the tinner as a mechanic. I find it impossible to get a tinner who understands his business thoroughly. One reason for this is that they do not take an interest in the trade and try to learn while serving as apprentices, but simply work at it for the few dollars a week they get for a year or so and then apply for jobs as tinners. In fact, it seems to be the ambition of the young men in the trade to learn to be helpers, and not to be tinners. If something could be done to change this, I think it would be to the advantage of the tinners, as well as of their employers

From C. N., *La Crosse, Wis.*—It would be wrong to hold each boy individually responsible for lack of interest in his work. It is his surroundings or associates that makes him thus. The average journeyman gives him little or no assistance. Indeed, many would prefer not to have the boy learn, for if he did he would, in many cases, soon know more than his instructor. Under the present apprentice system there are no mechanics made (unless it be in the training schools). The only mechanics we now produce are born. I have many times suggested to enthusiastic union men that they make their organization at the same time a kind of training school, where they could learn and practice drawing and the most approved methods of laying out work. But the real union workers seem to have no time for that, and the better class of mechanics generally do not take much interest in such an institution, as they have little to gain by it. The high wages that incompetent men are asking for their services, and especially the apprentice boys, makes it utterly impossible for an employer or his foreman to spend any of his valuable time in giving them technical instruction. In order to have him earn his wages, he is put and kept at laborious work where he needs little instruction, as helper for a journeyman, getting little or no training, he remains always a helper, and when his three years have been served he is not even a good apprentice, and certainly most of them are incompetent to go as journeymen.

Note.—Complaints of the dearth of good tinners are very general from the west; and our correspondents above quoted are not singular in their experiences in this respect. The cry for better training of apprentices is, indeed, almost universal throughout the country, and this want is to a certain extent being met, in some of the Eastern cities, by the trades schools recently established. A more extended application of the system throughout the cities and towns of the country seems to be the most promising way of raising the standard of the mechanic in all branches of trade, tinning included. As our La Crosse correspondent justly remarks, the fault does not lie altogether with the boys themselves. Their environment, together with lack of opportunity for obtaining competent instruction, takes away all ambition from those who are not "born" mechanics. They have no incentives to push on, and consequently are content to remain helpers.



The Common Sense Wire Cutter.

The Common Sense Wire Cutter.

From J. B Schneider, *Buffalo, N. Y.*—The wire cutter, of which a description is given below, is the best in the world. This may be a broad claim, but nevertheless true, as the writer knows of what he speaks, having had over 20 years' experience in tin and general sheet metal work and as foreman in some of the large tinware factories. This cutter has numerous advantages, the most important feature being fast cutting, the jaws always being open and in such a position as to enable the operator to use both hands for controlling the wire, so he can cut as fast as the foot can work the treadle. A lively boy can cut from 75 to 100 gross of two-quart bucket bails in a day. The machine will cut any size of wire up to No. 6 with ease. If heavier wire is to be cut, larger shears should be used for the machine. It will be seen from an inspection of the engraving that the cutter is a very cheap one to construct, for the reason that in most any tin shop that has been in business a number of years can be found a pair of old stock shears that can be used for the purpose. Any country blacksmith can do the iron work.

To construct the wire cutter. Fasten a piece of 2 x 12 plank, as shown at A, to the end of an ordinary work bench, and secure firmly to the end of bench and floor. Take an old pair of stock shears and cut the blades off, leaving them about 2 inches long. Care must be taken, if they are heated before cutting, that the temper is not injured. The safest way is to cut through the iron while cold, then place in the vice and strike on the steel side with a heavy hammer, thus breaking off the ends. The rough edges can be ground on an emery wheel. Next cut the handles off, leaving the one to be attached to the lever 6 inches longer than the other. Put a $\frac{1}{2}$-inch steel pin in the longer handle, letting it project $1\frac{1}{2}$ inches, as shown at E. The shears B are to be fastened to the plank A by two $\frac{1}{2}$-inch bolts, through holes in handle at C and D. Take a piece of $\frac{1}{2}$ x $1\frac{1}{2}$-inch iron 26 inches long and bend off 6 inches at right angles, as shown. Then cut a slot at F in end $\frac{5}{8}$ x $1\frac{1}{2}$ inches to receive the steel-pin E. Flatten out the other end, as shown at I, for a foot piece. Drill a hole at G for a $\frac{3}{4}$-inch bolt, which secures treadle to plank A. The guard H is made from a piece of $\frac{1}{4}$ x 1-inch iron, bent as shown, and secured to the plank A by means of screws or bolts at M and N. J is a spring made of No. 8 spring wire, and when finished should be 9 inches long and $1\frac{1}{2}$ inches in diameter. It is secured to plank by a screw at O, the other end being turned over so as to pass through the opening in treadle at P. The wire-holder K can be made of $1\frac{1}{2}$ x $1\frac{1}{2}$ angle iron, and bent to the required curve while hot, or it can be made of cast iron. The length of holder K will depend upon length of wire to be cut. The gauge L, which slides on the holder K, is provided with a set screw for securing it in any desired position.

Cleaning Copper for Retinning.

From J. T. H., *Washington, D. C.*—I would like to know the best method of cleaning and retinning copper ware, such as is used in hotels and restaurants. I wish you would submit the inquiry to the readers of *The Metal Worker*. I am doing work of this kind, and sometimes a vessel is exceptionally hard to clean, so that the tin will not readily adhere. There may be some of your readers who know of an acid, or a combination of acids, that may put the roughest of copper ware in condition to be tinned without great labor.

Note.—We would suggest that probably good results may be obtained in cleaning copper ware by the use of hydrochloric, or, as it is commercially known, muriatic acid. We wish our readers who have had experience in this line of work, however, would furnish us with their views.

Aluminum.

From L. A. M., *Mayfield, Ky.*—Please explain the composition of aluminum metal through the columns of *The Metal Worker*.

Answer.—We do not exactly understand our correspondent's inquiry. If he refers to the metal aluminum, we would explain that this is a primary metal and is not a composition of other metals. There are, however, various alloys and mixtures into which aluminum enters, but many of these are trade secrets of the manufacturers. Some ingredients of alloys of aluminum are, we believe, tin, zinc, nickel and lead. We must not omit to mention, however, the aluminum bronzes, in which aluminum plays an important part.

Forming Wash Boilers.

From ON THE ROAD.—In *The Metal Worker* of March 11 "O. J. B." of Troy, Ind., desires to know the quickest way to form up wash boilers. As I have had experience in tin and furnace work in seven different States since I commenced my business 25 years ago, and have made thousands of wash boilers, covers and all, at 20 cents apiece, I will offer a few remarks which may not be without interest to the correspondent named. In the first place, take the band iron which usually comes around Russia iron, or any band iron which is flat and about ⅛ inch thick by 1 inch wide, and cut one piece the length of the circle of the middle of the boiler it is desired to form. It will be the same length as the circle of one end of the bottom of the boiler where it is double seamed. Cut another piece of band iron just as long as the first piece, and flatten the ends down to a thin edge, using either a hammer or file for the purpose. Lay off the body of the boiler and make a mark where the circle is to commence. Raise the upper roller of the former so that the wired edge of the boiler and the short piece of iron will slip between the upper and lower rolls. Then adjust the back roll as nearly as is possible by guesswork, and hold the band of iron on top of the work. Turn the crank and feed the boiler and short iron band into and through the rolls until the short piece has passed through and formed half of the circle on one end. When the short piece of band iron drops off push the body of the boiler through to the mark on it where the middle circle commences. Place the long band iron on top of the wire edge of the boiler at the mark and feed through the same as before. Next, take the short piece and repeat the operation, forming up the last half at the end. "O. J. B." may not obtain a good form on his first boiler, but after he has formed a few he will catch on, so to speak, and find it easy enough. Once get the rollers set right, then do not touch the thumbscrews again. After they are once set, a hundred or more boilers can be set without further adjustment. Oil or grease the top side of the irons so that they will not feed through faster than the boiler. Always break the tin before locking. Run three to five sheets through the roller at a time so as to prevent kinks in the ware when forming up after wiring. Of course, the bottom side of the boiler will not form as exactly as the wire edge, but that does not matter. He can draw the circle down over a stake and true it up, if he wishes, though this is not necessary.

I used to take out six dozen boilers at a time when working in New York City and many times have formed the whole lot in an hour, though I always had to go over them when fitting covers. In order to make covers fit both ways is a knack. Never put a boiler on a stake for the purpose of truening it up. Set it on the floor, take a raising hammer in the left hand, holding it in the inside or outside of the circle, as the case may be, stand over the boiler and with the mallet give it a sharp tap which will shorten or lengthen the circles as may be required. The position of standing over a boiler permits the eye to take in the vital spot which needs a rap of the mallet. This may not interest "O. J. B.," but I tried all ways and could make more boilers this way than any man I ever saw by a different method. I have made 24 boilers and covers in ten hours and my covers fitted either way, and my brother tinners know what that means. Thanks to *The Metal Worker*, however, I answered, ten years ago, a want in the Labor Exchange, and secured a position on the road where I now am, though I still read *The Metal Worker* as eagerly as ever.

Cincinnati Industrial Assembly.

The third of the series of industrial assemblies instituted by the Merchants' and Manufacturers' Association of Cincinnati was held at the Gibson House in that city on the evening of March 14, in the interests of the metal trades.

An informal congress beforehand in the corridor of the hotel served to bring about introductions, and later the march was taken to the dining hall, where the gentlemen took seats.

President Stewart Shillito of the Association sat at the center of the main table, while at his left was President-elect W. T. Perkins of the Manufacturers' Association and Archer Brown at his right.

At the table were President Thomas P. Egan of the J. A. Fay & Egan Company, George M. Verity of American Roofing Company, John Crowther of the Globe Machine Works, John B. Morris of the J. B. Morris Foundry Company, G. M. Morris of the same company, G. C. Witt of the Witt Cornice Company and Harker Mfg. Company, Charles E. Witt of Witt & Brown, while at the other tables were C. W. Magill of W. W. Magill & Sons, D. B. Bayless, F. H. Lawson of F. H. Lawson & Co., W. S. Dickinson of W. S. Dickinson & Co., H. B. Wells and Charles Walter Bell of the Cincinnati Tin & Japan Company W. W. Tyler of Union Axle Company, Myer Ottinger of Isaac Fallers' Sons & Co., E. W. Vanduzen of the Vanduzen & Tifft Company, W. T. Johnston of Crowley & Johnston, J. C. Hobart of Triumph Compound Engine Company, Chris. Kiechler, President of the Kiechler Mfg. Company, Thomas J. Bell of Thos. J. Bell & Co., J. A. Jones of Robert Jones & Co., Col. J. A. Andrews of the Newport Rolling Mills Company, F. H. Osborn of Osborn, Hutchins & Hunt, Ervin Maxwell and Walter H. Maxwell of the Emery and Palace Hotels, F. B. Lotze of A. Lotze's Sons & Co., W. E. Ward, J. R. Stewart of the Bradford Milling Company, W. L. Clements of Clements & Co., H. J. Yosiger of the Eureka Yeast Company, James A. Sebastian of Mitchell, Tranter & Co., L. P. Phipps of the Globe Rolling Mill Company, A. C. Jones of the Jones Bros. Electric Company, Chas. Davis of the Lodge & Davis Machine Tool Company, O. D. Bryant, of the Crane & Breed Manufacturing Company, Chas. F. Thompson of the Lane & Podley Company, James Powell, President of the Wm. Powell Company, G. H. Merkel of Merkel Bros., H. H. Suydam of the Cincinnati Mfg. Company, J. S. Chambers of the Cincinnati Mfg. Company, George M. Clark of the Mitchell-Tranter Company, P. G. March, E. P. Wilson, Earl W. Stimson of the Geo. W. McAlpin Company, Chas. J. Steru of Strauss & Stern.

When the collation had been fully attended to, introductory remarks were made by chairman Shillito, after which he introduced W. T. Perkins, chairman of the Entertainment Committee, who announced that the next assembly would be held at the Hotel Emery, and would be for the wholesale grocery, spice and drug trade.

Among the speakers of the evening were: Thomas P. Egan, president of the J. A. Fay & Egan Company; F. H. Lawson of F. H. Lawson & Co., H. D. Wells of the Cincinnati Tin and Japan Company, Col. J. A. Andrews of the Newport Rolling Mills Company, Charles F. Thompson of Lane & Bodley, Charles Davis of the Lodge & Davis Company, and Joseph Jones of Robert Jones & Co. The topics most prominently touched upon were the Iron, Copper, Brass and Tin interests. Each assembly has shown an increase in numbers and interest over the first.

NEW PUBLICATIONS.

THE CONNECTICUT STEAM USERS' DIRECTORY, 1893. L. F. Middlebrook, Hartford, Conn.

A little work has been compiled with the object of supplying the steam-using public of Connecticut with a convenient book of mutual reference, and the general public with a medium of information to assist in soliciting business, sending circulars, &c. The book supplies the names, location and business of all users of steam in the State, alphabetically arranged under the various cities and towns, as well as a purchaser's guide, containing a list of manufacturers and dealers in other States who supply the necessities of mill owners. The directory should be a useful handbook for those doing business in or with the State of Connecticut.

The paper by Professor N. S. Hele-Shaw on the strength of small chains, an abstract of which was printed in *The Metal Worker*, did not refer to the makers of the American "Triumph" chain, to the extraordinary strength of which he calls attention. We may state, therefore, that the Triumph chain is manufactured by the Bridgeport Chain Company of Bridgeport, Conn., of which George C. Edwards is president and treasurer, and Charles L. Slide, secretary.

The only contracts for power at the great cataract which have been let up to date are with the Niagara Paper Company, who have contracted for 3000 horse power at the rate of $24,000 a year, and the Contract Electric Company of Buffalo, who have contracted for 10,000 horse power, to be delivered at the northern boundary of the city. There have been many other applicants for power, but purchasers seem to be holding back until the first trial is made, in order to see if it is entirely successful.

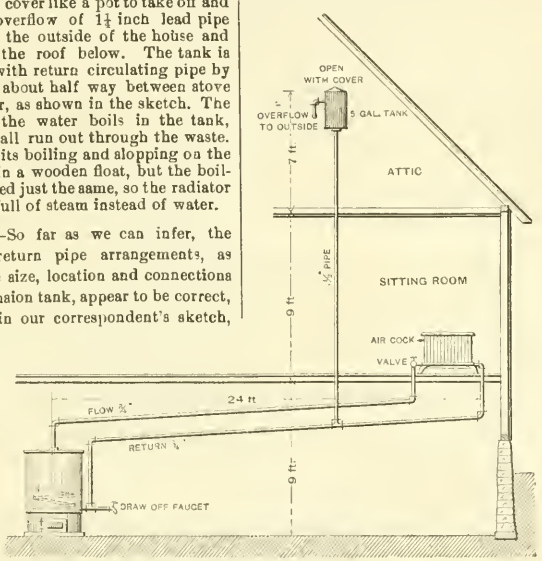
A report from San Francisco says that Claus Spreckles, the sugar operator, proposes to transfer four steamers owned by him and employed on the Australian route and start an opposition line from San Francisco to Panama.

STEAM AND HOT WATER.

Difficulty with Hot-Water Heating.

From R. B., *Massachusetts.*—I have had trouble with a small job of hot-water heating, and would like some information with regard to its working. The stove is an ordinary cylinder stove with sheet iron body and 16 inch fire pot. It is located on the first floor. A coil of ¾ inch iron pipe makes two circuits around the top of the fire pot. The flow and return pipes are ¾ inch, running 24 feet with 8 inch rise on the run to the radiator in second story. A 5-gallon expansion tank of galvanized iron is in the attic with open top and has a common tin cover like a pot to take off and fill. The overflow of 1¼ inch lead pipe leads out to the outside of the house and wastes on the roof below. The tank is connected with return circulating pipe by ¾ inch pipe about half way between stove and radiator, as shown in the sketch. The trouble is the water boils in the tank, making it all run out through the waste. To prevent its boiling and slopping on the floor I put in a wooden float, but the boiling continued just the same, so the radiator would get full of steam instead of water.

Answer.—So far as we can infer, the flow and return pipe arrangements, as well as the size, location and connections to the expansion tank, appear to be correct, as shown in our correspondent's sketch, which we reproduce. The difficulty apparently exists in the coil in the fire pot. In the first place, the coil may absorb more heat than the surface in radiator will give off, and the surplus thus absorbed will convert the water into steam, which in turn will blow the water out of the system. It is not improbable that if the surface in the coil in fire box were reduced the overflowing at expansion tank will be stopped. As our correspondent does not state the quantity of surface in the radiator we can only surmise the cause of the difficulty. If the surface in the radiator is large relatively to the coil in pot, then the overflowing may be due to want of inclination in the fire-pot coil, tending to form a partial trap in which steam may be produced, and by which the water is forced out through pipe to expansion tank. Should this be the case, it will be well to use a 1¼-inch pipe in coil in place of a ¾-inch pipe, and with a regular inclination it will be found to work satisfactorily.



Difficulty with Hot-Water Heating.

Factory Heating by the Blower System.

By Walter B Snow.

VARIETY IN APPLICATIONS.

There is diversity in the manner of application of the blower system as great as the diversity in buildings in which it is applied. Disregarding the higher classes of buildings, such as theaters, churches, halls, office and school buildings, there still remains that extensive class known as factories, as various in their design and construction as in their uses. From extended one story buildings to the many-storied mill; from the iron works to the cotton mill, and the blacksmith shop to the tool room, there is an ever-changing set of conditions and requirements.

The foundry, with its warm castings generally remaining over night, is easily heated, as compared with the granite cutters' shed. The machine shop, with its large masses of cold iron and with little heat generated by the friction of moving machinery, requires vastly more heat than the spinning room of a textile mill, with its thousands of revolving spindles and immense amount of shafting and belting.

The planing mill, with its capacious exhausters, removing not only the chips and shavings, but large quantities of warm air, is, like the picker room of a cotton mill, a much more difficult place to heat than a well built and tightly closed machine shop.

Furthermore, the boiler maker, molder or blacksmith, who has to work in a temperature that would be barely comfortable to an employee in a watch factory, will certainly complain of the excessive heat.

All these, and a thousand other points, have to be considered in satisfactorily heating a factory. Too often, however, it seems to be merely a question of cubic contents and exposure, with scarcely a hint as to character of construction, or the uses to which the building is to be put.

ONE-STORY BUILDINGS.

Of all open-storied buildings the most difficult to heat for a given cubic contents are, as a rule, those of one story, having, as they do, the largest amount of exposure per unit of volume, and when of considerable hight requiring special care in the distribution of the air. Whenever there is a ceiling beneath the roof timbers, rapid cooling is prevented and the air is given an opportunity to roll along this surface. The most satisfactory, but necessarily the most expensive, application of the blower system in a one story building consists in conveying the heated air from the hot-blast apparatus around the entire building through horizontal pipes inside the building as near the eaves as possible, and discharging downward therefrom through branch pipes extending nearly to the floor. There is thus provided a warm barrier of air close to the walls around the entire building. By the cooling action of the walls and the windows this air falls to the floor, passes to the center of the building and escapes through cracks in the monitor or else continues at the ceiling to pass back to the walls and there unite with more fresh warm air.

With this arrangement the fan and heater is frequently placed overhead on the roof trusses in the center of the building. Whenever it is not desired to provide fresh air the movement of the air already described is accelerated so far as the upward movement is concerned, and it is readily drawn back into the heater to be reheated. In the ordinary shop the matter of heating has very decided precedence to ventilating, and it is seldom that fresh air is taken directly from out of doors. With direct heating there is in a factory practically no entrance of fresh air except by leakage, but with the blower system such a pressure is created within the building that although the air may be continually passed through the heater there is always a slight outward leakage at some points and a corresponding, although almost imperceptible, inward leakage at other points.

The economy of reusing the air is marked and self-evident. For, suppose that the air discharged from the distribution pipes must be at a temperature of 140° to satisfactorily heat the building, with outdoor air at 0°, it clearly makes a difference whether air must be raised from 0° to 140°, or from the temperature inside the building—say 60° or 70°—up to 140°. That it is expensive to thoroughly ventilate must be admitted, and this, above all others, is the reason why the factories of the present day are so far from perfect in this respect.

To return to the heating of one-story buildings: many are satisfactorily heated by the placing of a single hot air pipe

down the center, discharging at an angle downward toward the walls and floor.

SINGLE APPARATUS.

The simplest arrangement conceivable where any piping whatever is to be used is that illustrated in Fig. 1, where, in a shop 80 feet wide and 400 feet long, a single cross pipe at one end is provided with one outlet under the monitor and one under each of the sides from which air is discharged, the entire length of the building.

The popular form of machine shop, familiarly known as the "galley shop," can be treated in this manner under certain circumstances. The traveling crane, which always forms a part of such a construction, prevents the carrying of any pipes directly across the building, except at the extreme ends.

Fig. 1.—One-Story Building, Heated by Single Apparatus.

Several methods have been successfully adopted for the heating of such buildings. One of the earliest was to place a fan and heater upon the first or ground floor midway of the length of the building and near one of the side walls. From the fan brick ducts were run along each of the walls beneath the floor level, connecting with the one on the opposite side of the shop, being made through a brick underground duct. At suitable distances and between the windows galvanized iron risers were provided, each having outlet openings on the first floor and the gallery floor, so arranged as to blow along the walls, no air whatever being discharged toward the center of the building. The natural circulation of the air, however, caused it to rapidly distribute itself throughout the entire building, creating a remarkably uniform temperature.

USE OF TWO HEATERS.

Whenever the building is large enough to warrant the introduction of two apparatus they may be very satisfactorily arranged as shown in Fig. 2, whereby all crossing of the center space is readily avoided. Here the air is discharged toward the outer walls, the larger volume beneath the gallery, from pipes as indicated. These pipes extend the entire length of the building.

By the introduction of a fan and heater at each end of the building and an arrangement similar to that in Fig. 1, a volume of air may be forced from each end toward the center. Care should, however, be taken that with this arrangement the end walls are sufficiently protected by volumes of warm air.

In all these arrangements the air from the shop can be readily taken back through the apparatus and reheated.

BUILDINGS OF MORE THAN ONE STORY.

In buildings of more than one story there should always be opportunity to place the apparatus on the lowest floor or in the basement, and as near the center of the building as possible. Very few factory buildings are square, by far the larger proportion being in length from two to four times the width. Hence, while in a square building a single sheet iron pipe extending from the apparatus vertically up through building at its center and discharging the air toward all four sides will prove very effectual and economical of distributing pipe, in a rectangular building, on the other hand, these stand pipes will have to be duplicated and connections to their bases made directly from the apparatus.

The general application in such a building is shown in Fig. 3, and probably forms one of the most common arrangements adopted in wooden factories or buildings not primarily designed with a view to the introduction of the hot-blast system. This arrangement is sometimes varied by carrying up a single riser at the center of the building and extending therefrom toward the ends horizontal pipes on each floor—in all cases these pipes being close up to the ceiling, so as not to interfere with belting or shafting. The distance these pipes have to be carried toward the ends, and likewise the number of the risers with the other arrangement, must depend on the distance the air can be forced and still do effectual heating—this in turn depending on the smoothness of the ceiling and the cooling character of the walls, as well as the relative width of the building. In a certain building in which the floors are carried upon the regular floor joist about 12 inches apart, these joists being at right angles to the direction of the air current, the serious breaking up of the currents which thereby resulted was almost entirely obviated by tacking to these joists a few lengths of galvanized iron of standard width, extending in the same direction as the current, so as to form a smooth surface along which the air could slide or roll. This was far cheaper than to make pipe to convey the air the same distance.

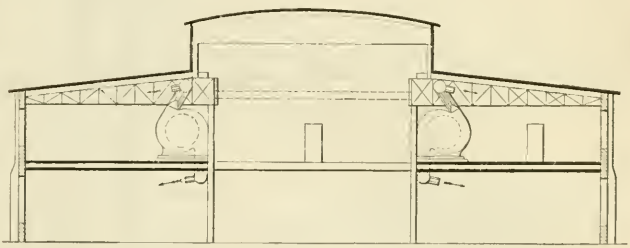


Fig. 2.—One-Story Building, Gallery Type, Heated by Two Apparatus.

Fig. 3.—Four-Story Building, Heated by Vertical Risers.

FACTORY HEATING BY THE BLOWER SYSTEM.

Sometimes when the central space in the building is extremely valuable, the pipe may be made rectangular and carried up between the windows.

As the blower system becomes better known, the builders of new factories more and more take it into consideration in their original designs. This is particularly true of the textile mills. All the prominent mill architects of New England are conversant with the merits of the system for cotton-mill work, and in their original designs, almost without exception, make suitable provision for the introduction of the system.

MILL HEATING.

The prevailing custom in this line of mill work—but applicable to all brick buildings—is to carry the heated air up on the outside of the building in special brick pilasters at proper distances apart, between the windows. The general character of such pilaster flues is indicated in Fig. 4, which shows one of the best construction, with air spaces in outside walls and with specially designed dampers at each floor. The area of the flue is decreased, as it ascends, in proportion to the area of the outlets to the various floors.

Such pilasters are usually placed 50 to 75 feet apart along one side of the mill and discharge directly across it, even if 125 feet wide. The large amount of moving machinery in a textile mill serves to thoroughly disperse the air and equally heat the rooms throughout.

Connection to the bases of the various flues is usually made by a duct from the fan running along the side wall of the shape shown or with flat top covered with plaster on wire lathing, blue stone, brick on tee irons; or quadrant in shape, spring-

ng in a quarter circle from the basement floor over to the wall.

As such mills are generally of considerable size, the fan wheel is seldom less than 6 feet in diameter, and almost, of necessity, is inclosed in a three quarter housing of sheet iron, the lower portion of the fan casing being formed in the brick foundation. A special shape of fan, rendered necessary by the existing circumstances, is represented in the cut.

Obviously, under such an arrangement of flues and ducts the heating apparatus may be either within or without the building. In large plants particularly, where there are several buildings to be heated, it is quite generally the practice to erect a special building for the apparatus.

Ventilating or outlet flues are never necessary in ordinary mill heating where the air supply is sufficient only to change the air in the building every 15 minutes. Such outward leakage as does take place is almost equally divided among all the windows with their numerous leaks and some of it even takes place through the porous walls.

SPECIAL ADVANTAGES IN TEXTILE MILLS.

In the textile mill the blower system adds still another to its advantages. The necessity of an atmosphere of stated and constant humidity for the proper working of fine yarns is well known, and many endeavors with expensive apparatus have been made to produce that moist condition of the atmosphere most conducive to success in spinning. In a certain mill such an outfit cost $2500. When the blower system was introduced in another mill of almost the same size and owned by the same corporation, the moistening system consisted simply of a rose spraying nozzle on the end of a 1 inch pipe introduced into the duct at the outlet of the fan. The cost of this outfit may be compared with that in the first mill with considerable to the credit of outfit No. 2.

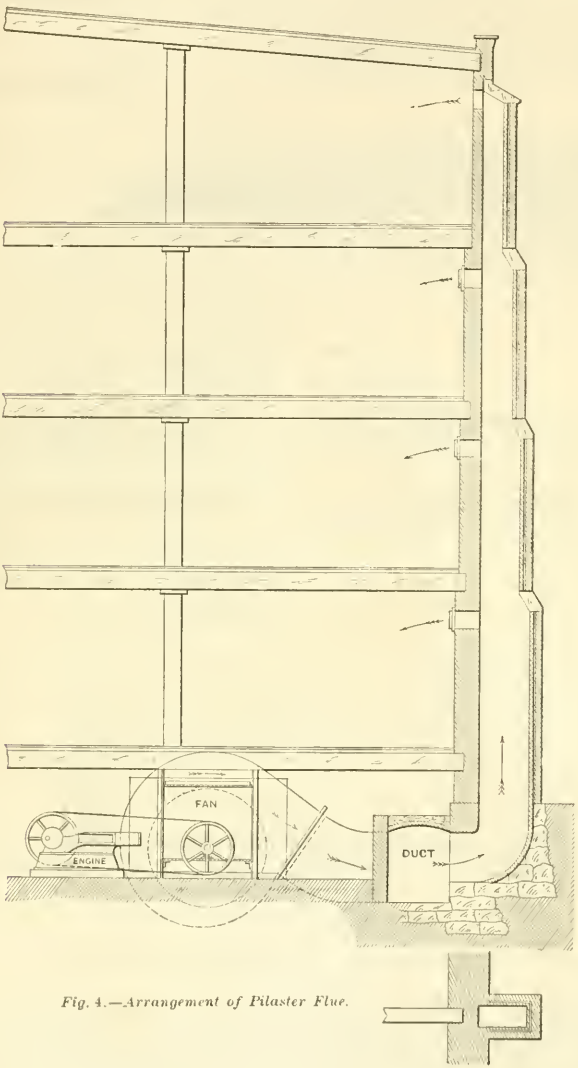


Fig. 4.—Arrangement of Pilaster Flue.

FACTORY HEATING BY THE BLOWER SYSTEM.

It was remarked of this same mill by a State inspector that, notwithstanding that no direct supply of fresh air was taken from out of doors, yet the atmosphere was far purer than in many of the public halls of the State.

In many cases, where from humanitarian or even from mercenary motives the air supply is taken from out of doors—particularly in shoe shops—the increased healthfulness of the operatives is noticeable. And the fact is further appreciated, that more and better work can be done in a pure and comfortable atmosphere than in the almost proverbially "stuffy" atmosphere of the ordinary factory.

IMPROVED VENTILATION.

The attention that is being given to this matter in the legislative action of our progressive States is at the present time noticeable to a marked degree, and goes hand in hand with the provision of safeguards against accident to the employee.

In some factories certain apartments require much more thorough ventilation than others. This is noticeably true of match factories, where, with the introduction of the blower system the air change in the rooms where fumes of sulphur and phosphorus are prominent is limited to five minutes while 20 minutes is the limit for the remainder of the building. If air of the same temperature were forced to all apartments alike, serious overheating would result in the rapid change portions. To obviate this, the apparatus is so designed that the air to the various apartments is properly tempered by mixing it with the requisite volume of cold air which has not passed through the heater.

While the presence of moist air in the textile mill is an advantage, a similar atmospheric condition in a machine shop with much bright work in progress would be a serious injury.

Fortunately the process of heating is such as to render the air leaving the ordinary apparatus (without moistening device) very avaricious for moisture and machine manufacturers have remarked on the absence of "sweating" on their bright work wherever the blower system is used.

In the lumber mill the same apparatus may be employed to heat the mill and dry the lumber. In small planing mills, furniture factories and the like, this is of great advantage. New adaptations of the flower system in factory heating are daily coming to view; manufacturers in certain specific lines are leaving its special adaptability to their particular line; the system, its operations and advantages are becoming better understood and its rapidly increasing adoption is a certainty of the future.

HEATING NOTES.

THE HERENDEEN MFG. COMPANY, Geneva, N. Y., send out postal cards directing attention to the Furman boiler of their manufacture, the merits of which are briefly alluded to.

IN AN ARTICLE in *The Metal Worker* of March 11, entitled, "Ventilation of Public Schools," the number of units of heat required to raise 1,080,000 cubic feet of air from zero to 65° F. were wrong, as stated. Cubic feet instead of pounds of air, were used in the calculation. The number of units of heat required to raise the quantity of air to 65° F. should have been 1,348,303. The weight of air is taken at 32° F., or about a mean between zero and 65° F.

THE MICHIGAN ASSOCIATION of Steam and Hot Water Fitters was organized March 16 at Detroit, Mich. This organization was the result of action taken by several prominent Michigan firms to bring about closer relations between the members of the trade in all parts of the State. Secretary Reynolds of the National Associa

tion of Master Steam and Hot Water Fitters, who was present at the meeting, spoke of the necessity of organizing to protect themselves against the manufacturers selling direct to consumers. The officers elected for the Michigan Association were as follows: President, Robert S. Sproul, Grand Rapids; vice-president, J. H. Crumley, Detroit; secretary, W. C. Weatherby, Grand Rapids; treasurer, James Meathe, Detroit; executive committee, T. F. Hertzel, Ann Arbor; C. W. Light, East Saginaw; J. A. Wheeler, Kalamazoo.

THE NASHVILLE MACHINE COMPANY, Nashville, Tenn., issue an illustrated catalague of the G. & J. R. Bolton Improved Hot Water Heater, which they manufacture. This heater is fully illustrated in the pages of the pamphlet, general and sectional views being presented, as well as full descriptive particulars. The main features of the heater and its advantages are also alluded to, and a table given of sizes, weights, and other particulars, including prices. At the close is a list of names of some of the users of these heaters.

F. P. HAMILTON, for a number of years superintendent for Dewstoe & Schneider of Cleveland, has connected himself with the Capitol Heater Company of Detroit. He will represent that company in Northeastern Ohio, North western Pennsylvania and Western New York, selling the Capitol and Bolton hot water heaters.

THE HERBERT STEAM HEATER COMPANY have purchased a piece of vacant ground on Shields avenue, 150 x 150 feet, near Thirty-third street, Chicago, on which they will begin at once the construction of a large plant for the manufacture of heating boilers. The ground is on the line of the Pittsburgh, Fort Wayne & Chicago Railroad. The company is composed of M. E Herbert, formerly of Chicago, but who has been successfully engaged in manufacturing at St. Joseph, Mo., for 15 years, C. J. Herbert and Louis Plath. The capital stock is $50,000. Plans for the first building to be erected have already been prepared, and construction will be commenced at once with a view to its completion by May 1. The building will be 50 x 125 feet in dimensions and a story and a half high, the section containing the offices being two stories high. It will be constructed of brick and stone, and temporary walls will be put in at one end, so that it can be easily extended as the growth of the business warrants.

THE MONITOR STEAM GENERATOR MFG. COMPANY of Landisville, Pa., report business brisk. They are makers of the Monitor Instantaneous Steam Generator and Positive Hot-Water Circulator, and their business is principally with the trade, they only taking contracts for heating in sections where the services of a practical fitter are unattainable. Their capacity is from two to three finished boilers per day, furnishing employment for about 45 hands.

THE ANTHRACITE BRASS WORKS of Tamaqua, Pa., have started a factory for the manufacture of stop cocks, brass castings and other goods. They also deal in plumbers' goods, and undertake steam heating. As a specialty, they are turning out large quantities of wrought-iron nipples and long screws, which they claim to be able to put upon the market at exceptionally low prices.

THE MODEL HEATING COMPANY, Stewart Building, New York, issue an elaborate pamphlet entitled, "Circulation at the American Institute Fair." The publication contains some 30 pages, and presents in an interesting way the exhibit of the company at the American Institute Fair, showing the circulation of hot-water through radiators and pipes in various positions. There is also a description given of the Novelty Circulator, models of which operated the radiators and pipes at the exhibit. The cuts are well executed and the publication is an interesting example of trade literature. Tables of dimensions, ratings, prices, &c. of the Novelty Circulator are likewise presented.

Errors of Experts.

In the course of a recent lecture before the British Institute of Marine Engineers at Cardiff Joseph Williams gave some striking instances of erroneous opinions expressed by experts, from which we extract a few of the most emphatic as examples of how even the greatest minds are not always able to grasp the full possibilities in their own particular branch of science or study:

James Watt, it is said, attempted to get an Act of Parliament passed to prevent the further introduction of Trevithick's high pressure engines, and for the latter's continued advocacy of the use of high-pressure steam, the mild Caledonian philosopher forgot himself so far as to say openly that the great Cornish man deserved hanging. It is an instructive commentary on the prescience displayed by such a great engineering authority, to observe that it is not uncommon to find steam engines of the present day working with a steam pressure five times greater than Trevithick adopted to work the first railway engine at the Penydarran Iron Works 26 years before the advent of George Stephenson's famous "Rocket" at the Rainhill competition. There can be little doubt that from Trevithick's achievements Stephenson drew the inspiration which his genius and industry elaborated into his magnificent success.

Reference to the "Rocket" reminds one of another rather strongly expressed opinion concerning the conditions which were formulated to govern the celebrated engine trials at Rainhill. Mr. P. Ewarts, who, though not so distinguished as the others, is said to have been a gentleman of some eminence in Liverpool, and to have subsequently filled the office of Government Inspector of Post Office Steam Packets, declared that only a parcel of charlatans would ever have issued such a set of conditions; that it had been proved to be impossible to make a locomotive engine go at 10 miles an hour; but if it ever was done he would eat a stewed engine wheel for his breakfast. About the same time a writer in the *Quarterly Review* remarked: "What can be more palpably absurd and ridiculous than the prospect held out of locomotives traveling twice as fast as stage coaches? We would as soon expect the people of Woolwich to suffer themselves to be fired off upon one of Congreve's ricochet rockets as trust themselves to the mercy of such a machine going at such a rate."

A speed of 60 miles an hour is now regarded with equanimity, and it has been satisfactorily demonstrated that upward of 80 miles an hour is possible.

When that grand old mechanic, William Murdoch, among his many other useful inventions, discovered the utility of coal gas, and advocated its general use as an illuminating agent, his idea was ridiculed by the most eminent scientific experts of his day, the foremost among them being Sir Humphry Davy, who sarcastically suggested the idea of using the dome of St. Paul's for a gas meter, but "facts before philosophers" was found to be true in this instance as in that of innumerable others, and Murdoch's experiment with the bowl of a tobacco pipe filled with small coal was the germ which eventually developed into one of the vastest industries of our time, which now furnishes daily employment to hundreds of thousands of workmen and creates an annual demand for millions of tons of coal.

Robert Stephenson (who unlike his great father) had received the benefits of a liberal scientific education, and who occupied a place as an expert in the very foremost rank of modern engineers, thus expressed himself in the House of Commons with regard to the project for cutting a canal through the isthmus of the Suez: "I have surveyed the line, I have traveled the whole distance on foot, and I declare there is no fall between the two seas. Honorable members talk about a canal. A canal is impossible—the thing would only be a ditch."

The Suez Canal has since become one of the greatest commercial highways between the nations of the world.

That eminent scholar and scientist, the late Dr. Lardner, pronounced dogmatically in 1835, that any attempt to send a steamboat across the Atlantic would prove an absurd delusion; but on subsequently modifying his views, he fixed the ultimate size and power of Atlantic steamers at 800 tons and 200 horse-power. The inaccuracy of both these predictions was demonstrated within a period of three years from their utterance, by the crossing of the paddle steamer "Great Western" of 1340 tons and 440 horse-power.

The great ocean "greyhounds," "New York" and "Paris," which have recently been added to the mercantile navy of the United States, possess 10,500 gross tonnage, with 18,000 indicated horse power, and the end is not yet. These figures are both to be overtopped by the last new liners now being fitted out for transatlantic service.

Numbers of other instances of similar miscalculations might be quoted, as showing that no man, however great his intellect, is infallible or omniscient. Science has constant surprises on hand, and what is deemed impossible to-day may to-morrow be placed in the catalogue of achievements.

The Supreme Court of Tennessee recently rendered a decision which is of very broad and general application in the principles it involves. It appears that the Wholesale Grocers' Association of Nashville had bound its members not to buy from any importer or manufacturer who sold to retail merchants. The plaintiff, a retail grocer, brought suit against the association for $25,000, alleging that this combination of wholesale grocers had damaged his business, diminished his profits, and subjected him to great inconvenience and trouble, and that the compact made and enforced by the wholesale grocers was in restraint of trade, and therefore against public policy and unlawful. The trial judge charged the jury that such an organization was illegal, and that the plaintiff was entitled to recover any actual damage he had suffered by reason of such combination. In sustaining the decision on these points the Supreme Court went further, and held that if such an agreement was found to exist and the plaintiff had suffered from it he was entitled to a verdict or nominal damages which would carry with it the costs of the action.

William R. England, Chicago, Ill., has been granted a patent on a pipe coupling, consisting of one member provided with a longitudinally corrugated spigot and another member having an interiorally longitudinally corrugated bell. The corrugated portion of the spigot and bell interfit with each other, and an annular chamber for packing is provided.

The companies in the northern part of New York engaged in producing mineral pulp are to be consolidated in one corporation having a capital of $2,000,000.

PLUMBING AND GAS FITTING.

Organizing a Health Board.

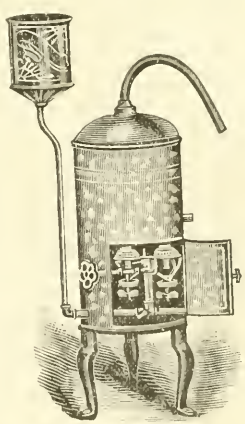
From C. A. B., *Pennsylvania.*—Please inform me through the columns of *The Metal Worker* how a town of 3000 inhabitants can go about it to secure a health board. Are sanitary inspectors usually appointed by the boards of health and are these officers usually paid anything? Where must a plumber apply for a license and examination, and what is the cost?

Answer.—Through the efforts of the Master Plumbers' Association of Philadelphia a bill was passed in the Pennsylvania Legislature in 1885 authorizing boards of health in cities of the first class throughout the State to present rules and regulations for the construction of house drainage, the registration of master plumbers and the construction of cesspools. The act consists of only three sections—one defining the general scope and purpose of the act, another conferring the power of supervising plumbing and house drainage on the respective boards; the sanitary inspectors to be paid such compensation as the councils of these cities shall approve, while the third provides the penalties for refusing or neglecting the requirements of the sanitary rules when promulgated. The bill, though intended only to apply to cities of the first-class, is held to be permissive so far as smaller places are concerned, the formation of local boards of health being vested in most instances in the local council or governing board. When the Board of Health is formed, if there is a sufficient number of plumbers in the town or district, rules can be formulated under which sanitary inspectors may qualify for position and plumbers prove by examination their fitness to conduct a plumbing business. As the Health Act of 1885 is in better working order in Philadelphia than in other cities in the State, owing to the good work of the Association of Master Plumbers, we give the methods in vogue in that city for the enforcement of the provisions of the act as follows: Under Section 1 authority is given "to provide for the registration of master plumbers and persons engaged in the plumbing business in said city." Before such registration can be effected the applicant must undergo an examination as to his fitness. The Registration Committee of the Master Plumbers' Association co-operate with the Health Department in the matter; but the examination of the applicant must be made by the chief officer of the Drainage Department of the Board of Health. A schedule of questions on the practical and scientific character of the work of plumbing and drainage is presented to the applicant, and if his correct answers fall under 70 per cent. he will not receive a certificate of registry, nor be permitted to engage in business in Philadelphia. Failure at the first examination does not deprive him of another trial, which, however, is deferred for three months, but if the second examination results in failure then he is laid off indefinitely. If successful he obtains his certificate, but whether there is any fee attached to the issuance of the license or otherwise, we are not in a position to state. There does not appear to be any fee called for in the rules promulgated by the Health Board in February, 1886, but refusal or neglect to comply with the rules is mentioned in the statute and subjects the offending plumber to "a fine of not more than one hundred ($100) dollars or to undergo an imprisonment not exceeding one year or both, in the discretion of the court." The sanitary inspectors in Philadelphia are appointed under the act by the Board of Health (*vide* Sec. 2), and are paid a salary of $1200 per annum.

It should be borne in mind that the act of the Legislature of June 30, 1885, applies to the entire State, and not to any particular location or city.

The Surprise Gasoline Portable Bath Heater.

The accompanying cut illustrates a portable bath heater adapted to use gasoline as a fuel that has been brought out



Surprise Gasoline Portable Bath Heater.

by McCahan & Co., 8 North Central avenue, Baltimore, Md. The gasoline heater is made the same as the gas heater of the firm, except that it has longer legs and a gasoline tank. A twin burner, operated with one crank, is attached to the case. The water inlet is near the bottom of the steel boiler, and hot water is delivered through goose neck at the top. The boiler, we understand, will resist any ordinary water pressure, and can be connected with any water supply, either by hose or iron pipe. Where connected by iron pipe permanently the hose and goose neck are not necessary, and the cost of the apparatus is less.

Range Boiler Emptied Through Relief Pipe.

From W. T., *New York.*—As well as can be judged from the sketch presented in *The Metal Worker* of May 18, the displacement of the hot water in the boiler through the relief or expansion pipe and the substitution of cold water therefor, as explained by your correspondent, "C. Q. A.," are due, in my opinion, to two causes, each more or less identified with the other—viz., the insufficient altitude of the tank above the boiler, and the use of a relief pipe, which is, consequently, too limited in hight to avoid being mixed up in the trouble. Your correspondent, I note, has fallen into an error in the first instance in attributing the effects he complains of to the fact that the water will syphon back into the supply tank through the vent pipe. This is an impossibility when the respective position of the two vessels are taken into consideration, as syphonage cannot take place where a liquid has to be drawn from a lower vessel into a higher one. In the illustration, as it appeared, the range boiler is the lower vessel, the supply tank the higher, and if syphonage had to be brought into operation as a means of transferring water from one to another of these vessels, the long leg of the syphon should be inserted in the boiler instead of in the supply tank. It is, therefore, clear that some other cause than syphonage must be made responsible for the emptying of the lower vessel, viz., the boiler, into the higher one, the tank. Now, as to the cause of the trouble. It is shown by the explanation appended to illustration that the tank said to contain 27 barrels of water —say, 810 gallons—is set on a level with the top of the boiler. The measurements of the tank are not given, but probably, judging by its alleged capacity, 6 feet in length, 4½ feet in width and 4 feet in hight, would suffice. From the top of the boiler an expansion or relief pipe is carried down to and under the floor and again upward to above the tank, where it is finished with a return bend. Through this pipe the emptying process complained of takes place—the water in the boiler as soon as heated commencing to discharge into the tank, its place being, of course, taken by the cold water. The agency through which this undesirable effect is accomplished is not, in my opinion, difficult to find out. It should be remembered that water is at its greatest density at 40° F.—that is, the greatest quantity can be stored in a given space at that temperature. If a boiler is filled with water at this density, and the water afterward be heated, expansion will take place—that is, the heated water will increase in bulk, and if there is no other relief afforded it will seek it through the cold-water supply pipe. If, as in the case cited by "C. Q. A.," a relief pipe is supplied, the expansion will naturally be through that pipe, and the question then comes up, what is the storage capacity of that pipe for the amount of water displaced by the expansion process? Hot water, as we understand the term, expands about 1 gallon in every 24—that is, there must be some receptacle provided equal in space to the duty of storing that amount of water after it is forced out of the boiler. If the boiler, as illustrated, is of the capacity of 40 or 50 gallons, the increased space necessary will be for the storage of either 1⅔ or 2 gallons, as the case may be. Is it not, therefore, fair to assume that

considering that "C. Q. A.'s" tank is on a level with the top of the boiler, the necessarily short expansion pipe is not able to store all of the water displaced in the heating process—that it is forced out in this way into the tank until the expansion is checked by the resultant inflow of cold water and the reduction of the temperature in the boiler? This is the view I take of it, and I do not see how the defect can be remedied unless, first, raising the tank sufficiently high to give the necessary lengthening of the relief pipe; second, extending the relief pipe as much above the tank as possible; and, third, doing away with the relief pipe altogether and letting the expansion find its own relief through the supply pipe. If the boiler were supplied from street pressure, "C. Q. A." could not use a relief pipe unless he carried it above the roof, which would not be a likely thing, and he would consequently have to dispense with its use. It is probable that this view of the cause of the trouble will be questioned, and that it will be urged that, as water exercises a pressure equally on all sides, it does not follow that the increase by expansion should seek an outlet in one direction only—that is, by the top of the boiler into the relief pipe. To this objection, if urged, I would say in advance, that the tendency in hot water is to rise, and that in my opinion, in obedience to this natural law it will seek the needed relief in that direction while there is no resistance, in preference to maintaining an unnecessary struggle with the body of cold water at the bottom of the boiler. As a proof that an expansion pipe can be dispensed with without danger, I may point to hundreds of houses in this city where no such pipe is in use.

Alleged Errors in Plumbing.

From H. S. P., *Paterson, N. J.*—I notice among the "Errors in Plumbing Practice," which are set forth in *The Metal Worker* of March 18, breaking joints and using quarter bends on horizontal lines are placed on the condemned list. I cannot understand why, and I write for information. I am a builder and take contracts in their entirety, which includes the plumbing work, and as I have to rely on the plumber to whom I give the work, and who constantly commits these alleged errors, I will be glad to learn something that I do not know. Let us suppose that I have a cellar bottom through which the house drain is to run under the floor and to get out to the sewer through a certain point. In digging the trench we strike a "snag" in the shape of a rock which we cannot displace, but which we can get around by breaking the joints, as you call it, in four or five lengths of pipe, by which means we get the required deviation and can get around the obstruction. Is this a better or worse plan than using a couple of quarter bends so as to get around the "snag" aforesaid? It seems to me a better and in fact the only one advisable, because by the other alternative the use of the quarter bends will not be as efficient. What would be your suggestion? Would you use offsets instead of the quarter bends? Or how would you get over the difficulty?

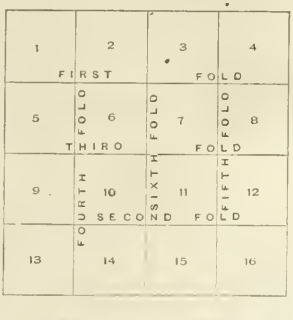
Answer.—It is a difficult thing at all times to give a definite reply to a hypothetical question, but we will endeavor to satisfy our correspondent. Three methods appear to be open by which the breaking of joints can be avoided: First, the plumber should thoroughly study the situation, and see if he could not, by the use of eighth bends, effect the necessary deviation—for instance, the drain pipe should be laid in a straight line to a given point. An eighth bend and a length of pipe, more or less, inserted at the proper place, would bring the drain in such a direction as to clear the obstruction, when the insertion of another eighth bend would throw the drain into a straight line again. A second plan would be to use a Y-branch on the line at such a point that an eighth bend inserted in the branch would bring it into line outside the obstruction, the mouth of the Y being meantime plugged up. This would avoid the breaking of joints or use of quarter bends. A third plan, the one of last resort, would be, if compelled to use quarter bends, or an offset, to use, instead, two one-eighth bends in place of one quarter bend, or four one-eighth bends in all, to curve the pipe so as to bring it around the obstruction. In theory the two quarter bends should be the same as the four one-eighth bends: but in practice, the latter make a much rounder joint or bend, and there is no sharp angle to interfere with the flow of the sewage.

Any of these three methods would be preferable to the broken-joint plan, by which the smoothness of the interior of the pipe would be completely destroyed. A portion of the spigot end of each length of pipe protruding inward at an angle would present an obstruction to the passage of the sewage. It also prevents the even calking of joints all round.

How to Make a Plumber's Wiping Cloth.

From A. D. E., *New York.*—Will *The Metal Worker* kindly afford some light on the proper method of making a plumber's wiping cloth, the material to be used and how it should be folded?

Answer.—The material used is strong ticking, of which sixteen folds are necessary for a good cloth. The appended diagram will enable our correspondent to make the folds, which must be evenly done. The size of the cloth when made up, as our correspondent knows, varies according to the use to be made of the completed article, varying from 2 to 6 inches square. As the latter is most used, we will select it by way of illustration. A piece of ticking 24 inches square, in order to serve the purpose, is marked out in imaginary squares of 6 inches. The first folding operation is to fold the portion represented by 1 to 4, inclusive, over that marked 5 to 8. The next fold places that portion represented by 13 to 16, over Nos. 9 to 12. These two double folds are again placed together, and the result so far is one long strip of four folds. The folding of this strip by first turning over the extreme ends, and then one other fold, completes the operation and gives a square of ticking of 16 folds, 6 x 6 inches, ready to be sewed carefully at the ends in such a manner that the stitches will not come in contact with the solder. The folded cloth is then thoroughly soaked in tallow, when it becomes a plumber's wiping cloth. It should be stated here that the first soaking is not sufficient; the process must be constantly repeated.



How to Make a Plumber's Wiping Cloth.

Setting Range Boiler.

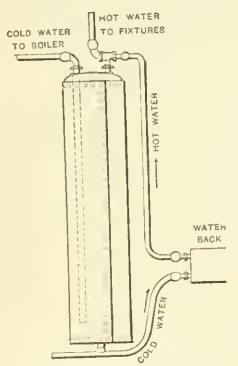
From W. H. S., *Bayfield, Wis.*—I noticed in the plumbing department of the issue of January 7, 1893, an article from "Young Mechanic," on the correct way of connecting range boilers to water fronts. I have connected quite a number of range boilers all in a similar manner, as shown by Fig. 2, and have never had a pipe burst at the bend B, shown in sketch, and of which "Young Mechanic" complains. I use the highest boiler stands made by a prominent manufacturer. As a general thing the cold-water supply pipe from the boiler has a rise of 2 or 3 inches to the water front. If Fig. 1 is the correct way and better results are obtained from it, why don't manufacturers of boiler stands make them high enough so that the boiler can be set as Fig. 1 shows, and not have "Young Mechanic," or any other plumber making wooden boxes to set the stand on in order to have the pipes in the correct position? It seems very strange to me that all the boilers I have seen set up by master plumbers should be wrong as regards the position of cold-water pipes from the boiler. "W. F. T.," in the issue of January 14, says the only defect in the sketches submitted by "Young Mechanic" is the sharp bend at B, Fig. 2. The usual couplings sent with a boiler are four. One of these is straight for the bottom and the other three are short right-angle bends. This, I infer from "W. F. T.'s" letter, interferes with or impedes the circulation in the hot-water pipe. I would like to know what kind of couplings "W. F. T." uses on the side of a boiler other than bent couplings sent with the boiler?

Answer.—Replying to our correspondent's questions, beginning with the last one, it is often advisable to discard the bent coupling and to use a straight one to which the lead pipe can be joined, a gradual bend in the lead pipe being preferable to the sharp sudden bend offered by the right-angle couplings our correspondent mentions. Although the position and manner of connecting a boiler shown in Fig. 1 and submitted by "Young Mechanic" we regard as an ideal arrangement, we are constrained to admit that most boilers are not (owing to the conditions of each case) connected in this manner. The standard sizes of boiler stands are 18 and 21 inches in hight. It can easily be seen why it would be impossible to have a stand of just the right hight to meet the requirements of every individual case owing to the fact that ranges are of so many different hights. Another point is that in city flats, as in the city of Chicago, range boilers are often connected and used in kitchens as high up as the second or even the fourth story. Very often the pressure of water from the city mains is not of sufficient power to force the water to the fifth story. This consideration makes it necessary to have the top of the boiler as low down as possible; therefore the lowest stand one can put under it must be used. The methods shown by Fig. 2 (if the pipes, connections and the water back are proportionate to the boiler) will give fairly

good results providing the pressure of the cold-water feed from the boiler is ample to raise the water so as to fill the water back and connection to the boiler and fixtures throughout the house.

Kitchen Boiler Connection.

From N. S. P., *New York.*—I do not quite agree with conclusions in your reply to "C. C.," Chicago, in *The Metal Worker* of February 25, as to the proper point of connection of the return (hot-water) pipe from water back, because of personal experience in that direction which agrees with that of the Milwaukee Gas Stove Company, as published in your issue of March 11. At the same time I must dispute the correctness of the claim presented by the last-named company, that the idea of connecting the hot-water return pipe at top of boiler originated with them three years ago, because I have been experiencing the benefits of that method of connection for more than ten years. When I purchased my house about that time the boiler was in position but failed to give satisfaction, as no hot water could be drawn from it for a considerable



Kitchen Boiler Connection.

time after the fire would be lighted in the morning. My plumber, who is well known as one of the leading members of the Master Plumbers' Association, at once undertook to remove the cause of dissatisfaction and made changes which were certainly new to me. He took out the hot-water return pipe from the usual side opening in boiler, which he had plugged up, and carried the pipe upward to top of boiler, where he had inserted a T, to one branch of which he connected it. From the other branch of the T he took his hot-water supply pipe for the fixtures through the house, and I can state positively that since he made the change there has not been a particle of trouble with the hot-water supply. He does not claim originality for his method, as it was well known at the time as the Creque method of connection. He maintains, however, that the water in the boiler will heat more rapidly by having the hot-water return pipe connected at top instead of side of boiler, and as he has given me satisfactory proof that he is correct, it is only right that I should concur in his opinion. I inclose diagram of boiler connection.

New York Gas Companies.

As illustrating the immensity of the gas interests of "Greater New York" a map published by the *Progressive Age*, with its issue of March 15, is of very considerable interest. The map, which has been gotten up with great care, shows the location of the different gas works and holders of the New York and Brooklyn gas companies, representing a total annual output reaching the enormous figure of 14,779,000,000 cubic feet. To the gas engineer the map should be of great value in giving him a perfect knowledge of existing conditions in the important industry of gas manufacture and supply in the metropolis. The map takes in the whole of Manhattan Island, with Brooklyn and a considerable portion of Long Island; embracing the territories of 16 gas companies which supply the cities and suburbs of New York and Brooklyn. From the details furnished by our contemporary we learn that an aggregate capital of $77,993,000 is invested in the gas manufacturing corporations of New York. Of these, the Consolidated Gas Company alone—a combination of a number of concerns, including the Municipal, the New York, and the Manhattan—hold an estimated capital of $39,000,000. This company, who stand first in importance, have an annual output of 8,000,000,000 cubic feet, and a largest daily output of 40,000,000 cubic feet. The next greatest concern is the Equitable, with a yearly send-out of 1,500,000,000 cubic feet of gas; the remainder all falling short of ten figures. The growth of the gas business in New York, despite the increasing use of electric lighting, is said to be rapid; and consolidation of all these vast interests is regarded as looming in the future.

Plumbers' Soil.

From R. L. S., *New Haven, Conn.*—Can you give me information as to how plumbers' soil is made, what the ingredients are and in what proportions they are used?

Answer.—The materials for making plumbers' soil are glue water and lampblack. Make a thin solution of the glue by boiling it slowly in water until entirely dissolved Then stir in lampblack sufficient to make the mass of the consistency of paint, simmering the compound over a slow fire for about a quarter of an hour. The testing of the article is done by applying it with a brush to a piece of lead and allowing it to get cool. The lead is next bent backward and forward in the hand in order to judge of its adhesiveness. If it cracks while the lead is undergoing the bending process, it is found to have too large a proportion of glue and is condemned. If it does not crack and adheres to the lead, it is considered all right.

Latrines of the East.

In a recent illustrated article published in the *American Architect*, of which we present an abstract, Edward S. Morse describes at length the ways of the people in Eastern lands in disposing of human excreta and the conveniences used by them. In most of these countries sanitary science is as yet almost wholly unknown, and their system of latrines is, to put it mildly, very primitive, not to say filthy in the extreme. That cholera should take its origin in China, Eastern Russia, and other parts of the Asiatic continent, is not surprising when we contemplate the methods pursued by the teeming millions of the East in the matter of sewage disposal, and its relation to drinking water, as detailed by Professor Morse and other authorities.

CHINESE METHODS.

The Chinese are, with the possible exception of the Russians, thought to be the most depraved of people in this respect. Their cities are said to be the filthiest places imaginable. In the better class of houses each room is provided with a covered wooden bucket for latrine purposes. These buckets are emptied each day by men who come round for the purpose, and the ordure is removed in open pails through the streets, being dumped into boats on the canals. These boats on being filled are towed away to the rice fields, where the material is spread over the earth for manure. It is said that much of the filth goes into the canal, through careless handling, and as this canal has no tide the result is that it mixes with what is generally the only source of drinking water. Moreover, the night soil manure on the rice fields is to a large extent washed into the canals by rains. Earthen jars imbedded in the ground are also used in the yards of some houses in China. These are covered by a low frame work of wood similar, as Professor Morse observes, to "the primitive simplicity of similar conveniences all over this country;" and these are periodically emptied. These jars sunk in the loose soil soon pollute the ground and, finally, the water supply. In Canton the latrines are public. Wooden buckets are used in the house by the women, but the men use the public places, which are to be seen in all quarters. These are described as a row of stalls in the filthiest condition imaginable, closed by doors. A deep stone gutter runs the length of the place, close to the wall. Across this in each stall are secured two narrow planks, and just in front a narrow gutter runs to carry away the urine. Widely distributed through the city are earthen jars imbedded in the ground, which are the public urinals. In Corea, a traveler has recorded that he saw women washing clothes in a stream, and "though the stream was low, and its bed served as a dung heap, water was also being carried away from it for household uses, and there was evidence on every side that, according to all rules of sanitation, the population should by right have ceased to exist."

JAPANESE CLEANLINESS.

Japan forms a striking contrast to China and Corea in these matters. Not only does every house have its privy, but there are public latrines as well, and the conveniences and general arrangements are scrupulously cleanly. In the country one often sees, in the neighborhood of the poorer class of houses, a covered place closed by a low door. Receptacles in the form of large jars or buckets are found near the rice fields. The Japanese are very careful to preserve the material for fertilizing purposes, and it is all transferred into the country, leaving the shores of a city absolutely pure. The general features of a Japanese privy are described by Professor Morse as follows: "The receptacle consists of a large earthen jar or the half of an oil barrel. This is sunk in the ground and emptied every few days by means of a long-handled bucket from the outside. The men who are engaged in this work have their regular routes and pay for the privilege. It seems incredible that a large city like Tokio, with its million of inhabitants, has this service performed in the most thorough manner. Indeed, so valuable is this substance that in Hiroshima, I was informed, in the renting of the poorer houses, if three persons occupied a room together the value of this product paid for the rent of one, and if five occupied the room no rent was charged."

In many places the privies might properly be called cabinets, so exquisitely clean and beautiful is the wood work inside and out. Some doors are inlaid in designs of different colored woods, the whole affair being a dainty bit of cabinet work.

The urinal is usually of wood, though porcelain ones are often seen. The wooden ones are in the form of a tapering box secured against the wall of the closet. Sometimes sprays of a sweet-scented shrub are placed in these and often replaced. The refinement of the Japanese in these matters is shown by the various names applied by them to the privy, such as *Setsuin*, snow-hide, *Chodzu-ba*, place to wash hands, *Ben-jo* and *Yo-ba*, place for business, *Koka*, back frame, &c.

OTHER EASTERN SYSTEMS.

On the Malay Penisula a few closed privies are seen among the natives. By those living over the water (as many of

these people do live) a shelter, removed from the house, and supported on poles, is provided. The floor of the convenience is constructed of a few boards, with wide interspaces between. On dry land a hole is excavated, and sometimes an earthen jar imbedded, in the ground, over which a few boards are placed.

In Siam the privy is usually erected on a frame work over running water, being a mere staging without covering. This custom seems to prevail among all the people of those parts from Bangkok to Singapore. Unfortunately, however, the water in which the excreta is emptied is usually the source from which the household water is drawn. The dissemination of disease is thus encouraged in these regions. The natives of Sumatra and Java follow the same general principles in erecting their conveniences over running water.

In parts of India, not immediately under British influence, gardens and open lots form the only convenience, pigs acting as scavengers. In Ceylon, the wealthier classes have latrines near the house, but the poorer classes resort to the garden or retreat to the underbrush near by. In many of our Southern and Western States, outside the larger towns, and in Central and South America, the same custom prevails.

RUSSIAN CONDITIONS.

In Northern Russia the habits of the natives are very filthy, and no conveniences of any kind are used. In Southern Russia, on the contrary, little houses are constructed in basket-work fashion and of basket material—roof, door and all. Within is a circular opening, or a wide interspace between the planks forming the floor. If anything would warrant a rigid quarantine against the Russian emigrant, the account given by Mr. Morse of the state of Russian towns, and especially of inns and public places, would certainly justify such an attitude. Unfortunately, the whole description is too long to quote in this article; suffice it to say that the interior of the public establishments "displays an inexhaustible store of disgusting foulness, eloquent signs and specimens of which cover the walls, the windows, the tables, the floors and the kitchen. The whole place is permeated with abominable smells and venomous exhalations." The unpaved yards of these places are merely great dung heaps, spreading disease germs broadcast. A native Russian writer in a European journal says in this connection: "The hygienic condition of yards, streets and public places is on a level with that of private dwellings, and the excreted refuse of houses, which, in European towns, is made to disappear as rapidly, opportunely and mysteriously as a suspected subject of the Czar's, is left as inviolate as if it were a sacrifice to the unclean gods. 'Even in our two capitals, the method of removing refuse and impurities is so antediluvian that it would be an abuse of terms to allude to it as sanitation. In the most favorable cases, the "system" consists in digging a big hole in the yard of every house and throwing into it all the garbage, offal, &c., and leaving it undisturbed for months, and for longer terms than months, until at last it is carted off in boxes and barrels to some place outside the city. It is easy to imagine to what extent the soil is permeated with filth and the atmosphere vitiated with miasms, and in what an Eldorado the microbes of infectious diseases revel. And it must be noted that even this "system," defective as it is, is followed only in favorable cases—*i. e.*, when private houses are provided with closets. As to the "system" pursued when there are no water pipes and water is dear, it is better not to speak of it. It is a horror.'"

In other parts of Russia, we are told, "cesspools are constructed under the floors of the houses; the river banks consist of solid filth, sprinkled over the top with sand; the cities are saturated with filth, excreted impurities oozing into the rivers, in which carcases of dogs and cats float; foul sewage is thrown into the streets," and such like tales of horror, showing indescribably bad sanitary conditions to exist to-day in the dominions of the Czar.

CUSTOMS OF VARIOUS PEOPLES.

The Greeks are stated to be almost as vile in their habits as the Russians, though the hot climate tempers their offense somewhat. The Tartars do not remain long in one place; they are obliged to keep moving to avoid the accumulations of filth that take place where they encamp. Various Siberian tribes are similarly circumstanced. In Egypt the natives resort to the desert, where the sun, aided by swarms of insects, soon obliterates all traces. In Turkey, latrines are common in houses. They consist of a large slab of stone or marble, with a hole in the center and grooved channels for running water inclined toward the hole. No seats are provided, but buckets of water stand by for the purpose of flushing the latrine. These conveniences are usually placed over large barrels, which are periodically emptied. Cleanliness in this matter is specially enjoined by the Moslem religion, and is usually pursued.

In the cities of European Turkey modern systems of drainage are being generally adopted. The natives of New Zealand are said to provide regular privies for every two or three houses; while those of the Marquesas Islands follow the primitive and wholesome custom of digging a hole in the earth or sand in order to bury their ordure. It is almost inconceivable that no privies existed in Madrid prior to 1760, the filth being thrown out of the windows after night-fall. Edinburgh was long notorious for this disgusting practice. In ancient Rome there were public latrines, but no private conveniences. Privies in houses were adopted in Paris in 1513, and in London toward the end of that century.

TRAPS AND VENTS.

W. N. McKENNA & Co., plumbers and contractors, 60 Anderson street, Boston, have finished the plumbing of the Massachusetts Building at the World's Fair. The Sanitas fixtures were exclusively used.

AS AN INDICATION of the prosperous condition of the plumbing trade in Chicago and vicinity, J. B. Clow & Son, manufacturers and dealers in plumbers' supplies, Lake and Franklin streets, state that their city trade for the present month has been twice that of the corresponding month of last year.

THE MICHIGAN STATE ASSOCIATION OF MASTER PLUMBERS, after several preliminary meetings, were organized March 16, at Detroit, Mich., with the following officers: President, Thomas Meathe, Detroit; vice-president, S. J. Wirtz, Jackson; secretary, F. C. Bennett, Lansing; treasurer, J. A. Wheeler, Kalamazoo. Executive Committee: J. H. Crumley, Detroit; W. C. Weatherby, Grand Rapids, and John Bradley, Port Huron. The next meeting of the association was appointed for May 5.

HERMAN C. STIFEL, St. Louis, and Francis J. Torrance and Oscar F. Grant, Allegheny, Pa., have secured a patent on an improvement in bathtubs, the principal feature of which is means for keeping the inner surface of the walls clean without the necessity of scrubbing. The invention consists in the combination with the bathtub of a hollow metallic rim for use as a water conduit, taking its supply from the hot and cold water supply adjacent to the tub and conveying the water to the interior through small jet openings against the sides.

THOMAS KELLY & BROTHERS, 123 Franklin street, Chicago, Ill., issue an 1893 illustrated catalogue of permanent plumbing goods which they manufacture and upon which they own the patents. The publication of 50 pages contains illustrations of a large variety of water closets, including the Kelly self-acting wash out: the Kelly self-acting frost proof after flush: the Kelly syphon: Kelly self-acting, &c. There is also a varied assortment of special articles, such as anti-freezing hopper cocks, lock pulls, poor water supply remedy, water cushions and many other goods. At the close attention is directed to the Kelly lavatory and sanitary syphon wash basin, the advantages of which are pointed out.

E. ASPINALL, 98 and 100 Beekman street, New York, has been made the sole agent in this country for the sale of lavatory basins made by T. W. Twyford, Cliffe Vale Pottery, Hanley, England, said to be one of the largest in Great Britain. The basins are made in 12 styles, aggregating 28 sizes, any of which can be furnished in white or marble finish. These goods are adapted to a variety of locations, whether in corners or flat against a wall, while the fronts are of various shapes, affording a good assortment to select from.

THE PLUMBERS' SUPPLY STORE of Dixon & Ballou, at Buffalo, N. Y., was destroyed by fire March 10. The enterprising firm have already rented another store and ordered a new stock of goods. They will be ready to continue business in a few days.

New York's Water Supply.

Governor Flower has signed a bill empowering the Commissioner of Public Works of New York city to purchase such lands in the Croton watershed as he thinks proper to secure the purity of the city's water supply. By the terms of the bill the sum of $1,500,000 is to be applied to this purpose at the rate of $500,000 yearly for three years. The Governor, in signing the bill, filed a memorandum stating that, while there is no practical objection to the enactment, he would recommend that if there is any doubt whatever as to the sufficiency of the measure for the sanitary protection of the watershed, "the Legislature should not hesitate to remove the doubt by the enactment of a supplementary measure suitably comprehensive in its terms." The Croton Aqueduct Commission filed a memorial recommending the rescinding of the three yearly clause in order that no delay may be incurred on account of limited funds, while the New York Academy of Medicine recommended that the work be confided to a commission of sanitary experts, with plenary powers.

A Washington dispatch says the President wishes it to be known that in the appointment of consuls, particularly those to places in South America and Central America, he will be guided largely by the adaptability of candidates for business. These consuls are to be persons of experience in all trade matters, so that they can readily recognize whether a port is capable of becoming a good market for American goods.

There is a strong probability that the Argentine railways enjoying the national guarantee will eventually revert to the Government on account of their increasing indebtedness. The Minister of the Interior states that the total advances to the end of their concession will approach $100,000,000. Therefore, to enforce its claim, the only method would seem to be to take possession of the property.

While the consumption in the United States of such articles as sugar, beer and tobacco has increased with enormous rapidity of late years, there appears to be comparatively little gain in the demand for wheat, tea and coffee.

ROOFING AND CORNICE.

Laying Zinc Roofs Abroad.

The roofing trade in this country have always felt a great deal of interest in the use of zinc for the covering of buildings, but no appreciable advance has been made in the application of the material. We often receive letters from roofers asking how it should be applied and why it has not come into use here to some extent. We would like to have the subject of zinc roofs discussed in the columns of *The Metal Worker*, and we think there must be many of our readers who have had early experience in the use of the roof abroad and could tell us of the methods there followed in laying this metal. We print below an interesting account of one style of laying zinc roof as furnished by J. B. Marold, Saquache, Col., who furnishes some particulars of the construction, as well as illustrations of the method of applying the metal. In the early part of his letter he discusses the question of applying the material in this country.

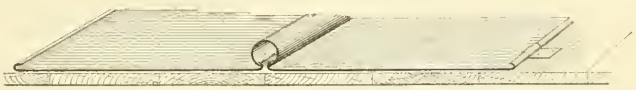


Fig. 1.—Method of Laying Zinc on Small Roofs.

Fig. 2.—Roof Patten.

Fig. 5.—Perspective View of Sheets Laid with Patten.

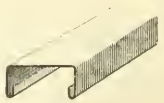


Fig. 4.—Cap with Lock.

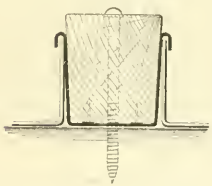


Fig. 3.—Patten with Cleats.

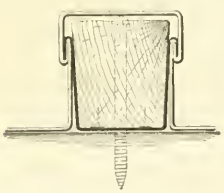


Fig. 6.—Section through Patten and Cap.

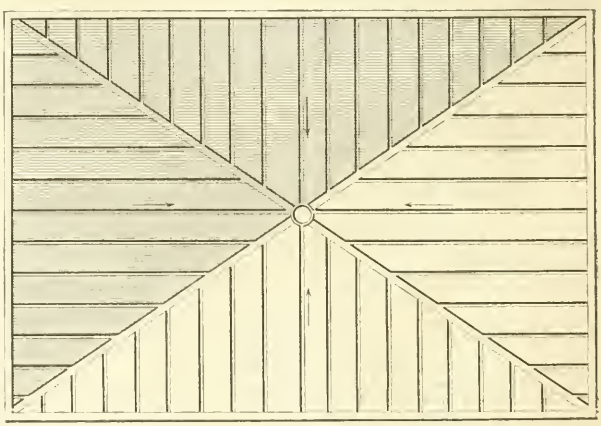


Fig. 7.—Roof Draining to Center.

LAYING ZINC ROOFS ABROAD.

He writes: "Concerning zinc roofs, I believe that the American climate, with its great variation of heat and cold and sudden changes, moves the metal more than the more temperate and even climate of Europe. Even there, however, I noticed that zinc had to be treated differently from tin. Standing seams, for instance, would not hold one year. In order to get space for contraction and expansion, we employed different methods, but in no case did we put the sheets together in long rolls, but laid each one down separately. The cross seams were located and soldered and fastened down with cleats. On very small roofs it is customary to make a wide lock on the sheet lengthwise, fasten it down with cleats and draw a cap, like an open round pipe over the adjoining edges. This style of roofing is shown in Fig. 1.

"The most common way, however, and one that always gave good results, was with the use of pattens or strips, which are screwed on to the roof between the sheets. Fig. 2 is a sectional view through one of these strips. On the bottom of the patten a strip of tin 5¼ inches long and about 2 inches wide was nailed, as shown in Fig. 3, the strips serving the double purpose of holding the sheets and securing the cap that fitted over the top of the patten. These pattens were generally 16 feet long,

2 inches high, 1¼ inches wide at the bottom and 1½ inches wide on the top. When the sheets were laid and the patten screwed on the sheeting, the strip of tin referred to was bent about the patten and over the edges of the tin, as shown in Fig. 3, holding it securely down, but leaving room, however, for the moving and working of the metal. After the roof was laid no little annoyance and possible damage by the dripping in the interior of the structure. This arises from the fact that warm air holds in suspension more moisture than cold air. The warm air of the interior of the building coming in contact with the cold corrugated iron of the roof is chilled, and, as a result, deposits a portion of the moisture on the under side of the iron. When the quantity is sufficient this will drip, resulting in not only great inconvenience, but serious loss, depending, of course, upon the kind of work that is being carried on in the building. With a view to overcoming this difficulty, the Berlin Iron Bridge Company of East Berlin, Conn., have introduced a form of roof construction which is manufactured under patents controlled by them. Upon the purlins of the roof trusses is first tightly stretched galvanized iron wire netting. Upon this, as a foundation, are placed two layers of asbestos paper, well lapped and smoothly laid, the edges of each sheet overlapping its neighbor about three inches, while each layer protects the joints of the next layer. Above this, in turn, and laid in exactly the same manner, are two layers of tarred paper, with tar between, or asphalt or Neponset paper, as may be most convenient, put on with broken joints, smooth and flat. On top of this composition is laid the corrugated iron in the usual way. We understand that roofs put on in this manner are guaranteed not to condense moisture on the under side. These roofs, we are told, have now been in use for about five years, through different seasons, and in no case has there been any signs of condensing moisture on the under side. In Fig. 1 is shown a plan view of a portion of a roof covered as above described, while in Fig. 2 is represented a section. The different materials of which the roof is composed are clearly indicated by the fine lettering at the right. In Fig. 3 is shown one of the buildings covered by the company with this anti-condensation corrugated iron roof, it being a foundry building for S. F. Hodge & Co., Detroit, Mich. A number of structures have recently been covered by the Berlin Iron Bridge Company with their patent roof, among the number being a dynamo room for the Elmira Illuminating Company, Elmira, N. Y.; boiler house for Cheney Bros., South Manchester, Conn.; dynamo rooms for the U. S. Electric Company, at Washington, D. C., and for the Pawtucket Gas Company, at Pawtucket, R. I., as well as an engine room for the Narragansett Electric Company, at Providence, R. I.

Anti-Condensation Corrugated-Iron Roofs.

It is very well known that when corrugated iron is exposed directly as a roof covering for buildings, for whatever purpose they may be employed, moisture is apt to condense on the under side during the colder months of the year, and cause

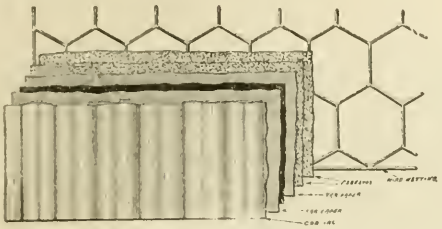


Fig. 1.—Plan View of a Portion of Roof.

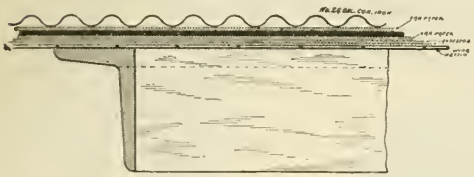


Fig. 2.—Cross Section through Roof.

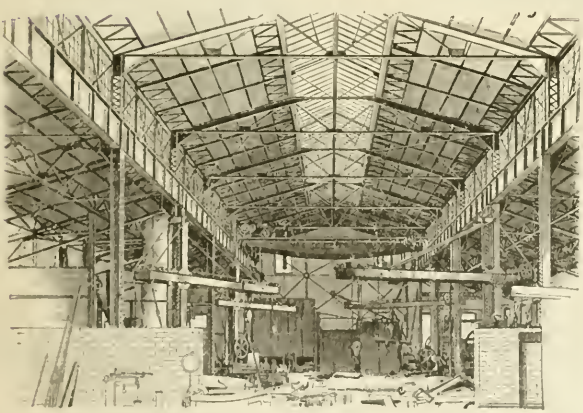


Fig 3.—Interior of Foundry Covered with Anti-Condensation Corrugated-Iron Roof.

ANTI-CONDENSATION CORRUGATED-IRON ROOFS.

a machine-made zinc cap, Fig. 4, was drawn over the pattens, as shown in Fig. 5. Fig. 6 is a sectional view through patten, showing the way the zinc cap was locked down by the cleats.

"I saw a curious variation of this style of roof on a royal castle, in which, instead of raised pattens, there were grooves sunk in the sheeting. The valley rafters also pitched toward the center of the roof, where there was a large receiver, from whence the water was carried to the sewer. A plan view of this roof is shown in Fig. 7."

FLASHINGS.

The Columbia Roofing Company of Canton, Ohio, favor us with a catalogue relating to the line of goods which they are prepared to furnish the trade. This roofing is said to be made of the best quality of steel, and is thoroughly plated on both sides. It is put up in rolls 50 feet long by 26¾ inches wide, and will lay one square of surface. Every sheet is inspected before painting, and the manufacturers state that the utmost care is taken to see that all sheets are free from holes, splits, or other defects. A list of the tools which the company furnish for use in applying the roofing is given, together with suggestions of general interest to the trade. Illustrations are presented of V-crimped roofing, pressed standing seam roofing, beaded iron siding and ceiling, corrugated iron, imperial pressed steel brick siding made of sheet steel and painted, patent rock face brick siding and patent slip joint eave trough.

The Caldwell & Peterson Mfg. Company of Wheeling, W. Va., issue an illustrated pamphlet descriptive of their patent metal ceilings, which are recommended for their simplicity of construction and economy of erection. Each panel is composed of a metal sheet, mounted complete, on a tongue and grooved wood frame. The wood frames fit into the adjoining panels as flooring boards fit into each other. The joined frames are then covered with metal moldings and rosettes, which, with nails, &c., are furnished by the company, so that a complete ceiling can be shipped without delay, ready for placing. The panels and fittings are made in various patterns, shown in the

circular. Attention is also called to the metal wainscoting, steel roofing and steel lath manufactured by the concern.

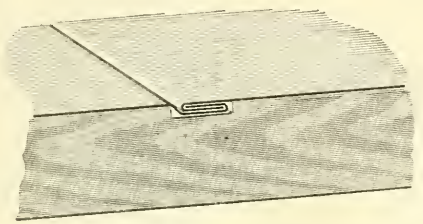
ROBLEY & BRUNDAGE, 142 Chambers street, New York, are agents for the Prentice patent metallic hip shingle, made by the Metallic Hip Shingle Company of Toledo, Ohio. A circular is issued by the agents illustrating the appearance and application of the metallic hip shingle, pointing out its merits and giving a number of testimonial letters.

AT THE ANNUAL MEETING of the Metallic Roofing Company of Canada, Limited, E. Samuel was re elected president, A. D. Benjamin, vice-president, and J. O. Thorn, secretary. The company are making arrangements to start a branch factory in Montreal.

Improved Seam for Tin Roofing.

We have received from John S. Brooks, 235 Fifth avenue, Brooklyn, N. Y., the following account of a new method which he has devised of laying cross seams:

The manner of laying flat seam roofing shown by the sketch given appears to answer two important purposes. It will facilitate soldering, as the solder first enters the seam in a downward course



Improved Seam for Tin Roofing.

to enable it to penetrate into the folds, and it leaves the surface of the roof flat on its upper side and solid on the roof boards. As the seam consists of four layers of metal, quite a hollow space is left near it on its upper side when put on in the usual way, and, so far at least as the cross seams are concerned, this ends in letting the tin sink to the roof boards and leaving a ridge at every cross seam to hold water. By an experiment it was found that a large goblet of water emptied on a roof slowly only reached the third course of tin below it, being held in the depressions mentioned. It is only a simple piece of work, coating next to nothing to run a tool similar to a joiner's grooving plane across the roof. After one cut is made that can be used as a guide for a gauge to run in to form all of the other grooves, and the plane should be so made that it will also level off any inequalities in the thickness of the roof boards at the same time. It is not necessary to sink the up and down seams. Observation shows that nearly all the leaks in tin roofs occur at the cross seams. They are more difficult to solder and are the only ones that hold back the water after a rain or in the damp weather, when heavy dew settles on them. If any one will look down on a tin roof that has been used, as all are at times, to walk upon, they will see at once the depressions mentioned, and find them holding water if rainy, or filled with dust when it is dry. The operation of hammering down the seams beds the tin into this groove, and if paper is used under the tin it will not interfere in the least with the work. Roofing leats should be used with this method.

Immigration Resumed.

The enforced suspension of immigration from Europe, which followed Treasury orders imposing a rigorous inspection at quarantine, is no longer operative. For awhile, and perhaps until the spring has well advanced, there is not likely to be any necessity for excluding immigrants of the better class, as a measure to bar out infectious disease. Cholera is known to be prevalent in parts of Russia and there are indications of its presence at points in other parts of Europe contiguous to regions whence much of our immigration is derived. Therefore all quarantine officials, whether at home or on foreign stations, will be on the alert to observe the first threatening symptoms and take measures to arrest the danger. These facts being understood, it is not surprising that the usual spring immigration from the Old World has already commenced in full volume. The immigrant landing at Ellis Island, deserted all winter, is again thronged with new arrivals and the customary troops of persons of foreign mien, encumbered with worldly possessions, are seen *in transitu* for their destination, usually in the far West. Indeed, it is evident that the temporary check to this movement only served to dam the current, which, being released, now moves forward with renewed impetus. We may reasonably anticipate, therefore, the addition of something like another half a million of people from over the seas before the expiration of the year. The peculiar political, social and industrial conditions of Europe at the present time, contrasted with the comparative affluence of the United States, the prosperity of trade, abundance of food and exemption from war alarms, all contribute to excite a feeling of unrest that can be satisfied only when a ticket is bought guaranteeing transportation to that far-famed elysium beyond the setting sun.

The question to be immediately considered by the national and State quarantine authorities with reference to this subject is the necessity of adopting such measures as shall secure uniform regulations along the entire coast and harmony of action in enforcing these regulations during the coming summer. To this end an important conference was held at Washington during the past week, in which the health officers and port physicians of all the seaboard States participated. The conference was called by the Secretary of the Treasury at the solicitation of Supervising Surgeon-General Wyman of the Marine Hospital Service, who had framed a system of rules applicable to all the ports, to serve as a basis for deliberation. The regulations define the equipment of stations, state what vessels should be inspected, how they shall be treated if diseases are found aboard, the mode of treatment of specific diseases, the proper mode of disinfection, &c. Special rules are made with reference to quarantine for cholera and yellow fever.

In the form finally agreed upon, these regulations will be sanctioned and promulgated by the Treasury Department. At the same time, American consuls abroad will exercise due vigilance and care that every needed precaution is taken by port officials and steamship companies to prevent the spread of infectious disease. Every vessel must be fumigated, every emigrant examined, and no bill of health given until all requirements are literally complied with. Hamburg suffered severely last season from neglect of sanitary precautions, likewise the steamship companies, which were driven from the trade as a consequence, so that the strongest motives of self-interest prompt to fidelity in the performance of duty on the part of all concerned. Thus with a double line of defense, as above defined—port officers and consuls co-operating with steamship companies—we may entertain a reasonable hope that the danger that threatened last summer will be warded off no less successfully should pestilence again menace our shores. As amended by the Secretary of the Treasury, steam vessels from a suspected or infected port may be allowed to enter after fumigation at quarantine and five days' subsequent detention.

The Western Pipe Consolidation.

The consolidation of the Western and Southern cast-iron pipe foundries, to which reference was made earlier in the year, is getting into shape. The companies represented at a meeting at Buffalo last week were Addyston Pipe & Steel Company, Addyston, Ohio; South Pittsburgh, Tenn., Pipe Works; Shickle, Harrison & Howard Company, St. Louis; Howard-Harrison Iron Company, Bessemer, Ala.; Lake Shore Foundry Company, Cleveland, Ohio; Radford Pipe & Foundry Company, two plants, one at Radford, Va., and the other at Anniston, Ala.; Dennis Long Company, Louisville; Chattanooga Foundry & Pipe Company, Chattanooga & Ohio Pipe Company, Columbus, Ohio.

There are not included, therefore, a number of small concerns, like the Hercules Foundry Company, Pell City, Ala.; New Birmingham Pipe Works, New Birmingham, Ala.; Rusk Pipe Works, Rusk, Texas; Cleveland Pipe Works Company, New Philadelphia, Pa.; Massac Iron Company, Metropolis, Ill.; Detroit Pipe & Foundry Company, Detroit; West Superior Iron & Steel Company, West Superior, Wis., and the South St. Louis Foundry at St. Louis.

It is proposed to call the consolidated company the American Pipe & Foundry Company, with headquarters at Chicago. Gen. Samuel Thomas of the Union Trust Building, New York, is expected to place a part of the new capital with Eastern investors.

One of the causes that has led to long delay has been the contest for the presidency of the new company. As a compromise between the different parties, O. C. Barber of Chicago will probably be chosen.

The great double track tunnel in process of excavation through the Palisades near Weehawken in New Jersey is making rapid progress and will be completed before the end of December. It will be one mile in length, and extends from the meadows to the tracks of the New York, Susquehanna & Western Railroad at Little Ferry Station, in whose interests the work is supposed to be. At the eastern mouth of the tunnel, piers, coal sheds and freight warehouses will be erected the coming summer.

Under the law of 1891, authorizing the President to set apart as a reservation any public land covered with trees, about 12,000,000 acres have been recovered from the woodman's axe. The principal tracts are in Utah, New Mexico, Colorado, Minnesota, California, Oregon and Washington.

"The Metal Worker" Competition in Skylight Pattern Cutting.

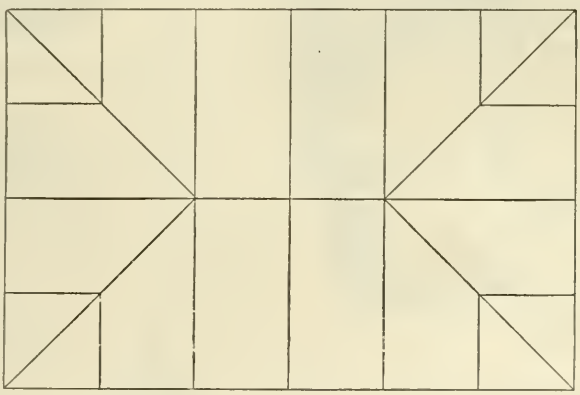
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight, and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desired pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

COPPERSMITHING.

ART OF COPPERSMITHING.

XLI.*

DOME AND PAN COPPERS.

Dome and pan coppers are a combination of the other two coppers we have steam generated in the copper into the liquor which may have been placed in the pan to be heated. It will be seen that the pan bottom is made separate, and when formed ready the inner edge is fitted to the sides, with the edge of the dome crown (except when the dome is in one copper. At the upper end of the inlet pipes and on the inside of the pan bottom is bolted a screw valve, Fig. 462, which is secured to its place by the same bolts that hold the pipe flange to the pan bottom. When the pan bottom and crown (if the dome is made in pieces) have been

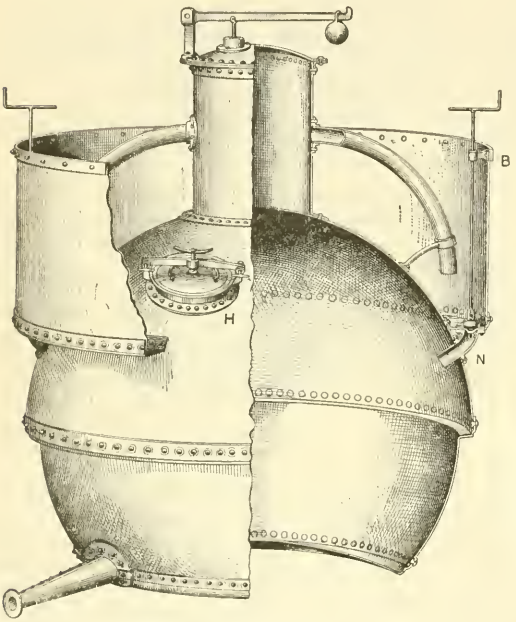


Fig. 461.—*Dome and Pan Copper.*

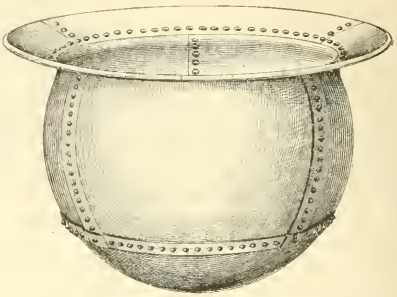


Fig. 463.—*Broad-Brim Tallow Copper.*

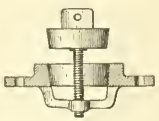


Fig. 462.—*Screw Valve.*

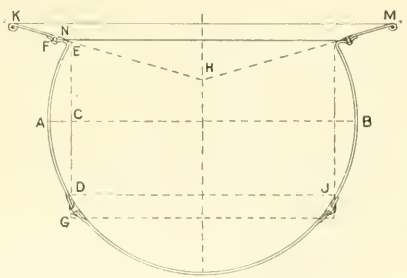


Fig. 464.—*Section through Broad-Brim Tallow Copper.*

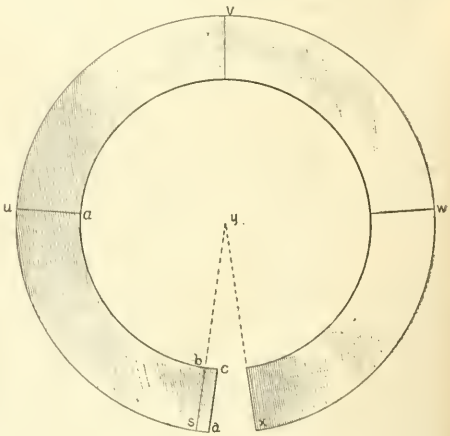


Fig. 465.—*Pattern of Brim.*

been treating of, combined in one apparatus with some few additions, such as the valves at the top of the chimney and the two side pipes to convey the overflow into the pan should the liquor in the copper tend to boil over ; also to convey the piece, when the pan would be worked on the dome as shown in Fig. 461), and then all three are riveted secure, and the rivets scrubbed up so that the heads are all smooth and even with the inner side. The inlet pipes are made of a suitable size, as in N, and connected by flanges with the pan bottom and the side of the worked in, the manhole H, Fig. 461, and the inlet pipes also completed, then the sides of the pan may be put up into position and the rivets worked in. The screw valves are now applied with a rod and T-handle, with which to open and close them, the rod being held in position by a bracket, B, bolted to the side of the pan.

*Copyrighted 1880, by JOHN FULLER, Sr.

Any good workman who has made a large open or dome copper should be competent, after studying the preceding pages and the accompanying illustrations, to build a dome and pan successfully. I shall therefore let the directions given for the building of the other two styles suffice for that of a dome and pan, and thus avoid repetition as much as possible.

TALLOW COPPERS.

In Fig. 463 is shown a tallow copper. These vessels were made for and used by tallow chandlers, whose principal use for them at one time was in manufacturing tallow candles. Tallow coppers are an extra good job, because of the greater care necessary to make them sound—that is to say, perfectly tight and not liable to leak. These coppers were at one time in great demand, when all England burned candles much more so than now. But there is yet an occasional demand for one, because tallow is still used for many other purposes besides that of making candles, and the shape of this copper is better adapted for the use of rendering out tallow than any other, as the curve or spherical shape of the sides tend to throw the fat that boils up the sides toward the center, which partly accounts for its peculiar shape, as compared with coppers for some other purposes. This copper has a wide brim, so that any slopping or drainings may be conveyed back into the copper by it. They are made sometimes with narrow brims, in which case the broad brim is substituted by one made of lead, covering the whole of the brick work on its top surface about the brim, and turning down over it on the inside of the copper from 2 to 3 inches, which, in some cases, is preferable, because, then, none of the tallow can penetrate the brick work from the top.

Let us make one of these broad-brimmed tallow coppers, and let the sides be made from a sheet of, say, 35-pound plate, or about $\frac{1}{8}$ inch in thickness, to hold 200 gallons, and let its sides be in three pieces and the bottom in one. It will be noticed that this vessel, Fig. 463, is spherical in form, the body being made up of the middle zone and the bottom segment, the other or top segment being absent to form the brim or copper mouth. Now, the first thing we must do is to find the size of a vessel of this shape that will hold 200 gallons, which we will now proceed to do as follows: It is well known that a spherical inch is represented by 0.5236, but the copper is a sphere with a segment cut off equal in hight to one quarter of the diameter of the sphere (see Fig. 464), and the value of this segment cut off is 0 08181; therefore $0.5236 - 0.08181 = 0.4417$. Now there are 277.274 inches in a gallon (English measure), therefore $277.274 \times 200 = 55,454.80$ cubic inches, and $\frac{55,454.80}{0.4417} = 125,548$; when, extracting the cube root of 125,548, we get 50 inches as the diameter A B of the middle zone of the copper when ready for the bottom. If Fig. 464 be drawn to a scale of $\frac{1}{4}$ inch to a foot, it will be found that from C to B is 47 inches, from D to E is 25, from F to E is 4 inches, and from D to G 3 inches. Adding these last three dimensions together, we have $25 + 4 + 3 = 32$ inches for the depth of the sides before working, and the diameter C B 47 inches, when $47 \times 3\ 1416 = 147.6552$, and 147.6552 divided by 0.03, the number of sides to be used, we have 49 2184, or 49¼ inches. To this we add 2 inches to each piece for seams, when we get 51¼ inches for the length of each side, including edges, and 32 inches deep, including brim and lap for the bottom seam. Now we find the size the disk should be for the bottom before hollowing as follows: It was stated in a former chapter that the surface of a sphere is equal to its circumscribed cylinder, and therefore the surface of any segment of a sphere is equal to the diameter of the sphere multiplied by the hight of the segment, multiplied by 3.1416; or the surface of a sphere is equal to four disks, whose diameter is equal to the diameter of the sphere. From which we get $50 \times 12.5 \times 4 = 2500$, and extracting the square root we get 50 inches for the diameter of the disk to form the bottom before hollowing, or $\sqrt{50 \times 12.5 \times 4} = 50$. Now we have the sides and bottom, and require the broad brim, which is obtained as follows: The brim when completed with a ¾-inch wire in the outer edge should measure 10 inches or thereabouts from E to K, Fig 464. Now the wiring edge at K will take 1½ inches, and will reach and lap at N 2 inches, which will make the brim before working 10½ inches wide. Then the diameter of the brim from K to M when complete before wiring is 66 inches, and forms a frustrum of a cone, the slant hight of which is H M, or 34 5; that is, *x y*, Fig. 465. With the radius *y x* from *y* as center describe the circle *x w v u s*, making the distance around it from *x* to *s* equal to the circumference of a circle whose diameter is K M, or 66 inches. Now $66 \times 3.1416 = 207.24$ and $69 \times 3.1416 = 216.66$ and $216.66 - 207\ 24 = 9.42$, or 9¼ inches nearly; that is to say, the segment *s y x* from *s* to *x*, which would be taken out, is equal to 9¼ inches nearly. The brim may be put on in any number of pieces. In this case let there be four; then *s u a b* is one section of the brim bare: adding 2 inches on for riveting edge, the pattern is complete and will measure from *u* to *d* 56.16, and from *a* to *c* 38.09, and from *c* to *d* 10.5 inches. Here we have all the patterns and will now begin to put them in shape: First, the bottom, by taking it to a hollowing tub, and with suitable mauls sink it in the tub until it is hollowed enough; that is, until it measures across it 46 inches. Then mark the rivet holes for about No. 1 or No. 2 wrought copper rivets, and space the holes so that the edges of the rivet heads are about ¼ inch apart. The sides are next in order. These will be put together with No. 3 or 4 rivets, and the heads about ⅝ inch apart and reaching to within ¼ inch of the lap edge. When the sides have been punched bend them into shape and put in a few temporary rivets; take a racer and divide the depth into three spaces and proceed to raze in both ends; the bottom end right out to the end, the top end to within ¼ inches, making the lower end fit into the bottom about 3½ inches, and drawing the top end out until it measures 43 inches at 4 inches from the end, when the brim is thrown back for the additional wide brim. While the two ends are being worked in the sides are put on the tub at the end of each course, and hollowed out to complete the spherical curve of the body. Now we form the brim by putting the four pieces together and wiring the edge with a ¾-inch iron ring. The workmen may now select which is more convenient to him, and first put on the brim or the bottom. If the brim is first put on, carefully scrub the rivets and make the surface smooth about the rivet heads, and work the seam edge carefully down close, then the same with the bottom. It is usual to rub the seam well with white lead and oil on the inside after the job is finished.

NOTE.—In this connection some piece work prices for coppersmiths' work paid in London will be of interest:

Brewing coppers, 3½ cents per pound for men; one-half the price for boys.

Niches for planishing general, 2 cents for men; one-half the price for boys.

Four-inch worms, 4 cents per pound for man and boy.

Retorts, 6 cents per pound for man and boy.

Stills, 3½ cents per pound, metal as well.

Middle pieces, 4 cents per pound for brazed seams.

Four-inch tee-pieces, $1 each for men; 50 cents for boys.

Three-inch tee-pieces, 75 cents each for men; 37½ cents for boys.

Four-inch bend complete, 83 cents each for men; 41½ cents for boys.

Three and one-half-inch bend complete, 64 cents each for men; 32 cents for boys.

Three-inch bend complete, 50 cents each for men, 25 cents for boys.

Two-inch bend complete, 37½ cents each for men, 18 cents for boys.

Worms, when two men work at them, 8 cents; when a man and boy work them, 6 cents.

The time usually consumed putting up sides into bottom of a 300-barrel copper by two men inside and three outside, two and one-half days. Punching holes, in bout, three men inside and two outside, one and one-half days each.

Setting-to 195 holes, two men one day. Setting-to 20 holes in seam and working in 20 No. 2 nails, with one man inside and two outside, three hours.

Working one seam of 20 nails, three men, one day. Working one bout of 15 nails, No. 1, three men, one day.

Time consumed taking off old bottom from a dyer's copper and putting on new one, the new bottom weighing 140 pounds, 38 inches in diameter and 8 inches deep. Cutting out old bottom and annealing sides and planishing, ten hours. Planishing new bottom, seven hours. Putting up block, punching holes, bolting together and working in 40 No. 4 nails, nine hours. Scrubbing up new bottom, eight hours. Total time for job, three days four hours.

Andrew Morton, 191 East Third street, New York, is making a standard cork bath mat, which is offered as a superior article for this purpose. The dimensions are about 18 x 27 inches outside and nearly 1 inch high. Cork blocks 3 inches square are strung flat on nickel plated steel bars and then mounted in a solid hardwood frame. All screws and metal attachments are plated to prevent corrosion. An advantage claimed is the warm, smooth velvety surface, obviating the risk of cold or chills after the bath, always maintaining a uniform temperature. E. Aspinall, 98–100 Beekman street, this city, has these goods on sale.

The first theater in Europe to use the electric iron curtain as a safeguard from fire is the Comédie Francaise, in Paris. This curtain was put up by the Edison Electric Light Company, assisted by the chief machinist of the theater, and has now been in successful operation for some weeks. The curtain is hung by four steel wire ropes, which run over pulleys driven by an electric motor. The total weight of the curtain is about 880 pounds, and is balanced by a counterweight held by a cord. The speed at which the wheels run is 1800 revolutions a minute, the motor being of 2 horse-power. The curtain can be lowered or raised at the maximum speed of 5 feet per second, the minimum speed being 2½ feet per second.

The London *Plumber and Decorator* gives the following recipes for two cements, which have been found of considerable value in calking iron pipes: 1. Two parts of ordinary well-dried powdered loam and one part of borax are kneaded with sufficient water to a smooth dough, which must at once be applied to the joints. After exposure to heat the cement adheres even to smooth surfaces so firmly that it can only be removed with a chisel. 2. Mix 430 parts by weight of white lead, 520 parts of powdered slate, 5 parts of chopped hemp and 45 parts of linseed oil. The two powders and the hemp, cut into lengths of ¼ inch, are mixed intimately, the linseed oil gradually added, and the mass is then kneaded until it has attained a uniform consistency.

The daily product of pins in Birmingham, England, alone, is stated to be 37,000,000. And still the question as to what becomes of all the pins is an unsolved mystery.

George I. Holdship, Allegheny, Pa., is the patentee of an apparatus for beading and curving sheet-metal machines. The object is to provide a machine by which both these steps may be performed at one operation.

Prize Competitions

$25.00.

IN ORDER to obtain information which will be of practical service to our readers we hereby announce

Prize Competition No. 17.

SUBJECT:

How Merchants Should Treat Traveling Salesmen.

In view of the fact that traveling salesmen occupy an exceedingly important place in securing orders, the manner in which they should be treated is a question deserving the careful consideration of the trade. This competition is intended to call out suggestions on this subject, and may naturally touch upon such points as the following:

The courtesy which should be shown to traveling salesmen;

The extent to which it is advisable for the merchant to give attention to all salesmen offering goods in his line;

The disadvantages of discourtesy;

The information which may be received by the merchant;

Legitimate methods of securing the lowest prices;

The advisability of purchasing from comparatively few or from a larger number of travelers;

To what extent the merchant should ask quotations on each article or leave the price to the salesman;

The advantages and disadvantages of holding orders for favorite travelers;

Treatment of travelers' broken promises and misrepresentation;

Practices justifying a discontinuance of buying from them;

The faults of merchants in the treatment of travelers;

The faults of travelers in the treatment of merchants.

This competition will remain open until April 15, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than April 15, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.

Prize Competition No. 17.

The committee to whom the contributions in Prize Competition No. 3 were referred have awarded the prizes as follows:

First Prize to W. T. WARSOP, Fairport, N. Y.

Second Prize to H. C. WISEMAN, Springfield, Ohio.

Third Prize to G. B. KORBETT, New York.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 14. Closing March 25.

Suggestions Regarding the Sale of Spring and Summer Goods.

No. 15. Closing April 1.

Suggestions in Regard to the Sale of Athletic and Sporting Goods.

No. 16. Closing April 8.

Three or More Rules to be Observed in Buying.

No. 17. Closing April 15.

How Merchants Should Treat Traveling Salesmen.

Another subject will be announced in our next issue.

An exchange says: A good plan for preserving tools from rusting is the simple preparation employed by Professor Olmstead of Yale College for the preservation of scientific apparatus, and which he long ago published for the general good, declining to have it patented. It is made by the slow melting together of six or eight parts of lard to one of rosin, stirring till cool. This remains semi fluid, ready for use, the rosin preventing rancidity and supplying an air-tight film. Rubbed on a bright surface ever so thinly, it protects and preserves the polish effectually, and it can be wiped off nearly clean, if ever desired, as from a knife blade; or it may be thinned with coal oil and benzine.

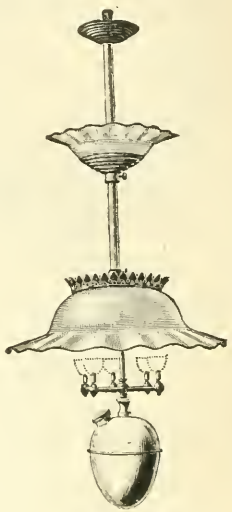
A French inventor has attached a tiny incandescent lamp to an ordinary pencil for use by reporters and others having to take notes at night. The battery is carried in the pocket, the wires passing down the sleeve.

The largest steam hammer in France has been erected at the works of Marrel Frères, Rives de-Gier. It is of 100 tons and has a fall of 19 feet. The anvil weighs 760 tons, the face being in one piece of 125 tons. The hammer is served by a traveling crane capable of lifting 120 tons, and two radiating cranes, one of which can lift as much as 180 tons.

The largest anvil in the world is supposed to be one now in use in the Royal Arsenal at Woolwich, England. It weighs 60 tons. The anvil block upon which it rests weighs 103 tons. Altogether, 600 tons of iron were used in the anvil, the block and the foundation work.

The Boston Gas Lamp.

In the accompanying illustration we present a general view of what is known as the Boston Gas Lamp, which is being offered the trade by G. H. Gregory of Boston, Mass. The illustration so clearly shows the general arrangement of the device that very little description is necessary. The depending bulb below the burners is a reservoir or receiver filled with kerosene or crystallized naphthaline. The fuel which is supplied to the burners may be either city gas or natural gas, as most convenient. The gas passes down the pipe to the receiver, from which is generated a rich gas which, mixing with the inflowing vapor and passing to the burners, produces a flame of high candle power. The manufacturer claims that



The Boston Gas Lamp.

this arrangement gives a very bright light at small expense and that the illuminating power of the gas used in the lamp is increased over 70 per cent.

The Pacific Northwest, lying north of California, promises commercial importance as a fruit-growing country. Prune culture is especially remunerative. East of the Cascades and west of the Rockies lies an immense region, known as the Inland Empire, mostly rolling upland, but portions produce choice fruit, as at the Dalles, close to the Cascades, at Walla Walla and in the Palouse. A very interesting fact in connection with that region is that the river cañons of the Columbia and Snake rivers and their tributaries, all of which have cut down through alluvial uplands, sometimes thousands of feet, produce fruits not grown in the coast valleys and not possible on the adjoining uplands. There is very little of these river lands, but where some stream or cañon debouches there may be a sandy loam spot where fruits can grow, or on the lower benches of the hills. The Columbia comes south from British Columbia for 300 miles, to its junction with Snake River, which rises in the mountains of Utah and Idaho; through all their course, draining 10° of latitude, these cañons and river shores produce all the fruits of the region and many grown in California.

THE RETAIL STORE.

Standard Hardware Lists.*

The second edition of *The Iron Age* Standard Hardware Lists, revised and enlarged, has been published and contains a number of lists not before issued in this form. The lists are intended to be cut out and inserted in price books and for this purpose are printed on thin and tough paper of the best quality, and on only one side of the paper. The pamphlet includes the following lists:

Auger Bits.
Augers.
Bells, Hand.
Belting, Leather and Rubber.
Boilers, Round.
Bolts, Carriage, Common.
Bolts, Carriage, Norway Iron.
Bolts, Carriage, Philadelphia Pattern.
Bolts, Machine.
Bolts, Plow.
Bolts, Stove.
Bolts, Tire.
Bowls, Scotch and Yankee.
Brads.
Butts, Brass.
Butts, Cast.
Butts, Wrought.
Cartridges.
Casters.
Chains, German.
Chain, Jack.
Chain, Safety.
Chisels.
Cocks, Brass.
Compasses.
Dividers, Wing.
Files.
Freezers, Ice Cream.
Gimlets.
Glass, Window.
Gouges.
Griddles.
Hasps and Staples.
Hinges, Strap and T.
Hoes, Eye.
Hoes, Field, Mortar, &c.
Hoes, Planters' and Cotton.
Hollow Ware, Stove.
Hooks, Awning.
Hooks, S.
Hooks and Staples.
Iron List, Eastern.
Iron List, Western.
Kettles, Brass.
Kettles, Cast Iron.
Kettles, Maslin.
Knives, Drawing.
Mattocks.
Mowers, Lawn.
Nail Card, Cut.
Nail Card, Wire.
Nails, Horseshoe.
Nails, Miscellaneous.
Nails, Wire, in Packages.
Nuts.
Oilers, Machine.
Paper, Sand and Emery.
Picks.
Pipe, Wrought Iron.
Plane Irons.
Points, Glaziers', &c.
Pots, Cast Iron.
Pots, Glue.
Rakes, Garden.
Rasps, Horse, &c.
Rings, Trap Door.
Rivets.
Rivets and Burrs.
Sauce Pans.
Screw Drivers.
Screws, Brass and Bronze.
Screws, Iron Wood.
Screws, Coach or Lag.
Shells.
Slicks, Carpenters'
Spiders.
Staples.
Squares, Iron and Steel.
Stocks and Dies.
Tacks.
Tacks, Carpet.
Trimmers, Bent and Straight.
Vises, Solid Box.
Washers.
Wire.
Wire Goods, Bright.
Wrenches.

The former edition was received with so much favor by the trade that it manifestly met a want, and our advices from Hardwaremen indicate that these lists have been found exceedingly convenient for the purpose for which they are intended. The labor of writing list prices in price-books and the amount of space occupied have deterred many from keeping price books as thoroughly and systematically as is desirable, and it has been found that lists taken from printed catalogues are not usually sufficiently compact in form to make them suitable for this use. It may also be said that the lists issued by manufacturers and jobbers are not infrequently incorrect, and in the compilation of these lists especial care has been taken to give the standard list prices representing the best usage of the trade. The lists comprised in this collection have been prepared with especial view to compactness of arrangement and convenience of reference, the aim being to present each list in the smallest space consistent with clearness and convenience of use. No effort has been made to give the lists in a uniform size or shape, but simply in such a way as will make them occupy as little room as possible in the price book. The precise manner in which this is done must obviously be left to the merchants, who will adopt such methods as are most consistent with their views, the size and character of the price book kept, &c. Some of the small lists will most appropriately be gummed on some vacant space on the page where the prices of these goods are kept; but some of the larger lists may conveniently be inserted as a separate leaf between the pages of the book. Some of the lists are given in more than one arrangement, thus permitting a choice of such form as is best adapted to the use to which it is put, as, for example, the cards for Cut and Wire Nails, which are printed in two forms, one of which would run up and down the page and the other across the page. Some of the lists may be cut down so as to show only the goods which are carried in stock, or on which the merchant cares to keep prices, and room can thus be economized. These lists have been prepared with great care to insure their correctness, and it is believed that they will be found a convenience to merchants for the purpose intended. As a compact and convenient collection of standard lists covering a large variety of goods they will also be of service for reference in the form in which they are presented.

* Published by David Williams, 96-102 Reade street, New York. Price 25 cents.

The Hardware Club of New York.

The annual meeting of the Hardware Club of New York was held on Saturday, March 18, at 3 p.m., in the parlors of the Cosmopolitan Hotel, corner Chambers street and West Broadway. There was a goodly representation of the membership, and harmony and enthusiasm characterized the gathering. The meeting was called to order by the president, William H. Williams, who submitted a report on behalf of the Board of Governors, in which he referred to the history and plans of the club, reporting a membership of 228 resident members and 61 non-resident members. After referring to the contract recently entered into with the Postal Telegraph Cable Company for a ten years' lease of the top floor of the new building now being erected on the corner of Broadway and Murray street, the president's report continued:

It is expected that these rooms will be ready for occupancy by November 1 next. Favorable arrangements have been made with the Postal Telegraph Cable Company for putting in the permanent fixtures that will be required for the use of the club.

As announced in a former circular, the building is exceptionally well located for the convenience of the Hardware trade of New York, and in its general appointments it will have no superior in the city.

The amount which will be received from initiation fees of members will be sufficient, the board thinks, to enable it to fit up the rooms in a suitable and elegant manner, which will make the club what it was designed to be, a pleasant and useful meeting place for its members.

Next to securing permanent quarters, the principal event in the history of the club during the past year was the fifth annual dinner of the Hardware and Metal trades, celebrated under the auspices of this club at Sherry's, on the evening of February 21 last. The success of the meeting, socially, intellectually and gastronomically, amply justifies the efforts of those who had it in charge, and confirms the wisdom of having at least once each year meetings of a similar character of the trade in which we are engaged and those allied to it.

Reports were also submitted by J. L. Varick, secretary, and Thomas F. Keating, treasurer. The following nominations for Board of Governors, which had been duly made and posted by the Committee on Nominations, in accordance with the requirements of the constitution, were then reported to the meeting, and the gentlemen named were unanimously elected:

BRACE HAYDEN.
M. C. OGDEN.
CHARLES DALY.
THOMAS F. KEATING.
R. R. WILLIAMS.
J. H. KENNEDY.
R. H. SWAYZE.
E. C. VAN GLAHN.
A. G. SHERMAN.
W. R. WALKLEY.
W. H. WILLIAMS.
J. L. VARICK.
PETER MCCARTEE.
EUGENE BISSELL.
A. D. CLINCH.

It was then, on motion of William A. Graham,

Resolved, That it is the sense of this meeting that the action of the Board of Governors in leasing from the Postal Telegraph Cable Company rooms for the use of this club, as reported to this meeting by the president, meets with the approval of the members of this club.

The following resolution was then moved by A. W. Milligan and unanimously adopted:

Resolved, That it is the sense of this meeting that the treasurer of the club should call upon the members now for their initiation fees, in order that he may be in funds to meet the demands upon him as security for rent or fitting up the new rooms.

The meeting then adjourned. In accordance with the requirements of the constitution, the newly elected Board of Governors will, during the present week, assemble to be divided into three classes, holding office for one, two and three years respectively, and for the election of officers of the club.

Keeping Dates of Invoices.

An inquiry for a successful method, entailing a small amount of labor, of keeping in sight the dates on which invoices become due, so as to avoid being drawn on, or the loss of discounts, has elicited a number of replies.

The accompanying cuts are reproductions of plans in successful operation, and are of particular interest because of their variety.

Case & Uehren, Aurora, Ill., have for some years used a block calendar, as shown in Fig. 1, and find it very convenient for making memoranda of bills payable,

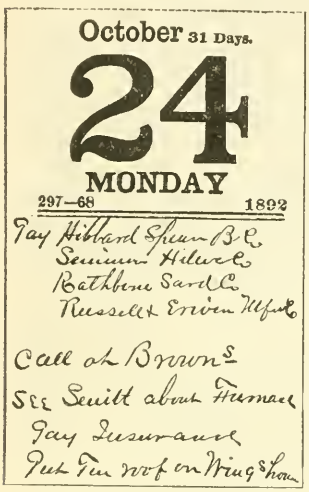


Fig. 1.—Case & Uehren's Use of the Calendar.

and of matters requiring attention on particular dates.

The plan of G. L. Phillips, Bethany, Mo., as shown in Fig. 2, gives a page to each month, and is ruled by himself. It gives the page on which the bill is entered, name of the firm, the date when each bill was paid, amount of the invoice, its date, time to run, date due, cash discount, and the amount of discount. In addition to this it is a record of the amount of goods purchased each month, and the total amount of discount for the month. By adding these monthly amounts together the total for the year is soon arrived at.

Day & Holt, Catskill, N. Y., use a well-bound four-quire record book, and rule it as shown in Fig. 3. When an invoice has been checked and footings and prices found correct, it is entered under the proper month, the date on which it becomes due. The dates near the left-hand corner of the page are in red ink and represent the Sundays in the month. Having these dates in sight, if an invoice should be dated September 1, based on ten days' payment, it is seen that it is due on the 11th, which is Sunday, and, therefore, it would be entered as payable on the 10th. It is the custom of the firm to pay on Monday such bills as become due during the current week, and stamp "Paid" in the column provided for that purpose. They find this plan answers the purpose, and is convenient, as at a glance they can tell how much they are owing. This they suggest tends to prevent careless buying at such times as a merchant might think he had small liabilities coming due, had he not some guide of this kind to show just where he stands.

When paying bills Day & Holt use the remittance blank with voucher, or blank receipt attached as shown in Fig. 4. This secures uniformity in size of receipts for filing, while the voucher number corresponds to the number of the invoice, for ready reference.

Sommer Bros , Portsmouth, Ohio, use a form much the same as shown in Fig. 2. They utilize pages in their ledger, the headings extending across both pages as follows: Date of invoice, month, received, name of firm, location, amount of invoice, freight, overcharges, freight rebate, rate of discount, amount of discount, amount of check, number of check, date about 3000 bills. The publisher explains the system as follows:

The bill-registering book shows the date of bill, amount of bill, the different rates of discount to which the bill is subject when it is due, the rate and amount of discount taken, the amount of cash paid and the date of payment, making a complete record of the bill from the time it is received until it is disposed of. It also makes a complete merchandise, discount and cash account, dispensing with the use of ledger accounts for bills payable. So far as the merchandise is concerned it enables the mer

Bills Payable Sept 1892

Page	name	Paid	amt	date	Time	Due	per ct disc	amt disc
56	Simmons Hdwe Co.	9/11	80.00	9/10	60d	11/10	2-10d	1.60
56	Do	9/17	98.00	9/10	30"	10/10	1-10"	98.
83	Excelsior Mfg Co	9/20	150.00	9/13	4mo	1/13	5-30d	7.50

Fig. 2.—G. L. Phillips' Plan.

chant to see at a glance which bills are paid and what are unpaid, and at what time he can pay them to save the greatest amount of discount. It also enables him at any time to see just the amount of merchandise bought, the amount returned, what shortages, claims or rebates stand charged against the bill, the amount of discount saved, and the amount of the actual net cash the merchandise has cost him. Each bill being numbered to correspond with number on register and filed consecutively, the bill file becomes paged like a book, and any invoice can then be very quickly and easily found.

Griffith Hardware Company, Rushville, Ill., who have used the Robb system for

4/1/1892 Dept. 1892

Day of month		Remarks	
Paid. 3	Phelps Dodge & Co	See 9/9	77 00
Paid. 8	Sickels S & L		93 24
Paid. 15	Russell & S. Mfg Co		64 52
Paid. 17	Phelps D & Co.		36 00
Paid. 27	Pottstown Iron Co	See Wright's	86 22

Fig. 3.—Day & Holt's Plan.

paid, time and when due. They refer to this memorandum, being kept in their ledger, as avoiding the necessity of devoting a separate ledger page to each firm from whom they buy goods.

In answer to an inquiry, T. M. Clark, Bloomington, Ill., sends a sample sheet of Robb's Bill Register, published by him, of which Fig. 5 is a reproduction, reduced in size. The 150 pages in this book are each 8½ x 14 inches in size, properly indexed and paged, and will accommodate several years, advise us that they find it the most perfect system they have ever used, and as soon as one book is filled they order another. Referring to their manner of using the book, they remark:

We keep no other account of our purchases than in this book; the whole of each transaction is complete, and we are able to refer to it in a moment at any time, and it need not go on the journal at all.

In connection with this register a remittance blank is published, together form-

ing, it is stated, as nearly as possible, a barrier against mistakes; as a cashier receiving such remittance has an exact transcript of the register, and if incorrect, errors can be immediately detected.

Discount for Cash.

The English retail merchant as a rule extends longer credit to customers than is usual in this country. From the accompanying card, taken from a London paper devoted to the interests of the Hardware trade, it will be seen that there is a tendency to encourage a cash

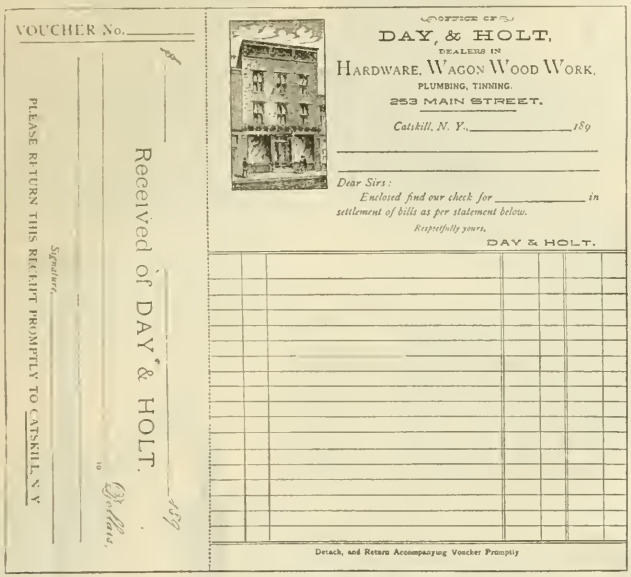


Fig. 4.—Convenient Remittance Blank (Reduced Size).

business. The card, which is about 3 x 4½ inches in size, reads as follows:

1D. in the 1S.

From All Goods paid for at the time of purchase at

TOLLIT'S

IRONMONGERY ESTABLISHMENT,

46, High Street,

ST. JOHN'S WOOD.

The cash discount which is offered, of one penny on every shilling's worth of goods, is equivalent to about 8 per cent. The card was extensively distributed by Mr. Tollit throughout the district tributary to his store. He has found the plan successful, as it has brought new customers, as well as pleased some of those who were in the habit of asking for credit. The suggestion this offers may be of service to merchants who are doing a part credit and part cash business, and who are desirous of educating their customers to pay cash for their goods. Whether the credit part of a business yields any considerable profit, is a question deserving consideration.

Cash or Credit.

The matter of cash or credit business is thus touched upon by a Hardwareman in Ohio:

It goes without saying that every retail merchant believes that a store run on cash principles is the ideal of business. Yet it is considered difficult in some lines to place one's sales on a strictly cash basis. Take for instance a Hardware store, where the sales are half cash and half credit, with the book accounts gradually getting the upper hand, it would seem that something ought to be done to turn the balance of sales on the cash side. There is no matter so disastrous to retail merchants as that of extending credit without proper discretion. The cost of keeping the books, collecting bills and loss of bad debts oftentimes equals the profit on credit sales. The man who wishes to pay cash and get full value for his money prefers to trade where his money goes furthest.

The dealer can afford to sell cheaper, since he has his goods or their equivalent always on hand, and is in a position to make money for his customers by discounting his own bills, thereby reducing the cost to his customer. We believe the time has come when the careful public will give preference to the cash store, and have therefore decided that on and after January 1 we will sell strictly for cash or its equivalent. Our prices at all times will be as low as is consistent with good goods and a fair margin of profit. We shall not try to make you believe we sell below cost, because the man who does is usually deceiving you, but we will aim at all times to please and give you full value for your money.

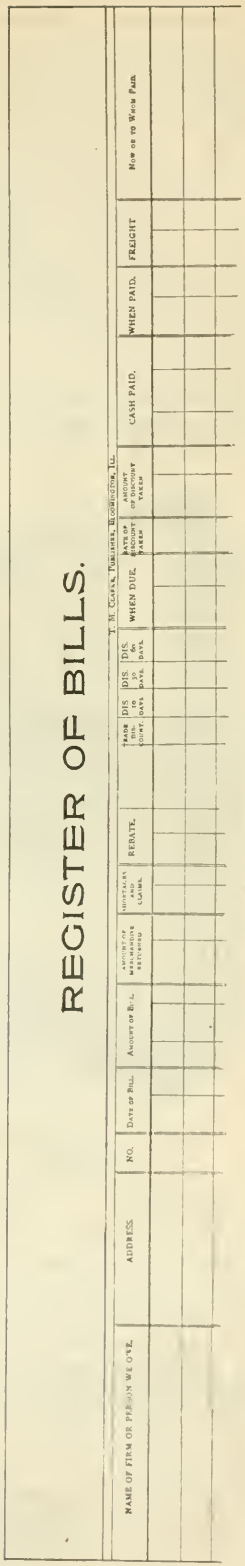
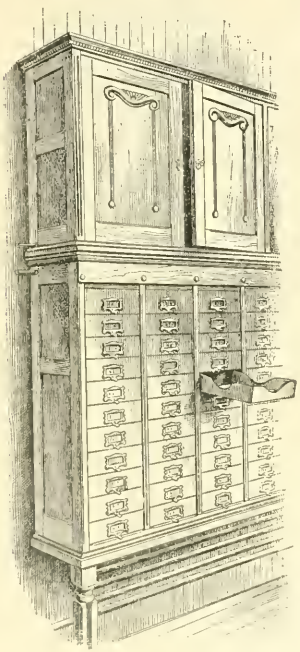


Fig. 5.—Robb's Bill Register.

Catalogue File Case.

We are indebted to the W. Bingham Company, Cleveland, Ohio, for photographs of their catalogue file case, reproductions of which are given herewith. The cabinet is located in the buyers' office, and is used for filing pamphlet catalogues, lists, circulars, quotations, &c., of the various goods in the lines they carry. The filing case is 10 feet 10 inches long and 4 feet high and consists of 11 tiers of 11 compartments each. In front of each compartment is a slide, which when raised discloses a neat tray 12 inches long, 10½ inches wide and 3 inches deep, with sides and ends slashed to facilitate getting at its contents. The index used is practically that of *The Iron Age* Multiple Index Price Book E, and indeed it was this index that first suggested the idea of the cabinet, as it occurred to H. S.

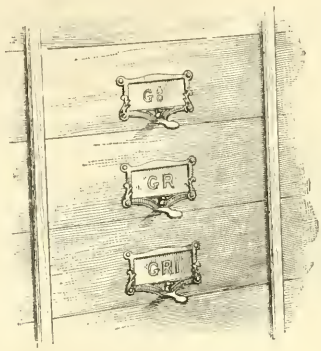


Catalogue File Case of the W. Bingham Company.

Blossom, the secretary of the company, upon examining this book, that a file, with this index would settle the vexed question as to how to conveniently care for the many small lists, &c., that it is necessary to have for reference. The index first put on the case was identically the same as that of Price Book E, but it was later found necessary to modify it, in order to relieve some trays that were too full, which was done by adding "Bells," "Locks," "Machines," "Pumps," "Refrigerators," "Tinware," "Tools," and "Wire Goods."

The whole is locked by simply turning a handle or fixed key at one end, and can only be unlocked by a key in the possession of Mr. Blossom's assistant, thus securing absolute privacy as to its contents.

As each list is filed under the name of the article listed, it is entered upon an index book under the name of the firm issuing it, the tray into which it is put being noted, so that it is but the work of a moment to find either the lists of any particular firm or all the lists of the makers of any particular article. There could hardly be an arrangement more complete or convenient, and the cabinet referred to is as satisfactory as a file as the Price Book E is as a register of quotations.



Enlarged View of Index.

On the top of the file is a cupboard 2 feet 9 inches high and 10 feet 10 inches long containing one shelf, and inclosed by six carved oak doors. This is used for large catalogues. The whole is mounted on legs 24 inches high, making the entire hight 8 feet 9 inches, the depth of the case being a trifle over 14 inches.

Eclipse Self-Measuring Oil Tank.

Wayne Oil Tank Company, Fort Wayne, Ind., are offering the self-measuring device shown in the accompanying illustration. The plunger rod of the pump is attached to a half circle connection, to which the lever is fastened, the object of this arrangement being to enable it to respond with greater ease and better results than a direct movement. The half circle contains the adjustments, which are made by means of thumb screws, as shown in the cut It is explained that the small nuts may be raised or lowered to suit the locality, and that the quart stop is made bysimply turning the handle without removing the handle from the lever. It is remarked that the measuring tanks can be made square as well as round, and that the pump cylinder is of seamless brass tubing, the valves of brass, ground air tight, and that all drippings return to the tank. When tanks are made square they are incased in a cabinet. If desired the tank can be placed in the cellar, and the measuring device on the first floor of the store. The point is made that no lamp is needed when drawing oil at night.

Eclipse Self-Measuring Oil Tank.

Steel Trowel and Weeder.

A. M. Ross & Co., Ilion, N. Y., are introducing these articles, as illustrated herewith. The garden trowel shown in Fig. 1 is made of steel, and is referred to as of good form, strong and durable. The steel weeder, Fig. 2, allows a person to stand erect when working. By inserting the tapered, half round steel blade into the earth beside a dock, thistle, planten, daisy or other weed, and then giving the hand a quarter turn, it is claimed the weeds and roots may be lifted out clean. The tool is designed for lawn, meadow or garden use.

Fig. 1.—Steel Garden Trowel.

Fig. 2.—Steel Weeder.

MEMORANDA.

THE HARDWARE BUSINESS of William Millspaugh & Sons, on West Main street, Middletown, N. Y., has been organized into a stock company under the name of the Millspaugh Hardware Company, the members of which are William Millspaugh and his sons, George M. and William M. Millspaugh.

THE BINGHAMTON HOUSE FURNISHING COMPANY have succeeded McElroy & Fancher of Binghamton, N. Y. In connection with the furnishing departments they have opened a handsome stove store, and will carry a full line of Fuller & Warren Company's rangea and heating stoves.

REYNOLDSON & METCALF, Primghar, Iowa, having outgrown their store accommodations, have erected a new two-story structure 43 x 123 feet of brick, with the lower rooms finished throughout with hard pine and metal ceiling. The Hard-

ware department is 23 x 60 feet; in the rear of which is a Tin shop, 15 x 30 feet. The Harness and Miscellaneous department is 23 x 60, with a Harness shop in the rear 15 x 15 feet. An implement sample room, 36 x 40, completes the lower story. The second floor is occupied as a carriage repository, in one room, 43 x 123 feet, reached by an elevator, 8 x 10 feet, upon which vehicles can be taken up and down.

SINCE TAKING the agency for the goods made by the Corning Stove Company of Corning, N. Y., some months ago, C. K. Converse, the Wellsboro, Pa., hardware dealer, has disposed of 125 stoves and ranges.

W. H. CRANE & SON, successors of Crane & Parker, stove dealers of Binghamton, N. Y., have refitted their store at 14 Court street, and have an elegant line of stoves and ranges. The new firm have a bright prospect.

THE PARTNERSHIP heretofore existing between E. J. Troxel and P. A. Martin in the Hardware business at Minonk, Ill., has been dissolved. Mr Troxel has retired and Mr. Martin will hereafter carry on the business alone.

Monarch Broiler and Odorless Fry Pan Combined.

Maltby, Henley & Co., Rocky Hill, Conn., are introducing this household utensil, as illustrated herewith. As shown in Fig. 1, the lug on the lower edge of the pan fits into the slot of the casting, and when the pan is in place over the casting, holds it in position as the pieces are

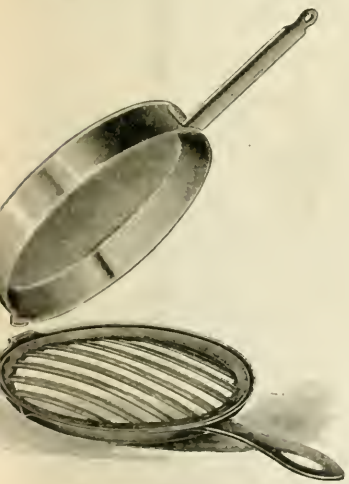


Fig. 1.—The Monarch Broiler.

reversed, or serves as a hinge when the pan is raised at right angles to the casting, and holds it in position. In Fig. 2 the broiler and pan are in position for broiling the steak, while in Fig. 3 is shown the pan as used with a cover, which accompanies every broiler or pan. The arrow indicates the opening through which the odors and smoke are sent up the chimney, when used with the stove lid removed; or when used on the top of the stove, the odors and smoke are designed to be almost wholly absorbed in the heated jacket underneath. It is remarked that the combination is a simple one; that its merits are quickly seen and explained, and that it covers many points that please. It is explained that the pan is made in one piece from Swedish steel, smoothly ground and polished inside with the riveting all on the outside piece, obviating any chance for leaks or disfigurement on the inside. The points of excellence are enumerated as follows: A complete broiler and fry pan are combined, avoiding the smoke and odor in both; an ordinary fire doing good work, not being checked while broiling; the whole outside of the cooking part is exposed to the fire, it heats quickly and holds the heat when the pan is removed; the pan rests on the beaded rim, preventing wear on the bottom, and is not easily turned over. It is claimed that the fry pan or broiler can be used with great satisfaction over gas or oil stoves, and that because of the peculiar construction of the pan it not only fits any stove hole, but catches the flame on oil and gas stoves, so that it heats quickly and evenly and absorbs the smoke and odors arising from cooking.

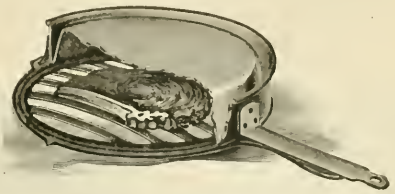


Fig. 2.—Broiler in Position for Use.

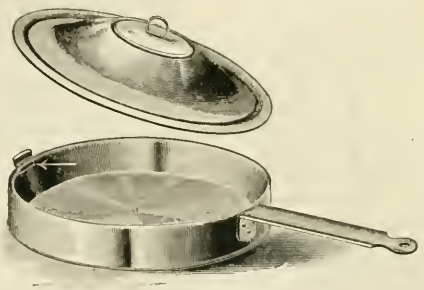


Fig. 3.—Used as an Odorless Fry Pan.

The Buckeye Churn.

The Bukeye Churn Company, Sidney, Ohio, are offering the form of churn as illustrated in Figs. 1 and 2, embodying the principle of concussion to produce

Fig. 1.—The Buckeye Churn.

desired results. In alluding to its construction and operation, the manufacturers state that it requires but one fourth the power crank or dash churns do, as by rocking the churn backward and forward the barrel is thrown on an inclined plane alternately from one end to the other, thus dashing the contents by its own weight into spray, and that the rebound or reaction, in connection with the mechanical fact that the fulcrum at the bottom of rockers changes from one to the other in accordance with the change in weight, balances the weight in its motion, thereby saving three-fourths of the labor required with other devices. The manufacturers claim that the apparatus does not heat by exercise; that it has no rim of cork to leak or get sour; that it is always open to admit air and prevent accumulation of gases, and that there are no cogs or journals to get out of order. The point is made that

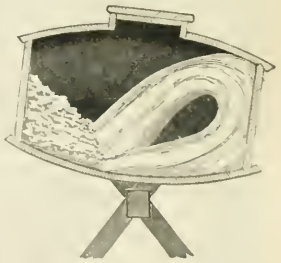


Fig. 2.—Showing its Operation.

the barrel is made of selected white oak staves thoroughly seasoned, varnished in natural wood, strongly and substantially put together.

A mechanic arts building will be erected in New York at a cost of $200,000, through the munificence of a lady who presents that amount to the Teachers' College.

A number of small storage battery electric steamers are to be built at Tacoma to ply between that point and all Puget Sound routes, as the entire shore line is settling up rapidly, and the new boats will in effect be extensions of the city car lines. These boats are 56 feet long and calculated to make 15 miles an hour.

STOVE TRADE NOTES.

The Stove Convention.

The meetings of stove manufacturers, held in Chicago last week, were of a special character, called to consider a subject which was not deemed by them of public interest, and therefore did not receive the attention from the trade press which is always accorded the annual stove conventions. The object of the gathering, however, was of sufficient importance to be considered of great interest to the public. Anything which directly concerns such a prominent industry as the manufacture of stoves, enlists the attention of the public. We have, therefore, endeavored to secure more extended details of the transactions than were published last week, but have been forced to be content with merely a brief report of the result accomplished.

The general meeting of stove manufacturers on Friday, which followed that of the Stove Defense Association on Thursday, was the first general meeting of stove manufacturers held in 15 years. Invitations to attend it had been sent to every manufacturer in the United States, and in no way was it connected either with the National Association of Stove Manufacturers or the National Defense Association, except as it might be considered as an advisory body to the latter. Every section of the country was represented in the attendance except New England. Letters from the New England manufacturers, however, as well as from large numbers of other manufacturers unable to attend, were received, in which strong ground was taken against an advance in molders' wages, claiming that it would be impossible to comply with the suggestion of the molders to advance the price of stoves in proportion. We are advised that over 70 per cent. of the stove-producing capacity of the country was represented at the meeting.

The request of the molders for a 15 per cent. advance was very thoroughly discussed. The condition of the stove trade was exhaustively considered. Every possible aspect of the subject was brought up, and the relation of the stove business to other trades was very carefully considered. In view of the general tendency downward of prices of staple commodities, it was finally determined by a unanimous vote that it would not be possible to advance the price of stoves, as an advance if made would only curtail consumption and injure both manufacturers and employees. The matter was then by formal vote turned over to the Stove Defense Association, to be properly handled by them.

A meeting of the Stove Defense Association was called immediately after the general meeting had adjourned; and, after some further discussion of the question, the officers were directed to advise the molders that their request for an advance in wages would be refused. This notification was forthwith sent, and it now remains to be seen whether the molders will accept the situation, or will insist upon the advance. In view of the fact that wages are being reduced in other vocations, it would seem wise for them to continue the present arrangement and await the return of general prosperity to the country to press the demand for an advance.

The Keeley Stove Company

of Columbia, Pa., are distributing a very attractive catalogue of 100 pages, relating to the Columbian stoves, ranges and furnaces, which they manufacture in great variety. The Columbian line of goods will be exhibited at the World's Fair, and the manufacturers will spare no effort to make their display a leading attraction. The opening pages of the catalogue contain some valuable suggestions for those who have occasion to order stove repairs, and in connection with which is a price list of fire-brick stove lining furnished by the company. The first construction considered in the catalogue is the Columbian Newport, a new range with elevated boiler, made with or without warming closet, and both right and left hand. It is offered in three sizes and embodies the latest features. The Columbian Choice is a neat six hole range, made in several styles and sizes and having a triplex grate, capacious oven and with an open end at which the ashes can be removed. The Columbian King is a member of this class, as is also the New Capello, a heavy, strong, six-hole range, with fire-box adapted for hard coal, soft coal or wood. The bed plate of this range is made in two parts, so that the grate may be taken out and replaced without disturbing the water back. The Columbian Plato, made in five sizes, is of attractive design, and the materials used in its construction are said to be of the very best. The Triplex grate is illustrated and described, together with a variety of high shelves, closets, &c. Some of the other goods include the Columbian Star, made with the modern improvements and decorated in an attractive manner; the Columbian Charm, a six-hole range made with right and left hand ovens and with parts so disposed as to give very satisfactory results in baking and roasting; the Columbian Dandy, a neat cheap range made in five sizes; the Columbian Gem, another member of this class; the Vim and the Columbian Queen. The cook stoves are represented by the Regulator, Golden Grain and Columbian Dora, made for coal or wood; the Columbian Alliance, a cheap wood cook made in two sizes, and the Miner's Friend, a coal stove made in one size. The leading heater is known under the name Columbian Art. It is handsomely treated with nickel and art tile and is made in two sizes. Each stove is a double heater and the system of circulation is said to be complete. The cold air is taken from the floor, carried through the stove and discharged through the heat pipe collar. A sectional view of the stove is presented showing the various parts and indicating the readiness with which the stove may be dismounted when desired. The Columbian Cadet, made with revertible flue and tea-kettle attachment; the Morning Light, a sheet iron cylinder surface burner; the Grip, an all-cast construction; the Luxury, a very neat open stove with sheet-iron back and dust flue; the Columbian Prize, a Franklin, made with round fire pot suitable for natural gas and hard or soft coal; the Columbian Ulster, a heavy cannon, and the Morning Light, Columbian Vulcan and Columbian Ulster furnaces, are some of the other goods to which the attention of the dealer is invited. A miscellaneous assortment of stove hollow ware, prices, &c., complete the work. Accompanying the catalogue is another devoted exclusively to the company's line of furnaces. These are described at greater length than in the larger work and prices are given of each of the sizes made. The binding of the catalogue is in colored paper covers with side title consisting of a picture representing a cozy interior with one of the company's heaters as a prominent feature.

Claims for Castings Broken in Shipment.

A correspondent who has read the series of articles which have appeared in these columns for a few weeks past, on the general subject of claims made for castings broken in transportation, sends us the following letter:

An article in *The Metal Worker* of the 11th inst., with the above heading, is of great interest. I would suggest to manufacturers that they get up blank forms and send them to dealers to fill out, and present to the carriers of freight. The reason the dealer goes back to the shipper is because he does not understand how to apply to the railroad company for damages, owing, no doubt, to the fact that the railroad companies require a great deal of red tape to be gone through with before any result can be reached. I think if the manufacturers would get up blanks for the dealers to fill out and present to the railroad companies, it would save a great deal of money. The dealers should also be given instructions of just how to fill out the blanks, and how to present them in case of claims for damages. They should also be instructed how to file shipping and freight bills, and such other papers as may be necessary to file, with the railroad companies. The manufacturers know better than the retailers how this should be done. Many of the retailers will not take the trouble to find out how it should be done, and the agent for the railroad company will not receive the document unless it is presented according to the company's rules. The result is, that dealers reach the conclusion that they can write to the shipper and secure greater satisfaction, so they do not bother the railroad companies.

The Weir Stove Company, Taunton, Mass., resumed active operations on the morning of the 17th inst., after a brief shutdown.

Imitation of Ornamental Wrought-Iron Work.

BY JOS. LEON GOBEILLE.

There can be no question regarding the artistic value of ornamental wrought iron work. Its intrinsic value is definitely settled also, for modern pieces, such as grills, lamps, fenders, &c., fetch large sums of money, is of good design, while genuine antique specimens bring almost fabulous prices—in some cases much more than their weight in silver. Now in just the proportion that ornamental wrought iron is good and worthy, any imitation is meretricious and valueless from an æsthetic standpoint, and yet the age we live in is so intensely practical, so anxious to have the form even without the substance, that from present indications in a few years much that purports to be of wrought iron will be of cast, treated with some dark solution by electro-deposit or finished in the Bower-Barff style. Recently a considerable number of pieces of imitation work have been designed and finished under the writer's supervision, and, as a simple statement of how the work was done may be of interest, the following is presented* as a good example of this class of work.

Fig. 1 shows the preliminary sketch, which was made to answer two purposes: to get the approval of the firm ordering the work, who are quite particular in matters of design, and to serve as a guide for the modeler.

Fig. 1.—Preliminary Sketch.

Fig. 2 is a representation of the Bracket modeled up in clay, a necessary preliminary to carving the pattern in all work demanding anything like artistic treatment, the reason for this is that slight modifications materially change the character of a design, and these changes are easily managed in a plastic material, as wax or clay, though exceedingly difficult, if not impossible of attainment by the wood carver without a model.

Fig. 2.—Bracket Modeled in Clay.

Fig. 3 shows the two faces of the pattern, midway in the process of carving; this part of the work must be done with great precision in order to get the effect; it must, of course, have uniform draft, so as to come readily out of the sand; but only the least possible amount of incline can be tolerated.

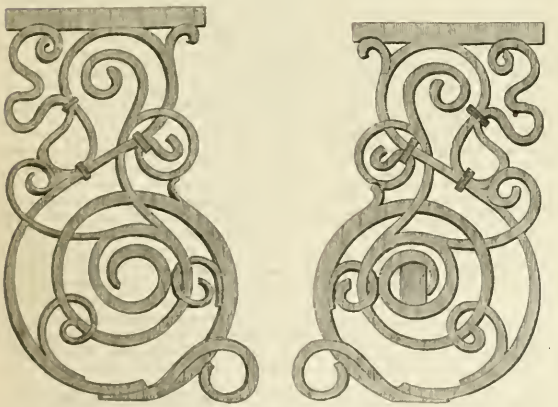


Fig. 3.—The Two Faces of the Pattern Partly Completed.

Fig. 4 gives a view of the pattern completed, glued on to a match board and in a snap-flask. Here, again, much care has to be exercised so that the two halves make the finished casting without defects.

All the curves, every outline in fact, of both the sides, must exactly coincide with each other and the match board and flask must come straight and plumb so that they will go together easily, but precisely the same way every time. Finally, only the best sort of molders should be put on this class of work; men who take more pride in the finished product than in the number of flasks they can put up before the wind goes on.

Fig. 4.—Pattern on Match Board in Snap Flask.

* By permission of the Chicago & Erie Stove Company.

ODD PLATES.

THE NATIONAL VAPOR STOVE & MFG. COMPANY of Lorain and Cleveland, Ohio, favor us with an exceedingly attractive catalogue of 56 pages which they have just issued, relating to the National gas and gasoline stoves. In offering this publication to the trade the manufacturers call especial attention to the New Idea Stove as placed upon the market for 1893. The principle of the New Idea is said to be a combination of the hot and cold process of generating gas from gasoline. The company utilize the cold process of generation for initial lighting, and, after the stove is started, hot generation. The construction is simple and the parts are put together with machine screws. It is claimed that there is no difficulty in lighting the burner, nor is there any odor emanating from it when extinguished. Another point to which attention is invited is that every part of the burner and

tubes is made of brass or cast iron, no sheet metal being employed. The company also have an interesting line of junior stoves, which are carefully illustrated in the catalogue before us. The descriptive letter press is full and covers the principal features to which the manufacturers desire to direct attention, while the illustrations are clear cut and satisfactory. The assortment of goods shown is a large and varied one, and the dealer is likely to find within the covers of the catalogue much that will interest him.

S. Bowen's Sons of North Penn Junction, Philadelphia, are putting upon the market a new stove putty, which they state is the result of experiments, extending over 15 years, in attempts to produce an article to withstand the highest degree of temperature and yet be sufficiently soft to make application easy and effective. The putty has been subjected to the most severe tests, and the makers claim that it can be left in bulk on a bench for several days without a covering, and will not harden enough to interfere with its working properties; yet when subjected to heat it will harden to a stone-like consistency without crumbling. The makers also claim that the new putty, to which they have given the appropriate name "Indestructible," will stick to the iron much better, has no odor or smell when the stove to which it is applied is first used, is much lower in price than furnace cement; keeps in the package much better, is more readily applied, and hardens slowly on a joint, thus allowing a mounter to putty up a line of stoves before putting the plates together. Generous samples of the putty have been sent to some of the leading stove manufacturers, with requests for practical and severe tests, and the reports resulting therefrom have been eminently satisfactory.

The Corning Stove Company of Corning, N.Y., will soon begin the manufacture of furnaces in conjunction with their large lines of stoves and ranges.

J. J Wilson, who is well known to many in the trade, has been with the Fuller & Warren Company, Troy, N. Y., since the first of the year, traveling in their interests, and selling furnaces, combination heaters, hot water and steam boilers. Mr. Wilson reports that the trade has been very excellent in the lines which he handles. Since the first of the year he has traveled in Pennsylvania, Maryland, and portions of West Virginia.

Robert Schueler & Co. of 615 Ogden avenue, Chicago, Ill., are offering the trade a line of gas ranges specially adapted for all kinds of baking, broiling and roasting. The goods are made under the name "American," and are turned out in a variety of styles, with or without water heater. The manufacturers refer to the operation of these ranges as being entirely satisfactory, and the design neat and tasteful.

The "Majestic Range Cook Book" is the title of a pamphlet which is being distributed by the Majestic Mfg. Company of St. Louis, Mo. Within its colored paper covers the leading lines of stoves are illustrated and described, following which is a long list of recipes of interest to the housewife. These cover a wide range, and are sent out with the statement that they have been carefully tested, and can be used with the certainty of success.

The Baxter Stove Company of Mansfield, Ohio, have just issued what is known as Catalogue No. 3, relating to their line of Monarch gasoline stoves and ranges. The work is printed in two colors, and is bound in colored paper covers of attractive design. The frontispiece is a bird's-eye view of the company's works, while facing this is a picture consisting of a group of photographs representing the late Mr. Baxter, president of the company, and his seven sons. The manufacturers state that the many improvements and developments made by them for the year 1893 cannot be shown in the illustrations, but they feel confident that an examination of the pages of the catalogue will give some idea of the labor and genius that have been employed to make the Monarch goods first class in every particular. The salient points to which the company call special attention are, "originality in design, novelty of features, perfection of mechanism, varieties in styles, and completeness of details." The first stove in the catalogue described is the Regal Monarch, a cabinet range which has been greatly improved for this season. It is fitted with patent air-blast oven and broiler burner, cast top and frame and cut-off cap, by means of which the generating flame may be reduced to a very low consumption and the entire line of burners fully operated. In connection with the Monarch New Method, special attention is directed to the direct action valves, Baxter's patent side feed and Baxter's patent vaporizing chambers. A varied assortment of Monarch Juniors is also shown, together with illustrations of ovens, broilers, steam cookers, &c.

According to the annual statement of the Employees' Mutual Benefit Association of the Michigan Stove Company, the disbursements during the past year in the shape of benefits amounted to $1115.37. The total amount paid in benefits since the organization of the association May 12, 1882, is $15,781.87. The organization is conducted upon the co operative plan, and thus far has proved a great success. A large number of employees of the company named have received benefits from the sick fund, which has enabled them to tide over a period of illness which otherwise would have proved very serious.

A simple apparatus, by means of which the exact quantity of water may be placed in the evaporating pans for the purpose of moistening the air in hot-air furnaces, is the basis of a patent recently granted to Joseph F. Jeffrey of Shell Lake, Wis. The arrangement is such that the device is placed near or within the hot flues and the evaporation controls the humidity of the air entering the flues. The evaporating pans are so constructed that they may be made to evaporate more or less rapidly as desired. The object of the inventor is to produce an apparatus which may be cheaply made, easily controlled, and which will accurately regulate the quantity of moisture with which the heated air is charged.

The Gobeille Pattern Company of Cleveland, Ohio, are completing the erection of their shop No. 3, a three-story brick building 68 x 70 feet. The equipment of the new shop will be modern throughout, the very best appliances that could be secured having been placed in it. Operations will probably begin during April and about 75 additional men will be employed.

Armstrong & Co. of Baltimore will shortly put upon the market a new stove, which will to a certain extent embody the good qualities of their Helper range. It will be fitted with a horizontal boiler and a warming closet. The company will make two sizes, No. 7 and No. 8, each with right or left hand fire box, as may be required.

The Magee Furnace Company, 117 Beekman street, whose plans were made to occupy their new premises at 242 Water street some time in January, were obliged to modify their arrangements somewhat, and took possession of their commodious quarters during the past week. This removal, they say, is occasioned by the increase of their business, requiring greater facilities to handle it. A new line of samples will be set up and the interior lighted by electricity.

The Calder Coal Oil Burner & Stove Company is the name of a concern recently incorporated at Omaha, Neb., for the manufacture and sale of a patent process for burning coal oil. The capital stock is placed at $4000, and the incorporators include C H. Pinney, Lewis Hammer, C. C. Cook, M. Pusey, F. P. Seybert and William Moore.

The Howard Furnace Company, Syracuse, N. Y., recently invited their managers of branches and salesmen to Syracuse for the purpose of exchanging ideas, views and experiences, partaking of the nature of a conference as to how the mutual interests of all could best be promoted. The meeting was held March 9, and after the conclusion of the discussion for which they were assembled, those invited were entertained at dinner at the Yates, the president, E. M. Moore; vice president, J. H. Norton, and treasurer, F. H. Moore, acting as hosts. C. D. Howard was unable to be present. A neat speech was made by the president, and complimentary resolutions of an informal character were offered and adopted by those present in appreciation of their reception. There were present: W. B. Wilkinson, New York; J P. Healey. Boston, and Mr. Tyler, Grand Rapids, managers of branches, and G. A. Stevens, covering lower New York. New England and New Jersey; Mr. Van Keuren, who looks after Central and Northern New York, and Messrs. Foord and Beers, who attend to local business around Syracuse and vicinity.

A tile fastener, intended for use in attaching art tiles to stoves, has recently been patented by A. M. Strusholm of Woodbridge, N. J. The invention consists of a suitable device, which can be readily attached to the stove or frame rod provided therefor, and is so shaped at the projecting end as to fit within dovetailed grooves formed in the tiles. A spring clip embraces the frame rods at any desired point, the clip having its end formed to correspond with the dovetailed recess or groove in the tile.

Charles T. Corby, whose present warehouse and headquarters are at Ralph avenue and Broadway, Brooklyn, will be at 117 Beekman street, New York, after March 20, occupying the premises lately vacated by the Magee Furnace Company. Mr. Corby carries a large stock of oil and gas stoves and stovemen's supplies. He is agent for Hoyt & Wynkoop, manufacturers of oil stoves; also for Schneider & Trenkamp, makers of vapor and gas stoves. The building in Beekman street will be used as a display room and shipping department.

A gas cut-off intended to prevent the escape from a stove into a room of disagreeable odors after the supply of oil from the reservoir has been cut off has recently been patented by Annie Sayers of Chicago. The cut off is adapted to be applied to the burner of a gasoline stove of any description, but is found to be especially adapted for use in connection with what are known as the new-process vapor stoves. The gasoline is admitted to a mixing chamber from the reservoir through a needle valve and drips through a tube to a vapor chamber formed by a cylinder. The vapor rises to the burner, at the top of which it is ignited. As soon as this takes place the vapor within the center tube also ignites and burns at the bottom of the tube, heating the barrel or cylinder above referred to, as well as the central tube. The heat thus generated causes a rise of air in the tube, which passes into and cools in the vapor and air chamber, thus causing it to descend through a vapor pipe and fill the

vapor chamber with gas and air. When the supply of gasoline from the reservoir is shut off by the needle valve, the flame at the top of the burner goes out owing to the excessive supply of air for the amount of gas remaining in the chamber. To prevent offensive odor escaping into the room the gas cut off is so arranged as to cover the top of the burner, and when applied the gaseous vapor is caused to be consumed at the openings of the lower end of the central tube previously referred to. This latter tube being open at the bottom and top and the cap centrally perforated, permits of a free passage of air to supply the flame at the openings at the lower end of the central tube.

IN A NOTICE in *The Metal Worker* last week of the catalogue of the Excelsior Steel Furnace Company of Chicago, it was mentioned that the material from which their fittings were made was IC tin plate. It should have been added that the company are prepared to promptly furnish these fittings made of IX plates, which is the weight required very largely by the Eastern trade.

THE BUILDING at 51 to 53 South May street, Chicago, partly occupied by W. J. McKay & Co., was damaged by fire on the night of the 22d inst. Their stock of stoves filled an entire floor and occasioned the firemen some anxiety. It was feared that the great weight on that floor would cause the walls, weakened by fire in other places, to give way, and everything was done by the firemen to keep the fire as much as possible from that floor. This was done so successfully that the firm's loss will probably not be over $10,000, covered by insurance.

A GAS BURNER having a greater number of openings than in the ordinary circular burner and means for preventing the escapt of unburned gas, which makes an unpleasant odor, is the subject of a patent granted February 28 to Herbert Clayton of New York City. The inventor makes the construction in such a way as to feed the air between the escaping and burning gas flames, allowing it to mingle therewith and produce complete combustion. He further provides against the escape of unburned gas by feeding to the outside of the flames a current of air in such a way that the air mingles with the burned gas and causes the entire volume of gas to be consumed. Another object of the invention is to give a uniform heat to the under side of a vessel placed upon the stove, by distributing the flame entirely over its bottom instead of burning it in a ring as in the ordinary burner. A still further object is to provide the device with a small central burner and a chamber for feeding gas thereto, while surrounding it is a larger burner also having a chamber. Means are provided for admitting gas to the small central burner only when the valve is turned a slight distance, thus preventing the escape of unburned gas through the large burner, and then admitting gradually the gas to the large burner as the valve is further opened, thus making it possible to have only a small flame without the escape of unburned gas into the room in which the device is placed.

J. B. COPP, manager of the Chicago branch of the Peninsular Stove Company, has made a number of improvements in his warehouse and sample room. The offices have been removed to the second story and handsomery refitted. Being further from the street, less annoyance is experienced from drafts, dirt and street noises. The sample floor has been considerably increased in size by the removal of the offices, and has been redecorated, making a remarkably fine room, more suitable for the display of the high grade goods manufactured by this company. These improvements have been made by way of preparation for the proper entertainment of their customers, who are expected to visit Chicago in force during the World's Fair.

WE HAVE RECEIVED, with the compliments of J. E. Walsh & Co. of Warren, Mass., an exceedingly pretty announcement in the shape of a four page folder, designed by Livermore & Knight, Providence, R. I. The front cover carries a panel picture representing a landscape scene in summer, while upon the third page is an illustration of the Highland Grand range and the announcement that Messrs Walsh & Co. have secured a store on South Bridge street, Warren, Mass., where they will carry a full line of stoves, ranges and kitchen furnishings, and will be prepared to execute first-class plumbing, tin, copper, and sheet-iron work, hot-water, steam and gas-pipe fitting. The firm is made up of John E. Walsh and H. A. Tannerbring.

WILLIAM L. MITCHELL of New York City has patented a gas burner so constructed, it is claimed, as to obtain a more thorough and uniform mixture of the gas and air before combustion, while at the same time making the pressure on the mixer uniform upon all parts of the burner, so that the amount of flame may be easily regulated to any desired degree between two extremes. The general form of the burner is annular and is designed to produce a flame on the inner periphery on the annulus, and an independent flame on the outer circumference. The two flames are fed independently, and when a minimum of heat is desired the supply of gas is cut of entirely from the outer flame or burner, while the inner burner is turned to its lowest point. When both flames or burners are under full pressure the maximum heat is secured. Between these two extremes the inventor claims that any desired degree of heat may be obtained.

GRAFF & CO., 208 Water street, New York, are now offering the trade a new range, which they have designated Columbian. It has double ovens, and is similar in construction to their well-known Faultless. The new feature is the method of treating the section over the fire box. Instead of four covers, with a long center, and two smaller ones, there is a removable frame, inside of which is a short center supporting two covers or lids, 8 inches in diameter, outside of which are rings ½ inch wide, thus affording a choice of either 8 or 9 inch holes, according to the needs of the housekeeper. Then, instead of the former arrangement, the removable frame runs the same way as this fire box and directly over it, permitting the whole fire surface being utilized whether for broiling, toasting or other purposes, where direct contact with the fire is necessary. Then, too, in laundering clothes, the ordinary wash boiler can be placed in the smaller oblong hole by removing the covers and rings, or the modern large-size square boiler by taking out the entire center. The range can be furnished in brick set or portable, right or left, &c. This house have also added for this season's trade a new style front to their line of Hero furnaces, consisting of a solid cast-iron front, which is fastened to the body of the heater in one piece instead of two, as heretofore. This furnace is now made in three styles—viz., steel tubular radiator, revertible flue cast-iron radiator, and what is usually known as sweep flue soft coal radiator.

A HEATING DEVICE for use in connection with gas jets or lamps has been patented by William Rennyson of Morristown, Pa. The object of the present invention is to produce a device which shall be cheap and simple in construction, efficient in action, ornamental in appearance and more easily taken apart for transportation and cleaning purposes. The globe or reservoir, is supported above the flame of a gas jet or oil lamp in such a way as to receive and temporarily confine the hot gases as they ascend from the flame and radiate them downwardly and outwardly into the room whereby, it is claimed, the heating and lighting capacity of the flame are greatly increased.

SCRAP.

BRITISH BOARD OF TRADE RETURNS for the month of February show a falling off in the shipments of tin and terne plates to the United States of over 3000 tons, as compared with the exports in February, 1892. The figures are: 1892, 23,268 tons; 1893, 20,190 tons.

N. & G. TAYLOR COMPANY of Philadelphia, Pa., send out a circular letter inclosing a description of their tin-plate works, from which they say they are now turning out American tin plate at the rate of a complete finished box per minute. They refer to the manufacture of tin plate in this country, and describe briefly the elements that enter into its cost. Reference is also made to the recently published statistics of the product of tin plate in America.

A LETTER SIGNED by Alfred Marshall was published in a recent issue of the Philadelphia *Press*, commenting on an editorial which appeared in the *Times* relative to the American tin industry. Mr. Marshall who, as the trade know, is in a position to speak from intimate knowledge, points out the fact that the large majority of the American tin-plate works are run by American labor. Americans, he said, after a few months' experience are thoroughly competent to turn out as much tin plate, and equal in every respect to the best imported. They are also more reliable in doing their work. Mr. Marshall likewise refers to the recently published statistics on the manufacture of American tin plates.

AT THE CONCLUSION of the last monthly meeting of the Iron and Steel Sheet Manufacturers' Association an informal talk was had by four or five tin-plate manufacturers concerning the advisability of having a display of tin and terne plate at the World's Fair. The question of having an exhibit showing the process of mining the ore, smelting it and of cutting the sheets, and all details connected with the manufacture of tin and terne plates, was discussed, but no definite action was taken. It was hoped the attendance of tin plate manufacturers would have been larger, but as only four or five concerns were represented, definite action on this subject was postponed until a later date.

The Nicaragua Canal Construction Company have purchased the ocean steamer "President Caraza," to be added to their fleet, making nine vessels owned by the company. The new steamer is American built, and it is the intention of the company to use the boat for shipping supplies and employees to the canal works from American ports.

The net profits of the Cunard Steamship Company last year were only about $150,000, on account of low freights and loss of steerage traffic.

New Orleans is promised an abundant supply of coal from the mines in Georgia and Alabama, the Richmond & Danville Railroad having arranged, through its Georgia Pacific branch, for a line of barges to run between its termini on the Mississippi and New Orleans for transporting coal.

TRADE REPORT.

The Iron Market.

There has been an increased demand during the past week for Iron and Steel without any pronounced change in prices. In some lines prices are a shade better, in others they are easier, so that there is nothing to be claimed as a distinctive advance in price, taking the market as a whole. A large quantity of material is being used, for which there is likely to be an increased demand when trade is fully opened; but a remarkable feature of the situation is that while consumers have plenty of orders they claim to be making little or no margin of profit, and are inclined to complain that they are doing a large amount of business for a small compensation. There is the best of reasons for believing that there are more hands employed in Philadelphia and its immediate vicinity and on fuller time than at any period on record. We refer, of course, to Iron workers only, which in the city alone aggregate between 30,000 and 40,000 hands. In view of such facts as these, it seems paradoxical to say that business is in poor condition, yet that is about the usual report. The Baldwin Locomotive Works alone are working nearly 5000 hands, turning out 20 engines per week; the Cramps and the Disstons make another 5000 between them, with quite a number of concerns running from 750 to 1500 each, among which may be mentioned the Southwark Foundry & Machine Works, Bement, Miles & Co., Wm. Sellers & Co., the Enterprise Mfg. Company the Allison Mfg. Company; and with 500 to 700 each, may be mentioned such concerns as the Geo. V. Cresson Company, Hoopes & Townsend, G. & H. Barnett, Isaac A. Sheppard & Co., and the Abram Cox Stove Company. Up the Schuylkill Valley, and especially at Reading, similar activity prevails, but they all say the same thing—no margin for profit. It is difficult to explain why such is the case, but that it is so in many departments of trade is a fact too well known to admit of denial.

Recent interviews with a number of the leading Iron and Steel manufacturers of Pittsburgh elicited the information that the prospects for a heavy business in nearly all kinds of Raw and Finished material are highly encouraging. The volume of business to day is much heavier than one month ago, and when spring trade has fairly opened up there will be a still heavier demand for Iron and Steel products. A very pleasing feature in connection with the improvement in the business situation is the fact that it not only applies to demand, but also to prices, although in not so marked a degree. Since February 1 we have seen Bessemer Pig advance nearly $1 ℔ ton, and it is in active demand to-day at $14 ℔ ton. Billets are fully $1.50 ℔ ton higher, while the immediate products of Soft Steel have also scored material advances. In Structural Material, Plates, Steel Bars and Merchant Steel there is too little difference between the price of the Finished and the Raw Material, and makers state that these must advance in price on account of the sharp advances in Pig and Billets. The Ore question is an important factor in the situation just now. The impression prevails that just as soon as the Ore sellers and furnace owners come to an understanding, its immediate effect will be in the nature of further advances in Bessemer Pig and Billets. More anxiety has been shown during the past week by the furnacemen to close up with the Ore people than existed several weeks ago. It is accepted as a fact that the shoving up of prices for Pig by the furnacemen has given considerable strength to the backbone of the Ore interests, and further advances in Pig will continue to strengthen the position of the Ore men.

The leading Northern furnace interest represented in the New York market reports that old customers are booking orders quite freely for Pig Iron, and that shipments thus far this year are much heavier than they were a year since. Complaints are again being heard of delay in delivery of Southern Iron. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 25 @ $14.75 for No. 1; $13.25 @ $13.75 for No. 2 and No. 1 Soft.

The Pig Iron business in the Philadelphia market is dull and prices are less firm than they were a week ago. They are not quotably lower, but there is more pressure to sell, and buyers are conscious of the fact that the market is in their favor. Under such conditions they are less disposed to make bids, or when they do make them they are at lower figures than before, and in some cases such bids have been promptly accepted. The general situation is such that we cannot fairly change the list of quotations, because there has not been enough done to warrant it, and, besides, there is a great deal of business being done at former prices. Some furnaces are in fact so well sold up that they have no need to change their figures, no matter what others may do. All the same, any large consumer with money in hand can buy almost any grade of Iron he wants, Bessemer excepted, at fractionally lower prices than would have been considered last week or the week before. The reason for this is due to the fact that Iron "for Iron" is in excess of the demand, Steel having completely usurped the place of Iron. Comparatively speaking, there is no demand for Mill Irons, so that prices must of necessity weaken. Instead of buying 300 to 500 or 1,000 tons of Pig Iron per week, rolling mills buy Steel Billets, and there is no prospect that they will go back to the old method of puddling. With this fact so constantly in view, producers seem to have made up their minds to a long period of low prices, and are therefore disposed to either get cost down to meet the requirements of the market, or to go out of business. It is no use contending against the inevitable, so that during the next few months the contest is likely to be settled on either of the lines indicated. Hence, for the next two or three months, there is little upon which to base expectations of improvement in prices, while there is a possibility that even the present low figures may be still further shaded before a reaction sets in. Meanwhile asking prices are nominally as follows for Philadelphia and equivalent deliveries, with 25¢ to 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore :

American Scotch, No. 1X.....	$16.75	@ $17 00
American Scotch, No. 2X.....	15 75	@ 16.00

From Chicago we learn that the advance in price made last week on No. 1 Local Coke Iron has been maintained and sales have been made in fair quantities, which justifies the action of the manufacturers in endeavoring to get better rates. Business in this class of Iron has been only moderate, it is true, but sellers report a continued accession to the ranks of buyers from unexpected quarters. Many consumers who have already bought are still adding to their purchases and encouragement is felt in the continuance of a satisfactory volume of trade. The local railroads last week for the first time recognized the justice of the claims made by furnacemen here for lower freight rates in competition with Southern Iron. A reduction has been ordered on freight rates from Chicago to Mississippi River points of 50¢ ℔ ton. This is expected to open to local makers an increased territory of considerable proportions unless the Southern furnacemen are able to secure a corresponding reduction in freight rates to the same locality. This remains to be seen. Southern Coke Iron has been sold only to a moderate extent, although inquiries are quite abundant. The Southern companies are generally not willing to make the deliveries that buyers ask; sales therefore are for reasonably prompt shipment. Competition is keen on this class

of trade, but a reduction in our quotations hardly seems advisable under the circumstances. Lake Superior Charcoal is still quiet, but held firmly by producers. We revise our quotations as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	$16.50 @ $17.00
Local Coke Foundry, No. 1	13.75 @ 14.25
Local Coke Foundry, No. 2	13.00 @ 13.25
Local Coke Foundry, No. 3	12.75 @ 13.00

In Southern markets there has been a moderate volume of business in Pig Iron during the week, the demand being mainly for immediate or short forward delivery, no sale being reported exceeding 1000 tons, and only a few of this quantity. Buyers decline to purchase for more than three or four months ahead, for they believe that Iron will be no higher; and while there is no urgency to sell for long delivery, the evidences are that purchases could be made for all this year on the basis of current prices. The large Iron companies in the South are doubtless maintaining prices having refused $8, f.o.b. Birmingham, this week for Gray Forge; but it is well known that sales have been made by other parties on this basis. There is little Mottled Neutral Coke Iron offered; but that sympathizes with Gray Forge in weakness. There has been no movement in Charcoal Iron, and, while the market appears to be weak, quotations are nominally unchanged.

Foundry.

Southern Coke, No. 1	$13.25 @ $13.50
Southern Coke, No. 2	12.00 @ 12.25
Southern Coke, No. 3	11.25 @ 11.50
Ohio Soft Stone Coal, No. 1	16.00 @ 16.25
Ohio Soft Stone Coal, No. 2	15.00 @ 15.25
Mahoning and Shenango Valley	14.75 @ 15.00
Hanging Rock Charcoal, No. 1	19.00 @ 19.25
Hanging Rock Charcoal, No. 2	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 1	15.50 @ 15.75
Tennessee and Alabama Charcoal, No. 2	14.50 @ 14.75

Metal Market.

Copper.—The expected spring season active demand is thus far slow to materialize. Evidence is not wanting that considerable quantities of Copper are being used for electrical purposes and that quite the average amount of stock is passing into other channels of consumption. It is a matter of record that production is being kept within manageable bounds. Still there seems to be more supply than demand at the present time and more or less weak undertone to prices, particularly for deliveries immediately after the opening of navigation. It is no difficult matter to fill orders for Lake Superior Ingot at 11¼¢, and hardly any secrecy is attached to the fact that 10¾¢ has only to be bid to find sellers of casting brands. In short, the market presents a weary appearance, despite all the efforts made recently with a view to regulating the relation of supply and demand, so as to prevent values from depreciating. Surface appearances are that Copper, like nearly all other merchandise, is affected to greater or lesser extent by the stringency in the money market.

Pig Tin.—The "bull" interest in the market has spared neither time nor trouble to induce consumers and distributors to believe that Tin is a good purchase at current prices. In fact, all sort of argument has been brought forward to hide the significance of present heavy supplies and large shipments from primary sources of supply during the first half of the month as an offset to the proposed duty of 4¢ ℔ lb. prescribed in the McKinley Tariff law. The fact that future deliveries have been sold in London at a large discount while commanding more or less premium here is also treated with indifference by prominent operators. In short, all signs point to clever manipulation with a view to holding prices, so as to facilitate the unloading of speculative holdings on this side of the Atlantic. Speculative deals have been chiefly at prices on the basis of 21¢ @ 21.10¢ for near future deliveries, and ordinary jobbing sales have in not a few instances been made at prices very close thereto. In futures the local transactions have been moderate, with latest dealings at prices closely in line with those that ruled a week ago. There were sales on Wednesday of 100 tons for May delivery at 21.05¢. April was offered at 20.95¢, but spot quotations were kept at about 21.05¢ @ 21.10¢.

Pig Lead.—Upward of 1200 tons have been sold during the past week at 3.95¢ @ 4¢, delivered, near future shipment. The purchases were chiefly by large consumers, some of whom, to all accounts, have been forced to enter the market to secure ordinary supplies. Light stocks in the West and moderate supplies elsewhere have served to stiffen the market, however, sufficiently to bring prices up to 4¢ bid for carload and larger lots for early delivery. Single carloads realized 4.05¢ on Wednesday, and that price was subsequently refused. At the close 4.10¢ was generally asked.

Spelter.—The market for Western Spelter is somewhat firmer, chiefly under the influence of higher prices for ores and preliminary movement in the direction of formation of a combination of producers. Buyers in this quarter and vicinity are not perceptibly influenced, however, and the market remains in a dull condition. For the present any price under 4.30¢ for near future shipments would appear to be exceptionally low, and for spot parcels 4.35¢ is named as a close price.

Antimony.—The market is still somewhat unsettled, but prices have undergone no decided change. Current quotations are 10¢ @ 10½¢ for Hallett's, 10½¢ @ 10¾¢ for LX and 10¾¢ @ 10¾¢ for Cookson's.

Tin Plate.—Business has been rather slow and the market bare of really new feature. Arrivals have been quite heavy, but the greater portion went in delivery on old orders, and, in the absence of any radical change in the foreign market, prices here remain very steady. The retail demand for Tin Plate is small, particularly in Ternes. Wasters are difficult to obtain on account of a limited supply. Although ocean freights on Plates have recently advanced, no increase in prices is contemplated in the near future.

Coal.

The effect of the recent advance in the prices of Anthracite Coal is to excite general inquiry with reference to future supplies. Thoughts are turned in the same direction by the prospect that increased demands for transportation will follow the opening of interior navigation, and the West will naturally be on the alert to provide for future wants before the World's Fair opening, and consequent demand for cars interfere with ordinary traffic. Prices are steady, except as they may be affected by a reported cut on the part of independent companies, who are said to be scooping in more business. As a rule, however, trade is flat. Of course there is a liberal movement of Coal for consumption, when considered in the aggregate, and some operators are short of special sizes. Pea and Buckwheat are still scarce; Pea, $2.50 @ $2.75, and Buckwheat, $2.50 @ $2.15, f.o.b. Stocks at all distributing points are of moderate proportions. Week's production, 863,707 tons; total to date, 7,531,571 tons, against 7,355,090 tons last year. Reading tonnage, 410,000 tons. Reading Railroad's Bituminous tonnage, 323,882 tons; Coke, 121,997 tons. Stocks at Port Richmond and New York, 467,000 tons; at Buffalo and Chicago, 460,000 tons. Bituminous shipments are heavy, under an improving demand. Clearfield for the week, 69,882 tons; Beech Creek, 69,888 tons; Chesapeake and Ohio, 74,381 tons; Norfolk and Western, 65,422 tons. Coke shipments for the week, 120,000 tons. Prices are unchanged.

It is reported that a number of suits are about to be brought against the Delaware, Lackawanna & Western Railroad for overpaid freight charges for Coal tolls. About a year ago the Lackawanna adopted the 60 % basis for purchasing Coal from individual operators, but, it is said, neglected to make a corresponding reduction in transportation rates. Individual operators who marketed their own Coal were therefore compelled to pay the maximum freight rate, which some of them did under protest.

Financial.

The New York money market, one might suppose, from the accounts colored by Wall street speculators, is in a strained and unnatural condition entailing much hardships among the mercantile classes. A bank president, who is in close touch with merchants and traders, remarks that this is an erroneous view; that, in truth, the experience this season in regard to discounts, accommodation, &c., is much like that of other seasons when money is wanted over a wide range of country for moving crops. The banks are accommodating their customers about as usual, of course, looking well to their securities. Doubtless there is far more difficulty of late in disposing of paper through brokers, who are unable to command the ample facilities sometimes enjoyed. The wants of the Treasury Department and the demand for export, tend to exhaust the gold resources, but bankers generally seem to think that the bottom has been touched, so that the proposed issue of Government bonds may be long deferred, or become altogether

unnecessary. Increased confidence abroad may cause a renewed demand for American securities, and exports of produce on the opening of navigation will be augumented. Still, the fact cannot be ignored that in our foreign trade there exists an adverse balance amounting to $32,000,000, as compared with a favorable balance of $171,000,000 one year ago. On the other hand, the quantity both of wheat and grain available for export is extraordinary; but, unfortunately, the price of wheat is about the lowest ever known. A question of much significance at the present time relates to the probable foreign demand for these articles, even at a concession from present market quotations. To carry these commodities requires a large amount of money.

Stocks have been irregular, influenced by railroad troubles at the West, dear money, and reports concerning the coal trade. The statement that Reading had 1,100,000 tons of coal among its active assets was regarded as a menace to the coal market. Erie was especially weak on sales by foreign houses. Saturday's bank statement had little influence, it being apparent that the gain in surplus was due to a contraction in loans.

General trade is on a conservative basis, and without speculation. Goods of the coarser description will, in many instances, be held back for the opening of navigation. Wheat, after various fluctuations, was a fraction higher at the close. In flour on Monday there was more firmness than for some time past, and exporters took hold with alacrity. Provisions are again lower.

A review of the foreign commerce of the United States for February shows an increase of over $13,000,000 in the imports, and in spite of the large shipments of specie, a decrease of more than $18,000,000 in the exports, making a difference in the balance of trade for a single month of nearly $32,000,000. Last year the February exports exceeded the imports more than $26,000,000; this year the February imports exceeded the exports, leaving out the specie from both totals, $19,688,262, showing a change in one month of over $40,000,000.

Chicago Report.

Scrap.—The market has undergone no change in the past week. Dealers' buying prices are as follows:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12.00	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	6.00	....
Horseshoes	13.00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	3 ¢

Anthracite.—Although prices have been lowered in the East, quotations here are unchanged at the following rates on carload lots of 12 net tons:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

CONDITION OF THE

Hardware Trade.

THE PAST WEEK has given little change in the general condition of the Hardware market. Trade on the whole is in excellent volume, and shows a natural increase as the season advances. In a good many lines the manufacturers are fully occupied on orders, and in some are unable to turn out the goods as rapidly as called for by their customers. In the matter of prices the market is at least in as good condition as it has been for several weeks, and in some lines there are indications of improvement. Collections are not entirely satisfactory, and complaint is made of difficulty in making them in several parts of the country.

Advices from Chicago.—Shelf Hardware orders came in something like an avalanche last week, following a few days of comparatively pleasant spring weather. The orders now received are running considerably larger than usual, showing that merchants generally are stocking up on account of the spring demand from their customers. Heavy Hardware is moving freely, all branches feeling an improvement in the trade consequent upon a belief in the genuine advent of spring. The month of March is coming up to its usual record for heavy business. Collections are still slow, probably not more than one-half what they should be at this season.

Notes on Prices.

Cut Nails.—The Cut-Nail market is represented by the quotation of $1.20 to $1.25 for carload lots at mill, the former figure being readily obtainable, though the latter is quoted in some cases. The new card is used by all the mills and is regarded as quite satisfactory. There are, however, indications of a tendency on the part of manufacturers to shade quotations slightly on specifications with a high average. The figures named above are generally quoted on assortments without regard to average. Carload lots on dock are regularly quoted at $1.40, with the usual advance for small lots from store.

Advices from Chicago.—The trade in Cut-Steel Nails has felt the effect of better building weather in the steadily increasing business every day for the past week. Prices are unchanged at $1.42½, Chicago, for mill shipment on the basis of the new card. Everything is moving smoothly under the new arrangement, and outside manufacturers appear to be standing by the schedule of prices previously published. Small lots are selling from stock at $1.50.

Wire Nails.—The Wire-Nail market continues in a very satisfactory condition and prices are evenly maintained. Notwithstanding the advances which have taken place, manufacturers report an excellent demand and many inquiries, so that the aggregate of current business is satisfactory. The market is characterized by an even and firm tone, and it would appear that Nails required in the near future are regarded as a safe purchase at current quotations, which are on a basis of $1.50, f.o.b. factory, Cleveland being the point of equalization for the West and Pittsburgh for the East. Small lots from store in New York are quoted at $1.75 to $1.80.

Advices from Chicago.—Manufacturers of Wire Nails state that the demand from jobbers is now excellent for delivery during the coming three months. The situation from the manufacturers' standpoint is steadily growing better. They have been able to maintain the advanced price without a break and look forward to a higher price if the present heavy consumption continues for the length of time expected. A conservative feeling obtains, however, with regard to making advances, and no further step in that direction will be taken until every condition is seen to fully warrant it. Quotations continue at $1.65, Chicago, for mill shipment. Jobbers report unchanged prices of $1.70 from stock and $1.65 for carloads.

Barb Wire.—While there has been no formal change in the quotations for Barb Wire, the market is somewhat firmer, so that $2.45 may be regarded as the price for carload lots of Four-Point Galvanized at mill. The volume of business is excellent and manufacturers are anticipating a heavy trade during the season, the prospects for a large consumption being unusually bright. Carload lots on dock in New York are quoted at $2.65 to $2.70. There has been no change in the price of small lots from store.

Advices from Chicago.—Contrary to expectations the Barb-Wire manufacturers concluded not to advance prices, at the meeting which was in session last week when our report was written. The conditions, it was then believed, were then propitious for an advance in prices, but jobbers had been so generally supplied with Wire at low rates, that an advance by manufacturers would probably have confined the trade for some time to jobbers and prevent manufacturers from obtaining any advantage from it. It was, therefore, decided to postpone any change in prices until some time in the future.

Meanwhile, the demand continues very heavy and large shipments are now going forward. Factory prices are reported at $2.20 for painted and $2.60 for galvanized. Jobbers quote small lots at $2 25 and $2 65 respectively.

Wrought-Iron Pipe.— The Wrought Iron Pipe market is weak and demoralized and prices are extremely low, notwithstanding the fact that the demand is good and the volume of business large. There are at present no definite indications of an understanding being reached by the manufacturers with a view to advancing prices, but it is not thought likely that the present condition of things can be of very long duration.

Cordage.—The advance referred to in our last issue in the price of Sisal Rope has been followed by a slight advance in Manila. The strength of the market is owing to the higher prices which are ruling for the raw material. The present condition of the market is represented by the following quotations for round lots, f.o.b. factory, subject only to a discount of 1½ per cent. for cash:

	Base.
Manila	9½ cents.
Sisal	7½ "
New Zealand	6¾ "

Montgomery's Patent Hammer.—This Hammer is put on the market by Montgomery & Horton, 107 Chambers street, New York. Only No. 1½, 1 pound, is at present made. It is listed at $12 per dozen, subject to a discount of 40 and 10 per cent.

Furnace Fittings.—The Excelsior Steel Furnace Company, 110 to 114 South Jefferson street, Chicago, are manufacturers of fittings for hot-air furnaces, with which they are now supplying the trade generally. Special machinery of an expensive character and requiring extended and costly experiments has been devised for their purposes. These goods are now recognized as staples, and we therefore take pleasure in printing the following price-list, on which there is a trade discount of 50 per cent.

Price-List of Register Boxes and Flanges and Floor Flanges.

Sizes.	First Floor Outside Box.	Second Floor Outside Box.	First Floor Inside Box.	Second Floor Inside Box.	Side Wall Register Head.	Circle Top Flange.
6 x 8	$0.52	$0.52	$0.32	$0.40	$0.24	
8 x 8	.56	.56	.36	.44	.28	
8 x 10	.60	.60	.40	.48	.32	
8 x 12	.64	.64	.44	.52	.36	$0.50
9 x 12	.68	.68	.48	.56	.40	.50
9 x 14	.72	.72	.52	.60	.44	.50
10 x 12	.76	.76	.56	.64	.48	.70
10 x 14	.80	.80	.60	.70	.52	.80
12 x 14	.90	.90	.70	.80	.60	
12 x 15	.98	.90	.70	.80	.60	
12 x 17	1 00	1.00	.80	.90	.70	
12 x 19	1.10	1 10	.90	1.00	.80	
14 x 16	1 30	1.30	1.00	1 20	1.00	
14 x 18	1.40	1.40	1.10	1.30	1 10	
14 x 20	1.50	1.50	1.20	1.40	1.20	
14 x 22	1.60	1.60	1.30	1.50	1.30	
16 x 20	1.90	1.90	1.40	1.80	1.60	
16 x 24	2.00	2 00	1.50	1.90	1 70	
18 x 24	2.20	2.20	1.60	2.00	1 80	
20 x 24	2.40	2.40	1.80	2.20	2.00	
20 x 26	5.50	2.50	1.90	2 30	2.10	
21 x 29	2.70	2.70	2.00	2.50	2.30	

New Favorite Family Scales.—These scales are manufactured by John Chatillon & Sons, 85, 87 and 89 Cliff street, New York, and are sold from the following list, which is subject to a discount of 40 per cent.:

New Favorite Family Scales.

With Platforms Only.

No.			Per doz.
36, 12	pounds by	1 ounce	$42.00
46, 24	"	1 "	52.00
56, 48	"	2 ounces	62.00

With Platforms and Tin Scoops.

37, 12	pounds by	1 ounce	$48.00
47, 24	"	1 "	58.00
57, 48	"	2 ounces	68.00

With Tin Scoops.

38, 12	pounds by	1 ounce	$46.00
48, 24	"	1 "	56.00
58, 48	"	2 ounces	66.00

Base Knobs, &c.—The following are the prices at which J. H. Sessions & Son, Bristol, Conn., are selling their patent rubber-tip Door Stops with gimlet-pointed Screws, packed ½ gross in a box:

Price of Boots.

Sizes.	Kinds.							
				Offset Boots to offset.				
With bottoms large enough to receive Collars indicated below.	Flat back, regular pattern.	Flat back, special pattern.	Center Boot, regular pattern.	Center Boot, special pattern.	4 in.	6 in.	8 in.	12 in.	Price of Collars.
7 inches	$0.60	$0.60	$0.60	$0.60	$1.10	$1.20	$1.30	$1.50	$0.10
8 "	.66	.66	.66	.66	1.16	1.26	1.36	1.56	.12
9 "	.72	.72	.72	.72	1.22	1.32	1.42	1.62	.14
10 "	.80	.80	.80	.80	1.28	1.38	1.48	1.68	.16
12 "	1.00	1.00	1.00	1.00	1.40	1.50	1 60	1.80	.20
14 "	1.30	1.30	1.30	1.30	1.70	1.80	1.90	2 10	.26
16 "	1.80	1.80	1.80	1.80	2 20	2.30	2.70	3.00	.32
18 "	2 40	2.40	2.40	2.40	2.60	3.00	3.50	4.00	.40
20 "	3.40	3.40	3.40	3.40	4.00	4.50	5.00	6.00	.50

Price List of Double Hot-Air Stacks; also Stack Collars and Stack Elbows.

Sizes.	4 x 8	4 x 10	4 x 11	4 x 12	4 x 14	6 x 10	6 x 12	6 x 14	6 x 16
Double Stack, 10 feet 6 inches long	$4.60	$4.80	$5.20	$5.50	$6.10	$6.60	$7.20	$7.80	$8.40
" 11 " 3 " "	4.72	4.96	5.30	5.66	6.30	6.76	7.42	8.10	8.80
" 12 " 0 " "	5.20	5.50	5.90	6.30	7.10	7.90	8.20	9.00	9.80
" 12 " 9 " "	5.70	6.00	6.50	6.90	7.80	8.30	9.10	10.00	10.90
" 13 " 6 " "	6.20	6.50	7.00	7.50	8.50	9.10	9.80	11.0	12.00
Square Stack Collars	.16	.20	.22	.24	.28	.32	.36	.40	.44
"A" and "B" Stack Elbows	1.08	1.10	1.16	1.20	1.30	1.40	1.50	1.60	1.70
"C" " "D" " "	.90	1.00	1.06	1.10	1.20	1.30	1.40	1.50	1.60

On Hot-Air Pipe, Elbows, Angles and Dampers, Smoke Pipe, Elbows, Angles, Dampers and Thimbles, Russia Iron Pipe, Casing Collars, Plaster and Finishing Collars and Other Fittings.

Sizes.	7 in.	8 in.	9 in.	10 in.	12 in.	14 in.	16 in.	18 in.	20 in.	24 in.	30 in.
Hot-Air Pipe, per foot	$0.20	$0.22	$0.24	$0.26	$0.34	$0.50	$0 60	$0 70	$0.80	$1.30	$2.00
" Elbows, three piece each	.32	.36	.40	.44	.60	1.00	1.20	1.40	1.80	2.80	4.00
Hot-Air Elbows, four piece each	.30	.40	.44	.50	.70	1.10	1.30	1.50	2 00	2.80	4.20
Hot-Air Angles, 45°	.20	.22	.24	.26	.40	.60	.70	.80	1.00	1.60	2 40
" " 22½°	.20	.22	.24	.26	.40	.60	.70	.80	1.00	1 60	2.10
" Dampers	.14	.16	.18	.20	.24	.30	.40	.50	.60	.80	1.00
Casing Collars for top of bonnet	.14	.16	.18	.20	.24	.30	.40	.50	.60	.80	1.10
Casing Collars for side of straight bonnet	.28	.32	.36	.40	.48	.60	.80	1.10	1.30	1.60	2.20
Casing Collars for side of 75 or 60° bonnet	.34	.40	.46	.50	.60	.74	1.00	1.25	1.80	2 10	3.00
Galvanized Iron Pipe per foot	.24	.28	.36	.44	.60	.70	.80	.90	1.00	1 20	
" " Elbows, each	.48	.56	.72	.88	1 20	1.40	1.60	1.80	2 00	2.40	4.00
" " Angles, 45°	.40	.48	.64	.80	.80	1.00	1.20	1.40	1 60	2 00	3.50
" " " 22½°	.40	.48	.63	.80	.80	1.00	1.20	1.40	1 60	2 00	3.50
Smoke Pipe Dampers	.30	.36	.50	.70	1.00						
Safety Thimbles	.80	.84	.88	.92	1.10						
Russian Iron Pipe, per foot	.48	.56	.60								
" " Elbows	.72	.84	1.08								
" " Plaster Collars	.28	.32	.36	.40	.50	.60	.70	.80	1 00	1.20	1 80
Finishing Collars	.56	.64	.72	.80	1.00	1.20	1.40	1.60	2 00	2.40	3.60
Inside First Floor Box Collars	.14	.16	.18	.20	.24	.30	.40	.50	.60	.80	1.20
Outside " " "	.10	.12	.14	.16	.20	.25	.30	.40	.50	.70	1 00
Stack Collars	.14	.16	.18	.20	.24	.30	.40	.50	.60	.70	1.00
Boot Collars	.10	.12	.14	.16	.21	.25	.32	.40	.50	.70	1.00

Note.—Hot-Air Pipe Elbows and Angles 14 inches in diameter and above are made of IX Tin, up to and including 20 inches, 24 inches and 30 inch goods of IXX Tin. These extreme sizes are made only to order at the present time and will probably never be carried in stock owing to the limited demand.

Birch.

Inches	2½	3	3½
Per gross	$1.25	1.35	1.55

Walnut.

Inches	2½	3	3½
Per gross	$1.55	1.65	1.85

Cherry, Oak and Ash.

Inches	2½	3
Per gross	$1.55	1.65

Floor Stops with rubber rings made from cherry or walnut are quoted at $4 per gross.

Furniture Knobs and Trimmings, mahogany, walnut and oak, are sold from the following list, which is subject to a discount of 30 per cent:

	Per gross.
No. 8, Wood Screw	$2.20
" 9, "	3.00
" 0, "	3.60
" 8, Plain, no Screw	2.14
" 9, " "	2.94
" 0, " "	2.94
" 1, Toilet Screws	3.50
" 7, "	4.75
" 7—1¾-inch Toilet Screws	4.75
" 7—2-inch "	5.00
" 8, Wood Screw, Maple in Wood to paint	2.00

Any of the above in wood or oiled, 20 cents per gross less.

The Levin Pruner.—This article is manufactured by the Levin Pruner Company, 37 Dey street, New York. The list is as follows, subject to a discount of 40 per cent.:

	Per dozen.
No. 1, 7-inch	$15.00
" 2, 9 "	21.00

Trojan Horse Rasps.—The Trojan Horse Rasp, manufactured by Banker & White, Troy, N. Y., is quoted at 60 and 10 and 5 per cent. discount.

Screen-Door and Window-Screen Hardware.—The following are the list prices of the goods included in the catalogue of Screen-Door and Window-Screen Hardware which has recently been issued by Reading Hardware Company, Reading, Pa. The goods comprised in the following list are subject to a discount of 5 per cent.:

	Per gross.
Sash Lifts, No. 240	$1.05
" " " 240¾	1.25
" " " G 241	2.60
" " " 1241	7.50
" " " 260	1.15
" " " 272	2.00
" " " 274	2.35
" " " 278	4.10
" " " 1278	10.60

	Per doz.
Screen Door Catches, No. 442	$1.45
" " " " 445	1.70
" " " " 453	1.45
" " " " 448	2.40
" " " " 448½	3.95
" " " " 1447	6.00
" " " " 1448	6.00
" " " " 458	2.40
" " " " 458¾	3.95
" " " " 449	4.25
" " " " 449½	7.65
" " " " 1449	9.75
" " " " 452	4.00
" " " " 452½	7.15
" " " " 1452	9.25

The following goods are sold net at the prices named:

	Per doz.
Screen Door Catches, No. 1451	$10.00
" " " " 1454	9.50
Screen Door Pulls, No. 1151	1.10
" " " " 1152	1.50

Glass.—The Glass market remains practically unchanged since our report last week. Business with jobbers and importers is quiet and but a limited amount of Glass is changing hands. Manufacturers of American Glass report a good demand and that the tendency is toward further improvement in this direction. It is also stated that manufacturers do not succeed in accumulating any large stocks and that it is not probable that they will be able to do so before the season closes. It is intimated that prices will be advanced in the near future by the National Window Glass Company, and also that the United Glass Company have joined the National Company. Since the arrangement of having all orders for Plate Glass pass through the hands of a general agent went into effect, this branch of the Glass business has been in a much more satisfactory condition. Stocks are reported as considerably smaller than a year ago, with a good demand and stiffer prices than for a year past. The New York importers of Glass are still formulating a plan for regulating prices, and, while no official announcement has been made, it is understood that a forfeit, to be paid in case agreed prices are cut, will be a feature of the agreement. Quotations remain unchanged, as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount to 80 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	@	.03
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔ lb	@	.04½
Wringer Wire Rolls, ℔ lb	@	.02
Syringes, ℔ lb	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper, ℔ lb	10¢
Light and Tinned Copper, ℔ lb	9¢
Heavy Brass, ℔ lb	7¢
Light Brass, ℔ lb	6¢
Lead, ℔ lb	3½¢
Tea Lead, ℔ lb	3½¢
Zinc, ℔ lb	2¾¢
No. 1 Pewter, ℔ lb	14¢
No. 2 Pewter, ℔ lb	7¢
Wrought Scrap Iron, ℔ gross ton,	$17.00
Heavy Cast Scrap, ℔ gross ton,	10.00
Stove Plate Scrap, ℔ gross ton,	7.00
Burnt Iron, ℔ gross ton,	5.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags, ℔ lb	4	¢
No. 2 White Rags, ℔ lb	3	¢
Mixed Rags, ℔ lb	1½ @ 1¾	¢
Blues and 3ds, ℔ lb	1¾ @ 2	¢
Hard Sized White Shavings, ℔ lb	2¾ @ 3	¢
No. 1 White Book Shavings, ℔ lb	2½ @ 2⅝	¢
No. 2 White Book Shavings, ℔ lb	1½ @ 1¾	¢
Light Book Shavings, ℔ lb	⅞ @ 1	¢
No. 1 Mixed Shavings, ℔ lb	1¼	¢
No. 2 Mixed Shavings, ℔ lb	¾ @ 1	¢
No. 1 Printed Books, ℔ lb	1⅜ @ 1½	¢
Ordinary Mixed Books, ℔ lb	¾ @ ⅞	¢
Newspapers, ℔ lb	½	¢
No. 1 Manila Paper, ℔ lb	1⅛ @ 1¼	¢
No. 2 Manila Paper, ℔ lb	⅞ @ 1	¢
Bogus Paper, ℔ lb	⅝ @ ¾	¢
Common Paper, ℔ lb	⅝ @ ¾	¢
Straw Chips, ℔ lb	½ @ ⅝	¢
Binders' Clippings, ℔ lb	½ @ ⅝	¢
Jute Butts, ℔ lb	1½	¢
No. 1 Jute Bagging, ℔ lb	1¼ @ 1⅜	¢
Mixed Bagging, ℔ lb	1	¢
No. 2 Bagging, ℔ lb	¾	¢
Hemp Twine, ℔ lb	2½	¢
Manila Rope, ℔ lb	2½	¢
Jute Rope, ℔ lb	1¾ @ 2	¢
Mixed Rope, ℔ lb	¾ @ ⅞	¢

The Cut-Nail Card.

THE FOLLOWING LETTER from a well-known Cut-Nail manufacturer will be of interest as referring to the relations of Cut Nails and Wire Nails as they are affected by the recent action of the Cut-Nail makers in adopting the Wire-Nail card:

To the Editor: It is a little remarkable that no one has explained the real cause for the adoption of the Wire-Nail card by the Cut-Nail manufacturers, in all the criticisms, favorable and otherwise, in your columns.

It was adopted simply in order to flank a brilliant move of the Wire Nail manufacturers. The latter gentlemen have but a very limited trade in Nails larger than 10d. To make a low price for the large Nails would cost them little, since they sold few of them.

To the Cut-Nail manufacturers, on the other hand, the price of the large Nails is important, for these Nails are largely used, by preference, over Wire Nails in heavy work requiring strength and powerful cohesion.

The Wire-Nail manufacturers made a low price for 60d Nails, for which they had little demand, and they advanced the price 50 cents per keg on 10d, and correspondingly on all the smaller sizes. They could thus quote a low base price for use in market reports, and yet get good prices for their average assortment. The Cut-Nail makers charge but 20 cents per keg extra for their 10d. If they made a low base price for 60d, their 10d also would sell below cost. Consequently they were at a disadvantage. The market quotations being for base size only, brought trade to the Wire-Nail manufacturers. In adopting the Wire-Nail card, for Nails sold in fair assortment, and in charging 10d price for all large Nails when sold alone, the Cut-Nail manufacturers have met the situation. The base prices now quoted fairly represent the actual difference to the purchasers of assorted Nails between Wire Nails and Cut Nails. The latter are cheaper by 25 cents per keg, and the market reports show it, as they should.

To charge 50 cents per keg more for 10d than for 60d is, of course, ridiculous, and every manufacturer of Cut Nails or Wire Nails freely admits it. To make 60d Nails at the quoted prices is an impossibility.

The Wire-Nail card (exactly imitated by the Cut-Nail card) is an absurdity, and no manufacturer pretends to defend it upon its merits.

But it is the Wire-Nail manufacturers that are responsible for this card. They introduced it, and if they will change it their action will be quickly followed by the Cut Nail manufacturers. So long as they retain it the Cut-Nail manufacturers will do the same.

If, therefore, any Hardwaremen are dissatisfied with it, it is to the Wire-Nail manufacturers that they must address their complaints and criticisms.

CUT-NAIL MANUFACTURER.

Trade Notes.

STARK MACHINE & TOOL COMPANY, Buffalo, N. Y., are just finishing a complete outfit for the Victoria Mfg. Company, Fort Erie, Ontario, for manufacturing the Ehle Nestable Dinner Pail in Canada. Messrs. Stark inform us that the outfit consists of about 125 drawing, cutting, combination and wiring dies, and six presses of various sizes. It is expected that the plant when finished will be one of the most complete of its kind.

THE ECLIPSE MACHINE COMPANY, Troy, N. Y., in an advertisement elsewhere, make an announcement of interest to tin and cornice shops respecting machines of their manufacture.

THE INDIANA LADDER COMPANY, Indiana, Pa., call attention to the Bent-Rung Ladder of their manufacture, and refer to its value for tinners, painters, builders and others.

A SPECIAL NOTICE of Haydock & Bissell calls attention to an auction sale to take place Wednesday and Thursday,

March 29 and 30, at 12 Murray street and 15 Park Place, New York City. A list of goods to be sold is given and includes a variety of Knives and Forks, Scissors, Silver-plated Ware, Ladles, Spoons, Pocket Knives, Razor Strops and other goods.

C. A. Cornell and N. E. Church, two enterprising young men of Troy, N. Y., have formed a copartnership under the firm name of Cornell & Church to carry on the business of metal and electroplating. They will have an office and shop on Ida Hill, near Troy.

Paul Thomas, manufacturing chemist, Richard and Delevan streets, Brooklyn, N. Y., distributes a circular relating to his Concentrated Soldering Flux. This Flux, it is said, makes no poisonous fumes, does not discolor or stain material, contains no free acids, does not injure tools or hands, is absolutely non poisonous, besides possessing other advantages. A list of references and several testimonial letters are printed in the circular.

Murphy Brothers of Lynchburg, Ohio, have succeeded the firm of H. Murphy & Son of same place.

The United States Iron & Tin-Plate Mfg. Company of Demmler, Pa., have awarded the contract to the Heine Boiler Company of St. Louis, Mo., through their Pittsburgh office, for four 100 horse-power boilers, to be placed over their heating and puddling furnaces.

In their advertisement appearing elsewhere in this issue, the Pittsburgh Tin-Plate Works, New Kensington, Pa., direct attention to their different brands of American Roofing Tin, known as Kensington, Westmoreland and Juno. The makers state that these Plates are made by the palm-oil process only, no acid being used in the coating. The names of agencies are also given in the advertisement from whom these brands of Plates can be secured.

In their advertisement appearing elsewhere in this issue, John W. Bell & Sons, Mercer, Pa., direct attention of the trade to their Wire Eave-Trough Hanger. The concern advise us that the demand for these Hangers is constantly increasing, large shipments having recently been made to Louisville, Cincinnati and other large cities. In addition to the above, this concern manufacture Bell's Lawn Grass Collector, concerning which full information will be furnished by the firm upon application.

Summers Brothers & Co. of Struthers, Ohio, manufacturers of Box Annealed Sheet Iron and Sheet Steel, will build another sheet mill this summer, having already started to put up the boilers and shears. The rolls will be 24 x 42 inches in size, made especially for rolling light Steel Sheets. The plant of the above concern is being operated full time, with plenty of orders on hand.

The McLeod & Henry Company of Troy, N. Y., circulate a postal card upon the back of which is a general view of their special lining fire-brick works at Troy. The foreground of the picture is humorous in its nature and bears beneath it a request for quotations.

Illinois Pure Aluminum Company, Lemont, Ill., are now preparing to make a Pan of any size to displace copper Pans used in large kitchens of hotels, steamers and restaurants. They are making a Pan for hotel use, 9¾ inches in diameter, and 1¼ inches deep inside, which, it is stated, weighs 1¼ pounds in aluminum, in comparison with a copper Pan of similar capacity weighing 14½ pounds. The point is made that the price, taking into consideration the constant retinning requisite for the copper utensil, makes the cost in favor of aluminum.

We understand a decision of the suit for infringement of Waffle Iron patent brought by the Griswold Mfg. Company, against J. B. Harker & Co. and others, will be decided early in April by the United States Court at Minneapolis. The decision will be awaited with interest.

Geo. N. Pierce & Co., Buffalo, N. Y., manufacturers of Refrigerators, Bicycles, Tricycles and Bird Cages, have opened a New York office at 23 Warren street, where a stock of the goods will be carried.

The Mackinaw Refrigerator Company, New York office, 106 Chambers street, in issuing an illustrated pamphlet of these goods, direct attention especially to some of the more recent additions to the line which are referred to as meeting with considerable favor, being made in very tall or very broad patterns for special uses, among them being Nos. 197, 199, 275, 4120 and 1000. We are advised the trade in this make of Refrigerators has doubled lately. The goods for some time past have been quoted net from this office, and the results are alluded to as very satisfactory, a departure having been made in the method of doing this expeditiously, resulting in the preparation of a special circular, which leaves but little to add in sending prices on application, a copy of which is kept with little labor.

The entire plant of the Youngstown Stamping Company, Youngstown, Ohio, has been put in operation, with the exception of the Glass factory, which is expected to be working within a very short time. This concern reports a large accumulation of orders with the prospects of a heavy demand for their line of Oil Cans, Tin Specialties, &c., during the spring and summer. Some improvements have been made in their factory, which will allow them to turn out a considerably larger quantity of Tin Fruit Cans during the coming season, for which this concern have a very large demand. As before announced, the entire plant will be operated under the management of W. C. Hine, receiver.

The Novelty Stamping Co. who have been recently organized at Bellaire, Ohio, will manufacture Stamped Ware and all kinds of Sheet Metal specialties. The buildings comprising their plant are all new, and fitted up with the most improved machinery for their line of manufacture. The company are not yet in full operation owing to the fact that their dies are not completed. When they are, employment will be given to some 200 persons. The officers of the company are M. L. Blackburn, president and general manager; A. Klotz, vice-president, and W. C. Bergundthal, secretary and treasurer.

The party of American manufacturers who have recently made a tour through Mexico with a view to examining the condition of that country and its commercial capabilities, returned home this week with favorable reports. They appear to have thoroughly inspected the principal Mexican seats of industry, and were everywhere cordially received. A correspondent in the City of Mexico, writing recently to a Southern trade journal, said: "The excursion of manufacturers from the United States arrived in the City of Mexico on February 14, and after spending some days in examining the important manufacturing establishments, factories and points of interest in the city, went to Vera Cruz, where various establishments and manufacturing interests were seen. The party have expressed themselves as surprised at the excellent opportunity for trade which exists in Mexico, and it is expected that the trip will result in a strong effort to introduce American goods." As a proof of the impetus which has recently been given to business in the Republic, it is stated that during the past year 59 new companies have been organized for operation in Mexico, all of which are either American or English enterprises. Of these companies the United States has furnished 50, with an aggregated capital of $91,625,000, the remainder being English, with $8,000,000 capital.

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Metal and Miscellaneous Prices.

See Standard Lists on Following Pages

CHICAGO, MARCH 23, 1893.

Tin—

Straits pigs.....23¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland'and Meiyn Grade	IC, 10 x 14.....@ $6.75	
	IC, 12 x 12.....@ 6.75	
	IC, 14 x 20.....@ 6.75	
	IC, 20 x 28.....@ 13.50	
	IX, 10 x 14.....@ 8.75	
	IX, 12 x 12.....@ 8.75	
	IX, 14 x 20.....@ 8.75	
	IX, 20 x 28.....@ 17.50	
	DC, 12½ x 17.....@ 6.50	
	DX, 12½ x 17.....@ 8.50	
Allaway Grade,	IC, 10 x 14.....@ 6.00	
"	IC, 12 x 12.....@ 6.50	
"	IC, 14 x 20.....@ 6.50	
"	IC, 20 x 28.....@ 13.00	
"	IX, 14 x 20.....@ 8.00	
"	IX, 20 x 28.....@ 16.00	

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14.14x20.....@$6.00	
IC, 14x20.90 ℔.....@ 5.75	
IC, 14x20, 100℔.....@ 5.85	
10 x 20.....@ 9.00	
20 x 28.....@12.00	
IX, 10x14, 14 x 20 .....@ 7.50	
BV Grade.—IC, 10x14, 14x20.....@ 6.00	

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—	
IC, 14 x 20 ..@ $5.62½@	
20 x 28.....@ 11.25	
IX, 20 x 28.....@ 14.25	
Worcester Brand and equal.—	
IC, 14 x 20.. 6.12½@@	
IC, 20 x 28..12.25 @	
IX, 14 x 20.. 7.62½@@	
20 x 28..15.25 @	

American Tin Plates

Charcoal Plates.—Bright.

Irondale, A. A.—IC, 14 x 20.....$7.00	
" " IX, 14 x 20..... 9.00	
" " IXX, 14 x 20..... 11.00	
" " IC, 20 x 28..... 14.00	
" " IX, 20 x 28..... 18.00	
" " IXX, 20 x 28..... 22 00	
Florence.—	
IC, 10 x 14, 12 x 12, 14 x 20..$7.00	
IX, 10 x 14, 12 x 12, 14 x 20.. 9.00	
Palma.—	
IC, 10 x 14, 12 x 12, 14 x 20..$7.50	
IX, 10 x 14, 12 x 12, 14 x 20.. 9.50	
Each extra cross $2.00 and 20 x 28 double these prices.	
Brilliant, IC, 14 x 20.....$9.25	
Royal, extra, IC, 14 x 20..... 7.25	
Merion, IC, 14 x 20..... 6.75	
Almond, IC, 14 x 20..... 6.50	

Coke Plates.—Bright.

Elwood.—IC, 14 x 20.....$6.00	
" IC, 20 x 28.....12.50	

Roofing Plates.

Arch (205 ℔), 20 x 28.....@$11.50	
Crescent, IC, 20 x 28..... @ 12.00	
" IX, 20 x 28..... @ 15.00	
Hickory, IC, 20 x 28..... @ 13.00	
" IX, 20 x 28..... @ 16.00	
Alaska (heavily coated), IC, 20 x 28 @$14.50	
Alaska IX, 20 x 28..... @ 17.75	
Special, IC, 20 x 28..... @ 15.00	
" IX, 20 x 28..... @ 18.00	
Merchant's Roofing (extra coated), IC, 20 x 28.....@$17.75	
Merchant's Roofing (extra coated), IX, 20 x 28.....@$21.50	
Merchant's Old Method (extra heavily coated), IC, 20 x 28.....@$19.75	
Merchant's Old Method (extra heavily coated), IX, 20 x 28.....@$23.60	
Irondale A:	
IC, 14 x 20..... $6.25	
IX, 14 x 20..... 7.75	
IC, 20 x 28..... 12.50	
IX, 20 x 28..... 16.50	
Kensington:	
IC, 14 x 20..... 6.62½	
IX, 14 x 20..... 8.12½	
IC, 20 x 28..... 13.25	
IX, 20 x 28..... 16.25	
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20 ..... $9.50	
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20 ..... 11.00	
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28 ..... 19.00	
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28 ..... 22.00	
Neville, Stamped, IC, 14 x 20 ..... 6.25	
" " IX, 14 x 20..... 7.50	
" " IC, 20 x 28..... 12.50	
" " IX, 20 x 28..... 15.00	
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)..... $9.50	
Taylor's Old Style, IX, 14 x 20 (Stamped and Resquared)..... 11.00	
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)..... 8.25	
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)..... 16.50	
Columbia, IC, 14 x 20 (Stamped)..... 7.25	
" IC, 20 x 28 (Stamped)..... 14.50	
Maple, IC, 14 x 20 (Stamped)..... 6.75	
" IC, 20 x 28 (Stamped)..... 13.50	
Willow, IC, 14 x 20..... 6.00	
" IC, 20 x 28..... 12.00	
Globe, IC, 14 x 20..... 5.75	
" IC, 20 x 28..... 11.50	
Miami, IC, 14 x 20..... 6.00	
" IC, 20 x 28..... 12.00	
" IX, 20 x 28..... 15.00	
" (Redipped), IC, 20 x 28..... 17.00	

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28.....	$13.00	$13.00
XX, 14 x 28.....	14.50	14.50
X, 14 x 31.....	14.50	15.80
XX, 14 x 31.....	16.50	17.50
		Per box of 56 sheets.
X, 14 x 56.....	29.50	16.50
XX, 14 x 56.....	32.50	18.20
X, 14 x 60.....	31.50	17.65
XX, 14 x 60.....	35.50	20.90

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 16.....	℔ 2 7-10¢	3 3-10¢
17 to 20.....	℔ 2 8-10¢	3 4-10¢
21 to 24.....	℔ 2 9-10¢	3½¢
25 and 26.....	℔ 3¢	3 6-10¢
27.....	℔ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ A, 10½¢; B, 9½¢

Craig Polished Sheet Steel.....℔ 8½¢

Galvanized.

List on following page.
Juniata, or first quality.....dis. 70&2½%

Copper—

Ingot.

Lake.....13¢ @ 13½¢
Casting Brands.....12¢ @ 12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 ℔.
Above 5-16 inch to 3 inch inclu....35¢
Plain, above 3 inch.....45¢
Plain, 5-16 inch.....45¢
Plain, ¼ inch.....60¢
Plain, 3-16 inch.....$1.00
Plain, ⅛ inch.....$1.50
Fancy Tubing, Brass, to No. 20 inch.....43¢ ℔
Bronze Tubing, 3¢ ℔ more than Brass.

Roll and Sheet Brass.

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 ℔ casks.....7¢
Less than Casks, ℔.....6¼¢

Lead—

Soft Pig Lead.....4¢
Bar.....4½¢@5¢
Pipe.....5½¢, dis. 10%
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10%

Solder—

½&¼.....13¼¢@13⅞¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....13¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain.....	60&10%
1¼ and under, Galv.....	52½&10%
1½ and over, Plain.....	70&10%
1½ and over, Galv.....	60&10%
Boiler Tubes, list Oct. 24, 1892.....	65%
Casing, list Nov. 16, 1892.....	52½%
Inserted Joints Casing, list Nov. 16, 1892.....	47½%
Steel Boiler Tubes.....	27½%
Cold Drawn Seamless Steel Tubing...	50%

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted.....55%
Austin's Corrugated.....60%
Gordon & Gilbert's Corrugated.....55%
Ritchie's (Galv. Iron only) Cor'd.....55%
Ritchie's Spiral Lock Seam, Galv'd....50%
Austin's Spiral Ribbed Pipe.....55%
Plain Adjustable Elbows.....55%
James A. Miller Bros. (Galv'd Iron only) Corrugated.....55%

Furnace Fittings—

Discount from list.....Excelsior Steel Furnace Co's list.....50%

Steel Roofing—

Perfection.....$3.75 square
Climax.....$3.50 square
The Lloyd Spanish Tiling....$4.50 square

Metallic Shingles—

Cushman's.....$4.25 square
Merchant & Co.'s Spanish Tiles: Copper, 14 oz.....$96.00 square
Steel, painted.....$0.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c—

Deodorized Benzine.....7½@8 ¢
Iron Paint, Bright Red.....℔ ½, 2 ¢
" " Brown.....℔ ½, 1¾¢
" " Copper.....℔ ½, 2¾¢
" Ground in oil, B. Red ℔ ½, 6¾¢
" Ground in oil, Red..℔ ½, 6¾¢
" Ground in oil, Brown ℔ ½, 5¾¢
" Ground in oil, Purple ℔ ½, 6 ¢
Linseed Oil, Boiled, in bbls.....53¢
Linseed Oil, Raw, in bbls.....50¢
Mineral Paints.....2@4¢
Orange Mineral.....10¾¢
Pure White Lead in Oil.....6¾@7¼¢
Dry White Lead in bbls.....6¼@6½¢
Red Lead, American.....6@7¼¢
Red Venetian, English, dry...$1.65@$1.70
Red Venetian in oil; asst'd cans, 8¼¢; kegs.....7¼¢
Shpe's Paragon Oil, in bbls, ℔ gal.....34¢
Spirits Turpentine, in bbls., ℔ gal..39 @40¢
Asphaltum, Trinidad Refined, ℔ ton .$45
Coal Tar, Felt, 1 Ply, ℔ 100 ft.....$1.68
Coal Tar, Felt, 2 Ply, ℔ roll 108 sq. feet.....$1.50
Coal Tar, Felt, 3 Ply, ℔ roll of 108 sq. feet.....$2.00
Roofing Pitch, ℔ bbl. of 300 ℔.....$3.20

NEW YORK, MARCH 24, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots..℔ ℔, $0.75
No 1 guaranteed to be 98 % pure and over), in ton lots .....℔ ℔ .90
Lots less than 1 ton, 10¢ ℔ ℔ additional.

Antimony—

Cookson.....℔ ℔, 12½¢
Hallett's.....℔ ℔, 10¾@11¢

Brass—

Planished—

List on following page.....net

Roll and Sheet—

List on following page.....35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per ℔.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive....	$0.35
Plain, to No. 20, above 3 inch....	45
Plain, 5 16 inch to No. 20.....	45
Plain, ¼ inch.....	60
Plain, 3-16 inch.....	1.00
Plain, ⅛ inch.....	1.50
Fancy Tubing to No. 20, inclu....	43

35&10%

Copper and Bronze Tubing—

3¢ ℔ ℔ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c.

Over ¼ to 3½ inches inclusive....17¢ ℔ ℔
Over 3½ to 5 inches inclusive.....18¢ ℔ ℔

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ ℔
Over 3½ to 5 inches inclusive.....19¢ ℔ ℔

Clips—

Buffalo Damper Nos. 1, $1.25; 2, $2.50 per doz.....40&10%

Conductors—

Corrugated. *Round or Square—*

Lists on following page.

Galvanized.....	60%
Galvanized, Locked Joints.....	60%
Tin.....	60%

Spiral Riveted—

List on following page.
Galvanized..... 50

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.

List on following page.....15@25%

Ingot.

Lake.....12¼¢
Ansonia Grade Arizona.....12¾
Ansonia Grade Casting.....11⅝

Planished.

List on following page.....net

Sheet and Bolt.

List on following page.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering,* in Current Hardware Prices.

Damper Clips, Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

List on following page.
Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

List on following page.
Lap or Slip Joint.....list, net

Elbows—

List on following page.

Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four-Piece.

4 in.	5	5½	6	7 inch,
$0.78	.87	.90	.90	1.20 per doz. .20 %

Elbows and Shoes—

List on following page.

Flat Crimp.

Tin.....35%
Galvanized.....35%

Corrugated.

Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ ℔, 12@13¢
Patent Planished....℔ ℔, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ ℔, 8½¢

Galvanized.

	B. R.
Nos. 10 to 16.....	℔ ℔, 4 2-10¢
Nos. 17 to 23.....	℔ ℔, 4¾¢
Nos. 25 to 26.....	℔ ℔, 5¢
Nos. 27.....	℔ ℔, 5¼¢
No. 28.....	℔ ℔, 5⅝¢
Nos. 29 and 30.....	℔ ℔, 6¾¢

Filter Joints—

List on following page.
Lee's.....33⅓%

Lead—

American Pig.....4¼¢@4½¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....10¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ ℔.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ ℔, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ℔, .03½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing.....	10%
Fencing, Painted Sheets.....	20%
Netting, Painted Sheets.....	20%
Door Mats, Galvanized.....	25%
Window Guards, Paneled.....	15%
Tree Guards, Paneled.....	15%

Mitres, Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.—

Lead, Amn. White, Dry or in oil, Kegs, lots less than 500 ℔ ... 7 @ 7¼¢
Kegs, lots 500 ℔ to 5 tons ... 6¾@6¾¢
Kegs, lots 5 tons to 12 tons... 6¾@6¾¢
Kegs, lots 12 tons and over... 6¼@6¾¢
Lead, White, in oil, 25 ℔ tin pails, add to keg price. ... @ ½
Lead, White, in oil, 12½ ℔ tin pails, add to keg price..... ... @ 1
Lead, Red, bbls. and ½ bbls... 6 @ 7
Lead, Red, kegs . 6¼@ 7¼
Lead, American ... ½@ 1½
Red, Venetian, American ..... ℔ 100 ℔., 1.00 @ 1.10

Linseed Oil:

City, raw, ℔ gal.....	@ .50
City, boiled	@ .53
Western, raw.....	@ .50

Spirits Turpentine:

In regular bbls.....	@ .35¼
In machine bbls	@ .36

Putty:

In barrels and ½ bbls.....	.01¾@ .01¾
In tubs	.01¾@ .01¾
In tin cans	.01¾@ .02½
In bladders	.01¾@ .02¼

Roofing material, &c.:

Asphaltum, Trinidad Refined, ℔ ton.	$30.00@$35.00
Asphaltum, Rock, ℔ ton.....	$14.00
Coal Tar Felt, 1 Ply, ℔	.2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl.....	$2.24

Pipe, Drain—

List on following page.....50%

Pipe and Fittings, Cast Iron Soil—

List on following page.
Cast-Iron Soil-Pipe, Tarred, sizes 2 to 6 inches, inclusive.....60@60&10%
Other sizes.....55@55&10%
Cast Iron Fittings, Tarred, sizes 2 to 6 inches.....60@60&10%
Other sizes.....55@55&10%

Pipe, Spiral—

List on following page.

Galvanized.....	60%
Tin.....	60%

Pipe, Wrought Iron—

List on following page.

For discounts see Current Hardware Prices.

Rivets and Burrs—

List on following pages.

For discounts see Current Hardware Prices.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, April 1, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....220 South Fourth Street
BOSTON.....146 Franklin Street
PITTSBURGH.....Room 509 Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....302 The Cuyahoga

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

The Cleveland office of *The Metal Worker*, under the management of Ezra S. Adams, removes on April 1, from 219 Superior Street to Room 312 of the Cuyahoga Building, Cleveland's latest addition to its modern business structures.

The British Tin-Plate Industry.

A tabular statement showing the exports of tin and terne plates from Great Britain from 1862 to 1892, inclusive, has just been issued by Bradley & Burch of London. The statement shows a remarkable development of the British tin-plate industry during that period. The total exports in 1862 reached 1,000,437 hundredweight. In 1892 they were 7,911,600 hundredweight. The shipments of the previous year, however, were the highest on record—namely, 8,967,580 hundredweight. During all these 30 years the United States took by far the greater proportion of the British tin plate exported. In 1891, 6,502,860 hundredweight, or more than four-fifths of the total exports, were shipped to this country. Last year this proportion was somewhat reduced, being 5,569,580 out of a total volume of 7,911,600 hundredweight of exports. It is shown in these tables that the home consumption of tin plate in Great Britain has grown in the last eight years from 1,750,000 to 2,600,000 hundredweight. There are now in England and Wales, it is stated, 100 tin-plate works in existence, comprising 509 mills; and of these mills 409 are in operation, with an estimated productive capacity of 10,500,000 hundredweight per annum. In view of these facts and figures, it is small wonder that British manufacturers of tin and terne plates view with apprehension the growth of the industry in this country.

Disappointments in Promotion.

One of the most galling things that happen to a man in business or industrial life is to be passed over in promotion. An employee, after faithful and long service in a subordinate position, sees a place in his business on which his eye has been fixed for years in the hope and expectation that he shall one day fill it, at last fall vacant. He thinks the fullness of time has come and that his hopes are at length to be realized. But, to his mortification, a junior or an outsider is preferred for the post. He immediately concludes that he is the victim of gross injustice; and, if he is what is called a "high-spirited" fellow, he throws up his job in a fit of pique and goes forth to seek new employment, sacrificing a steady and assured position and all the claims of his faithful service for the gratification of his injured vanity. He fails to consider that the fact of his not having been awarded the special place he wished for gives him the greater claim on his employers when another opening for promotion occurs. And the worst of it is that he usually finds sympathetic friends to condole with him and applaud his "proper pride," causing him to metaphorically pat himself on the back as a fine fellow who will brook no slights. Whereas he is actually more aptly to be compared to a pettish child who refuses all its dinner, though hungry, because it is denied some special dish which its wiser parent for good reasons withholds. Sometimes, we admit, the method of filling places by employers is grossly unjust, and when that is clearly seen and maturely considered, it is, perhaps, justifiable for a man to seek employment where his qualities and abilities will be more appreciated.

Promotion by Merit.

But we are inclined to believe that injustice does not mark the majority of cases where men are passed over in promotion. Usually it will be found that the overlooked clerk or workman, although believing himself to be competent to fill the coveted post, is not considered by his superiors to be equal to its duties. Men are by no means always the best judges of their own ability. The "boss," or member of the firm with whom the nomination lies, has generally had his eye on the men who may be candidates for positions of responsibility, and knows which is the best one for the place. One rule is pretty constantly followed by employers in promoting their subalterns, and that is that the best man is the one who will fill a post to the best interests of the business. It is unlikely that an interior man will knowingly be preferred. It would be contrary to the employer's own interests. Therefore, in such a case as we have put, it is well for the disappointed individual to weigh well the probable reasons for the apparent neglect of his claims before taking hasty action. Let him not get a "big head," and think the business cannot get along without his services, and either throw up his position altogether, or go along sulkily determining that in future he will not put himself out to do any more than is absolutely necessary. Rather let him in a manly spirit face his disappointment and resolve that if merit is to win the next promotion he will be the man to get it. In nine cases out of ten evidence of such a spirit and disposition, combined with diligence and ability, will be the most effective testimony to the employer of the man's fitness for a rise. He will say:—"We can't pass over so-and-so this time. He took his last set-back so well, and has, it anything, been more useful since, that he is the man for this place." Patience and merit are bound to win in any line of life provided they have the necessary dash of push and energy indispensable in the present age.

The Lowest Bid in Plumbing Contracts.

The practice of awarding contracts for plumbing work in buildings to the lowest bidder is something which in the light of experience needs consideration. In theory it may be correct because of the natural assumption that no man will knowingly offer to do work at less than it will cost him. But architects are wiser, and their experience in this regard has impressed many of them, at least, with the conviction that it would be cheaper, all things considered, to give the contract to the man whose bid more nearly approaches the correct amount than to the inexperienced man who has not the knowledge to cover every possible detail of outlay in his estimate for the job. This is readily accounted for. From time to time young men, ambitious to be master plumbers, go into business on their own account with a proper knowledge of their trade as mechanics, but totally at sea as regards business knowledge, the cost of material and labor and the necessity that the work be not delayed. They put in bids for plumbing contracts at as low a figure as they consider will cut out the old well-established plumbers, and in the existing order of things obtain the contract. After the work is well under way, the enterprising contractor finds out that he has undertaken too much, and, being unable to grapple with the difficulties of the situation through lack of experience and resources, finds when it is too late that he has gone beyond his depth and cannot keep pace with the work as required.

Costly Delays.

As a consequence the plasterer, the carpenter and the concrete men are at a standstill, for, until the plumber's work is done, the walls cannot be finished, the casing of pipes by the carpenter cannot be done, and the concrete man in the cellar is vainly waiting for the house drain to be laid. The owner is likely to find out also that the economy which prompted him to accept the "lowest bid" was not a wise one, that it was a case of "tight at the spigot and loose at the bung," and when, in the case of a tenement building, he is deprived of at least a month's rent by the delay of the plumbing work, he finds out that time is money and that there is nothing saved.

whatever is lost, by giving his plumbing contract under all the circumstances to the cheapest man. But while this is the owner's side of the question, the competing plumber has also to be heard. His experience of the "lowest bid" business is in his own way unfortunate. The architect sends out requests to plumbers to estimate for certain work. Four or five or more plumbers will make estimates in good faith in the expectation that the contract will be given to the lowest bidder. It may be, however, that the architect may desire to give the contract to some favored plumber whose estimate is in the first instance too high. The competing estimates being lower, the architect has only to say to the preferred plumber, "The contract will be yours if you come down to these figures," to which in most cases he consents. The contract is awarded him, while the plumbers who have enabled the architect to bring his friend down to the required amount have nothing for their pains beyond the consciousness of being made the instruments by which another plumber is influenced to take the contract at a reduced estimate. The awarding of plumbing contracts to the lowest bidders does not always yield unmixed satisfaction to those interested.

Chicago's Manufactures.

We have commented to some extent at various times on the rapid development of manufacturing towns in the vicinity of Chicago, either within the corporate limits of the city or a very short distance outside. This movement has by no means culminated, but still continues, being remarkably persistent. It has covered more than an ordinary business cycle since it became sufficiently pronounced to attract much attention. Booms in other localities have run their course and faded, but new Chicago projects continue to come forward. Several ambitious schemes, with industrial enterprises of promising scope as a nucleus, have quite recently been organized and will shortly be launched on the sea of popular favor. It seems only reasonable to suppose that a limit of development of this character must be reached, but thus far all predictions of a disastrous collapse have failed.

Consumption of Wire Rope.

A surprising quantity of wire rope is used in the operation of elevators in office buildings and warehouses. In a seven-story office building, for instance, in which there are only two elevators, nearly a mile of one-inch wire rope is required for the elevator equipment. It can readily be seen from this statement that the consumption of wire rope for this purpose alone throughout the country is enormous. The construction of very large office buildings above four stories in hight is of comparatively recent date, the movement being scarcely ten years old. In fact, there are not a few important cities in which construction of this character has but just begun. It is probable that already the consumption of wire rope for passenger and freight elevators in buildings is as large as in any other single channel. This is but one of the numerous developments of business enterprise which is steadily increasing the general consumption of iron and steel.

Malleable Castings.

The malleable iron foundries have increased their capacity remarkably during the past year or two. Not only have old concerns, almost without exception, greatly enlarged their facilities, but a number of new establishments have been started, and all appear to have plenty of business, although the usual complaint is heard in this as in all other branches of manufacture that profits are reduced to almost nothing. The growth of this trade is due mainly to the expansion of the business of agricultural implement manufacturers, who are heavy purchasers of malleable castings. But the consumption of malleables has also increased in many other directions, and large establishments are to be found that do not to any considerable extent depend on the agricultural trade for their business. The growth of the manufacture of small wares, in almost infinite variety, is proceeding at a rapid rate, and for many of these malleable castings are demanded.

Makers of coke pig iron have found this an inviting field for their attention, and they are attacking with considerable success this last stronghold of charcoal iron, which has hitherto been deemed indispensable for malleable castings. Special qualities of coke pig iron are being made for this purpose, and it is asserted that the percentage of coke iron used has not reached its limit. The aid of chemistry has been invoked in this as in other branches of the pig-iron trade, and some aggressive coke-iron makers claim that they can now furnish material totally innocent of charcoal which will make high-grade malleable castings.

Shop Stories.

THE SCOTCH PLUMBER AND HIS BOOK-KEEPER.

In a thriving Canadian town there resides an industrious son of the Land O'Cakes, who for more than "Sax an' twenty simmers ha seen the bud upo' the timmer" since he hung out his sign, "Robert Douglas, Sanitary Plumber."

His reputation for doing good work at honest prices has failed to yield more than a plain, humble living for a constantly increasing family. His infant industries have apparently been his only prosperous ones. Recently his eldest son, having completed his schooling and apprenticeship, was admitted a partner in business with his father. The son's education had been extended to the science of accounts, but his skill in this had not been as well tested as his knowledge of plumbing.

When the sign had been enlarged to read "Robert Douglas & Son," Jack, the son, took charge of the books. At the end of the first year he prepared a statement of their business, showing a handsome net profit. This "balance sheet" proved a great surprise to the old man. The profits appeared unduly large. Never before had he cleared anything above the actual cost of living. Now something truly startling appeared. In a single year, with his son as partner and bookkeeper, nearly $2000 had been gained. It was actually too good to believe. Jack insisted that his statement was entirely correct, and, moreover, there were the figures to prove it. So the old Scotchman accepted it as true, and quite naturally felt pleased over it. He accordingly decided to enjoy some of the fruits of his honest toil by indulging in more comfortable clothing for his family and self and the purchase of some much needed household goods.

> But pleasures are like poppies spread—
> You seize the flower, the bloom is shed.

And, alas! our old friend's enjoyments proved as short-lived, for when the purchase bills were presented there did not appear to be any more ready cash to pay with than formerly. He did not have the "stuff." Truly here was a mystery. The balance sheet was apparently all right, but where was that $2000 hiding? Determined to solve the riddle he hunted up Jack's statement and declared: "Before I sleep a wink I vow I'll find it."

Long, dreary hours were spent by the old man in his lonely shop searching for the missing funds. He sat up until "the wee sma' hours ayont the twal," while his family slept, innocent of care and ignorant of the earthquake that was about to swallow up their domestic joys. The bills of the "butcher, the baker and the candlestick maker" were large; their demands urgent, and money must be obtained to pay them. Each item is carefully scanned, the footings gone over carefully, but always from the bottom upward. They prove Jack's knowledge of addition to be all right, but do not console the old man in his perplexity. Finally, after several hours of fruitless search, it occurs to him to test the footings from the top downward. And now came a revelation that fairly lifted the old man off his seat, and the discovery of the much lost and long sought item. But, to his dismay, it proves to be something gone forever and that none have ever recalled.

Frenzied with rage, as he realized his embarrassment and the hopelessness of the situation, he hastens upstairs to the room where Jack has been soundly sleeping all these weary hours, oblivious both of the damage his blunder has cost and his father's diligent search. With a rush he seizes the hapless youth and drags the sleeping form from the bed to the floor as he exclaims: "Jock! Ye *skellum* bumler! Ye're nae worth a plack! Ye hae ruin'd me! Ye added in the year of the Lord!"

SWIPED JOINT.

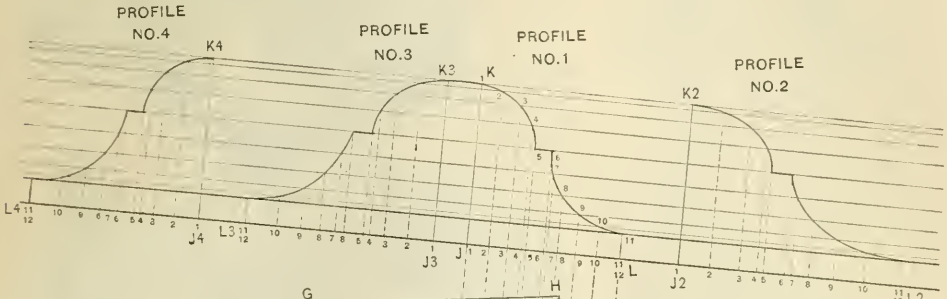
In connection with the new British Labor Bureau, President Mundella of the Board of Trade has sanctioned the employment of 21 labor correspondents in Manchester, Liverpool, Sheffield, Newcastle, Birmingham, and other great trade centers of England. The duty of these correspondents will be to supply periodical information with regard to matters affecting labor in their respective districts. They will communicate with the Central Labor Department, and their reports will be published monthly in the official journal of the Board of Trade.

There were erected in Pittsburgh last year 3,470 buildings at a cost of more than $8,000,000, which is a large increase over any previous year.

THE TIN SHOP.

Pattern for an Article, the Plan of Which is an Irregular Polygon.

From PATTERN CUTTER. *Troy.*—The plan shown in Fig. 1 represents that of a pinnacle required on a certain building The shape in plan is that of an irregular polygon, and supposing each of the sides to be a different shape, the usual method would be to develop a new stay or profile for each. This requires an amount of time out of keeping with the value of the work. As a matter of convenience, a simple molding is given for the profile of the article, and the usual method for obtaining the patterns shown. If there are any readers of *The Metal Worker* who have a shorter solution of the problem than the one shown, I shall be glad to have them present it.



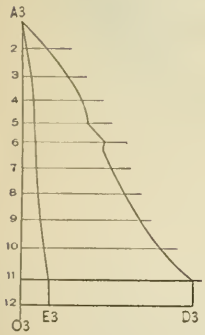


Fig. 2.—Pattern of No. 3.

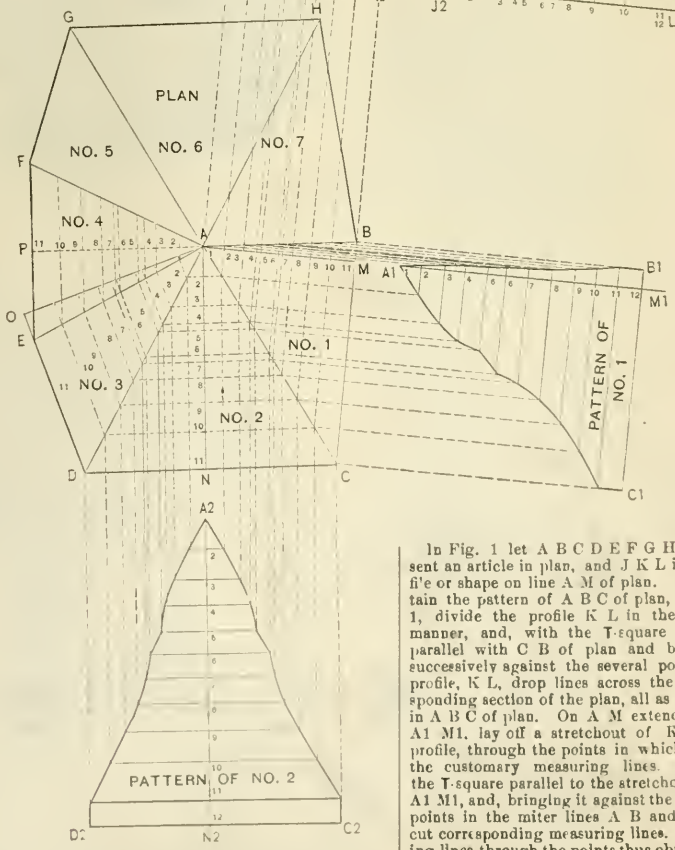


Fig. 1.—Plan, Profile and Patterns.

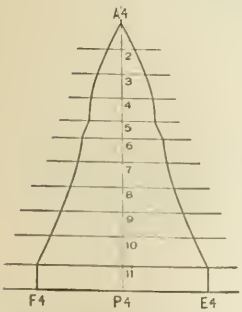


Fig. 3.—Pattern of No. 4.

PATTERN FOR AN ARTICLE THE PLAN OF WHICH IS AN IRREGULAR POLYGON.

In Fig. 1 let A B C D E F G H represent an article in plan, and J K L its profile or shape on line A M of plan. To obtain the pattern of A B C of plan, or No. 1, divide the profile K L in the usual manner, and, with the T-square placed parallel with C B of plan and brought successively against the several points in profile, K L, drop lines across the corresponding section of the plan, all as shown in A B C of plan. On A M extended, as A1 M1, lay off a stretchout of K L of profile, through the points in which draw the customary measuring lines. Place the T-square parallel to the stretchout line A1 M1, and, bringing it against the several points in the miter lines A B and A C, cut corresponding measuring lines. Tracing lines through the points thus obtained, as shown by A1 C1 B1, will give the pattern of part of article shown on plan by A B C.

With the T square placed parallel with D C, and brought successively against the points in A C, draw lines cutting A D.

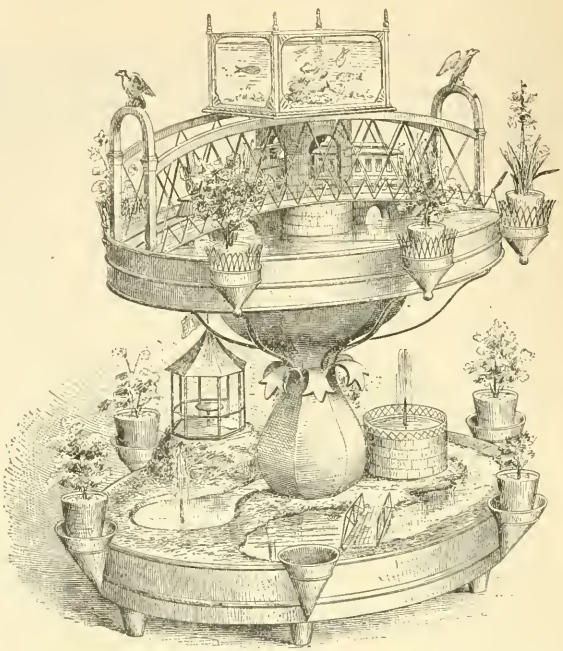
From A, drop A N, perpendicular to D C. Then the points in A N can be used to obtain a profile of section No 2. Also continue the points from A D across the third section of the plan, and parallel with D E, and produce them until they cut A D, which is a line drawn from A at right angles to D O produced. Then A O contains the points necessary in obtaining a profile of the third section. Continue the points from A E across the fourth section of the plan, and parallel with E F, and produce them until they cut A F. From A, drop A P, perpendicular to E F. Then the points in A P can be used to obtain a profile of section No. 4.

Continue J L of profile No. 1 in either direction, as shown by L4 L2 From the several points in profile No. 1 draw lines parallel with L4 L2, extending them indefinitely in either direction. To obtain the profile of No. 2 on line A N of plan proceed as follows : From any convenient point on the base line L4 L2, as J2, set off points corresponding to the points in A N of plan, making the distances from J2 equal those from A of plan. For convenience these points can be numbered to correspond with the points in profile No. 1. From each of the points laid off from J2 erect perpendiculars and continue them until meeting horizontal lines of same number drawn through the profile No. 1. A line traced through these points of intersection, as shown in J2 K2 L2, will complete the profile. The profile of No. 3 is obtained in a similar manner. From J3 set off points corresponding to the points in A O of plan, and from each of the points thus obtained erect perpendiculars, and continue them until they meet horizontal lines of same number drawn through the profile J K L. A line traced through these points of intersection, as shown by K3 L3, will complete the profile. For the profile of No. 4 proceed in a similar manner. From J4 set off points corresponding to the points in A P of plan, and from each of the points thus obtained erect perpendiculars and continue them until they meet horizontal lines of same number drawn through the profile of No. 1. A line traced through these points of intersection, as shown by K4 L4, will complete the profile. If desired the profiles of the other divisions can be obtained in a similar manner.

To obtain the pattern of No. 2, or A C D of plan, proceed as follows: On A N extended, as A2 N2, lay out a stretchout of part of profile K2 L2, through the points in which draw the usual measuring lines. Place the T-square parallel to the stretchout line A2 N2, and, bringing it against the several points in the miter lines D A and A C, cut corresponding measuring lines. Lines traced through the points thus obtained, as shown in A2 C2 D2, will be the pattern of part of article shown on plan by A C D. The pattern of No. 3 can be obtained in the same manner, or as shown in Fig. 2. To do this, draw any line, as O3 A3, on which lay out a stretchout of profile No. 3. Through the points in this stretchout line draw the usual measuring lines, as indicated by the small figures. By means of the dividers set off from O3 A3, on lines of similar numbers, the length of lines in O A D of plan. Lines traced through the points thus obtained, as shown by E3 A3 D3, will complete the pattern of No. 3. The pattern of No. 4 can be obtained in the same manner as was No 2, or No. 3, as may be found most convenient. Adapting the latter method, lay out on P4 A4 in Fig. 3 a stretchout of profile No. 4, through the points in which draw the usual measuring lines, as indicated by the small figures By means of the dividers, set off on either side of P4 A4 the length of lines of similar number on either side of A P of plan. Lines traced through the points thus obtained, as shown by A4 E4 F4, will give the desired pattern of No. 4.

A Sheet-Metal Fountain.

From PHOTOGRAPHER —There are few workers in sheet metal that have any idea into what curious shapes the various sheet metals can be worked. There are at present so many branches of the business that those who follow a particular line are liable to overlook the kinds of work that are being done by others. Such were my ideas when passing the general jobbing shop of Phil. Kempter, 32 North State street, Chicago. In Fig. 1 is shown a general view of the fountain, as it might be called, taken from a photograph. The fountain, which is mainly constructed of gavanized iron, is placed in the front window, and is as attractive a sign as one could desire. Referring to Fig. 2, which is a plan of the article, D C E F is the base of the fountain, which part is shown in plan, Fig. 3, in which K K K K K represents a miniature lake, over which a bridge is placed. There is likewise a



A Sheet-Metal Fountain.—Fig. 1.—*General View of Fountain, taken from a Photograph.*

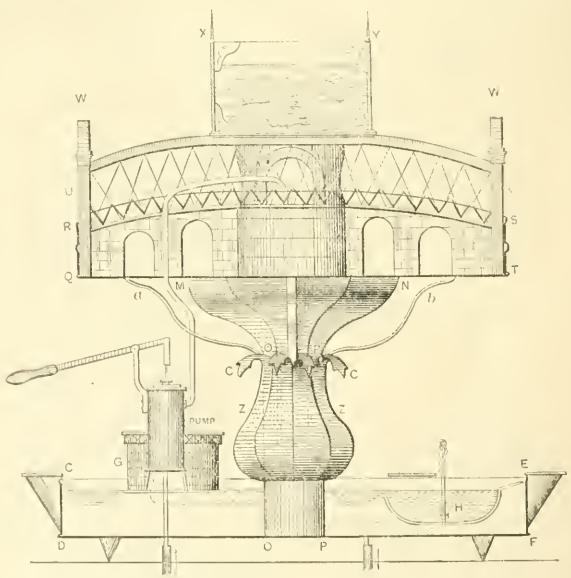


Fig. 2.—*Elevation of Fountain.*

fountain, which is shown in the elevation at G. At the right of the plan is a basin fountain that is shown in elevation by H. The location of the pavilion shown in Fig. 1 is indicated in the plan, Fig. 3, by J. In the elevation, Q R S T is similar to D C E F, which is connected to the base by M N O P and *o p*, O P *o p* being a continuation of M N O P to give strength to the structure. R U V S, Fig. 2, is a railroad bridge, through which a train of cars is seen to be passing. (See Fig. 1.) At W W are two eagles that proudly perch upon the arches. X Y is an aquarium, which has a number of alive and lively fish in the water therein contained. The location of the pump is shown, and from this a pipe is taken, as indicated by the dotted line, so water can be pumped into the reservoir M N O P, when required to supply the two small fountains at G and H. These pipes are furnished with stop cocks, so the supply of water can be regulated at will. The pipe for supplying the reservoir M N O P can be changed so the water can be pumped into the fish pond Q R S T. As the water passes out of the jets at G and H, it flows over into the lake, shown in plan, and

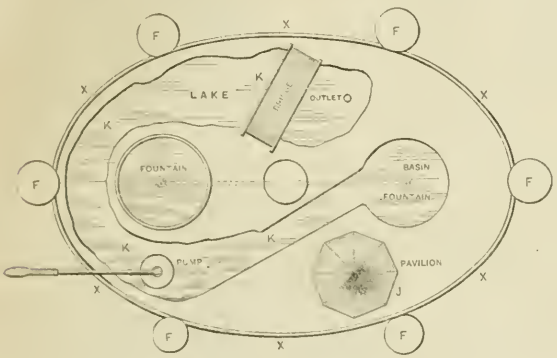


Fig. 3.—Plan of Fountain.

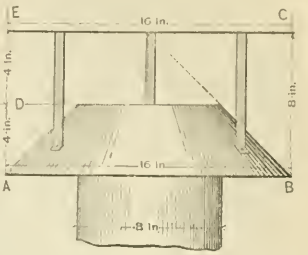
follows the course indicated by the arrows and out at the outlet near the bridge. At *a* and *b* are shown two of the 1½ x ¼ inch iron braces that are used as a support to the fish pond. On general principles, it can be stated that the bridge is intended to represent one that turns on its center, and below is the stone work, as shown in Fig. 2. The arches in the supposed stone work allow the fish or other animals to pass from one side of the pond to the other. About this pond are placed six supports for flower pots (X X X X X X in plan), while about the base are placed an equal number of similar supports, as shown by F F F F F F in plan. The earth or banks of the lake is made from sheet zinc, which, pounded into irregular shapes and painted green, answers the purpose for which it is intended in a very able manner. All of the fountain, except ing the two eagles over the arches and the aquarium, was made by Mr. Kempter, who also designed the structure. As the plan and elevation are drawn nearly to the scale of 1 inch to the foot, the reader will have little difficulty in determining the size of any of the parts or in making a similar fountain of any desired size.

Emerson Ventilator.

From H. C., *Elizabeth, N. J.*—I would like to see diagrams and measurements of an Emerson ventilator published in *The Metal Worker*. There is a difference of opinion among tinners regarding shape and dimensions.

Answer.—In Fig. 1 is presented a side view of an Emerson ventilator that is supposed to be drawn after the original design. These tops are made in a variety of ways, as most tinners have their own ideas on the subject, and make tops unlike the Emerson. If the top was to be made for an 8-inch pipe, from A to B would be 16 inches, or twice the size of pipe. From B to C would be 8 inches, or same distance as diameter of pipe. From A to D and D to E are each 4 inches. The top E C has the same diameter as A B, which is 16 inches. In Fig. 2 is presented a sectional view of top, showing method of construction. The disk G has its inner edge turned for greater strength, and rests on the bead of pipe F. The outer edge of H is turned onto G, when the top of pipe at J is turned over, thus binding the parts together without the use of rivets or solder. When putting the top together, the bead F should be such a distance from the end of pipe that some pressure will be required to bring the pipe through at J, so as to spring the disk G, as shown. The top piece M, when not made of heavy iron, should have the edge strengthened by wiring, and can be fastened to H by riveting on pieces of band iron, as shown at K, or by running rods through, which are held in position by nuts, as at O, or by riveting. When rods are used for holding the parts together, tubes, N, can be soldered about the rods L to prevent water from entering the top, where the rods pass through. When pieces of band iron similar to K are used for securing the top M, the irons should be riveted at H before the parts are put together.

The trip of W. R. Walkley, New York manager of the Peck, Stow & Wilcox Company, and A. R. Treadway, vice president of the same corporation, in charge of the Cleveland factory, to Havana, Cuba, as alluded to recently in our columns, has been accomplished. They left New York, March 15, on the steamer "City of Washington," of the Ward line, and returned by the same boat, encountering a rough passage both ways, arriving here March 28. Among their experiences was a call at a representative Hardware store, where they were hospitably invited to partake of breakfast. It appears to be quite a universal custom for employers in almost all branches of trade to board their employees on the premises, rooms included. The majority of merchants and clerks are said to be Spaniards, and being away from home and without family ties, this custom has obtained. Business is commenced about 6 o'clock in the morning, breakfast being served at 10 a m. This meal, which was a fair sample, consisted of five courses, including wines, mainly claret and sour wine. The repast is described as having been excellent. The host referred to his wine bill per annum as averaging about $3000, 30 bottles being served at that meal. Dinner occurs about 6 p.m.



Emerson Ventilator.—Fig. 1.—Side View.

Among the mementoes of the trip are a few fine cigars, for special acquaintances who call early.

America's foreign trade, though unsatisfactory in results, bears a very favorable comparison with that of Great Britain. In the aggregate British imports and exports combined were 13 5 per cent. smaller in February than in the same month last year, while American imports and exports combined were but 10.8 per cent. smaller than in the same month last year. But this is not all. While the British imports were unusually small the decrease was largely in the necessary materials of great manufactures. On the other hand, the

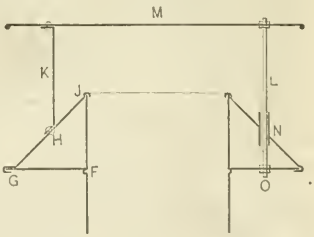


Fig. 2.—Section through Ventilator.

exports from the United States, though very much smaller than for the same month last year, were yet about as large as was usual in that month a few years ago.

Up to the latest advices four large bulk oil tank steamers had passed through the Suez Canal from the Batoum and Baku regions, and this trade is now supposed to be established. The demand for petroleum in the East has gradually assumed important dimensions, the annual consumption, it is said, amounting to 35,000,000 cases, or thereabouts, valued at some $35,000,000, with a steadily increasing demand. The chief part of this large supply was brought from America mainly by sailing vessels by way of the Cape.

Two solid men of iron, ex-Mayor Hewitt and Andrew Carnegie, addressed the General Society of Mechanics and Tradesmen at Masonic Temple, Newark, last week, and gave much good advice.

WORLD'S FAIR NOTES.

Hurrying the Work of Installation.

Only a month remains until the formal opening of the exposition. There is bedlam in the buildings. They roar with the mighty exertions of the workmen. The chaotic condition of the grounds is nothing when compared to the jumble of exhibits, the hurry and skurry of mechanics, the coughing and wheezing of engines and the heaps upon heaps of wood and metal to be seen and heard in the immense structures. There is no time to lose and contractors are pressing their men as captains urge their companies to carry a desperate point.

There is nothing humorous about the work. It is grim and killing. There are a thousand pavilions to be built and a hundred more to be finished before the big doors swing open to the world. Meantime trains burdened with foreign and domestic exhibits are rolling into the park from all points in the country. Huge steam cranes snort and hiss at the entrances. Even electricity is used to facilitate the handling of the ponderous exhibits of machinery. The roar is loudest in Manufactures Building, Machinery Hall, and in the great white structure where the products of the mines and their method of crushing are to be seen. The interior of the great Manufactures Building in these days of turmoil looks like the pictures of the construction of the Tower of Babel. The rumble of trucks over the floor, the roar of the carpenters of 20 nations and the cries of the men make a deafening din.

If there is to be one uncompleted building in the park, so far as pavilions and booths are concerned, it will be the mighty Manufactures, and it is here that the most frantic endeavor is being made to stretch a minute into an hour. The little Japs, working like squirrels in their queer blouses and ostrich-toed stockings, have made more progress than the rest of the exhibitors, although Germany, with an exhibit which will astound the world, is toiling with might and main to prepare its pavilion for the reception of its display. England's exhibit is pouring into the building. It is coming on every train. And side by side with it are the big boxes and crates from Austria and Belgium.

There is an immense amount of work to be done in the Manufactures Building, but the force of workmen is being increased each day. It is scarcely probable that all the exhibits consigned to the big structure will be installed by May 1, but the building, like the gates of the fair, will be opened on time and there will be enough to be seen there even on that day to bewilder and charm the eye. There is also a wild uproar in Machinery Hall. The exhibits here are for the most part so ponderous and so unwieldy that the work of placing them in their proper places is necessarily slow. Like the Manufactures Building, the display in Machinery Hall will scarcely be completed by the opening day. Electricity is being used to hoist, transfer and lower the huge engines and machines, and an army of brawny men, many of them in the strange garb of foreign countries, are hauling and tugging away at steam chests, piston rods and wheels of amazing diameter. The German exhibit in this building, as is the case in other departments, is nearly ready for the band to play. Looking down upon the piles of iron and steel and brass from the east gallery it would seem to be an impossibility to set the wheels agoing before July 1; but men work wonders at the fair these days. An immense structure has been erected in four days. Even 500 carloads of exhibits can be handled in a single day. Considering all this, and the fact that men in Machinery Hall are not only working like demons upon the floor, but are riveting and welding things while suspended in the air, there are reasons to accept the confident assertions of contractors that the displays will be in good shape on the opening day.

Work is more advanced in the Mines Building, where the floor is strewn with exhibits and splashed with the pavilions of countries famed for their minerals. Agricutural Hall is also in good trim now that the glass broken by the heavy snows of the winter is being replaced. For a time exhibitors in this building were bothered by water falling from the roof upon the space assigned for their displays. Since the leaks were stopped work has progressed steadily, until the main floor, as well as the balcony, is thickly dotted with pavilions, many of them of the most interesting and unique character.

There has never been much concern about the Electricity and Transportation buildings. Electricians have a way of doing their work with incredible speed, and it may be confidently predicted that their display, which will be the most wonderful of its character ever seen in the world, will be a "blazing and a singing and whirring" on schedule time.

The same is also true of the Transportation Building. Most of the exhibits for this department roll on wheels, and they are rolling in all the time. The main floor is already filling up with locomotives and specially constructed trains, and upstairs men are pushing vehicles and odoriferous canoes into place. Over at the Fisheries Building, where the guards have had nothing to do for months but press their faces against the window glass and watch the skaters on the ponds, there are signs of activity. Last week the first consignment of fish was received at the building, and from this time until May 1 the slate-colored cars of the United States Fish Commission will help fill the tanks in the building with fish.

The State and Foreign buildings will be finished by May 1. Many of them are now ready for occupancy and the rest are so well under way that there can be no question as to their completion by the specified time.

Nearly 10,000 men are now at work under the direction of the construction department. By far the larger proportion of them are on the pay rolls of contractors under bond to increase their working forces any time they may be ordered to do it. Foreign countries have a thousand or more men in the park, some of them putting the finishing touches on their buildings and others unpacking and setting up exhibits.

The Manufactures' Roof.

The reports that have been published in Chicago papers of late concerning the condition of the roof of the big Manufactures Building have greatly displeased Director-General Davis and Chief Allison. Last week Chief Engineer Shankland gave out the following as an official report of the condition of the roof:

"When the snowslides of last month broke large sections of the glass in the roof orders were at once placed for a large supply of the glass required to make the necessary repairs. There has been great difficulty in getting this glass, as it had to be made, and it is only within a day or two that it has begun to arrive. The places in the roof where the glass was broken have, of course, been leaking, owing to the numerous rains and snows of the past month. There is no such thing, however, as a general inundation of the whole Manufactures Building, and any complaints that may have been made by exhibitors were probably made by those whose floor space is located under the broken space in the roof. With two or three days of fair weather now, the roof will be repaired in such manner as will stop all leaks and all complaints."

America's Adam and Eve.

Two figures cut from marble, to represent the typical American male and female forms, will make one of the most interesting features of the ethnological exhibit. They will be installed by Professor Putnam in his laboratory in the Anthropological Building.

These figures are now being completed by Harry Kitson and Miss Theo. Ruggles, both well-known sculptors and both of Boston. Theirs is the first attempt ever made to reproduce in marble the typical form of a whole people. The idea originated with Dr. D. A. Sargent, Director of the Harvard Gymnasium, who has given much time and attention to the matter, furnishing for the use of the sculptors most of the measurements. The figures are really the result of measurements carefully taken by the most approved anthropological methods of no less than 10,000 different persons, nearly all of them in bloom of youth, that is, between 18 and 25 years of age, and the great majority of them college students, 5000 Harvard undergraduates alone having been measured for the male statue. A number of measurements of students of other colleges and a few of professional athletes have been used.

There are a little less than 5000 measurements of ladies, and they are from Harvard Annex, Smith, Vassar, Wellesley and other female institutions of learning.

Ever since 1880 these measurements of Harvard men have been pilling up in the archives of the gymnasium of that institution of learning. Sixty five different measurements were taken of each individual before he was considered measured. These sixty-five measurements have been taken of every one of the 10,000 people represented in the two figures.

The measurements include the girth of head, neck, trunk, arms and legs, each in a number of different places, the length of the body and limbs, both standing and sitting, and a part of other dimensions too numerous to mention. Then the sixty-five measurements of the 10,000 people are classified and the mean obtained of each one of the sixty five. A mean, be it noted, is not at all the same as an average. The mean is, instead, the instance that is found most frequently; for instance, if more of the 5000 men are just 68 inches tall than there are of any other hight, 68 inches, the mean, is taken. By this method of calculation the extremes do not count, and the true normal type is unaffected by the freaks and eccentricities in which even mother nature at times indulges. Scarcely an individual has filled the measurements of the type in more particulars, and a great multitude, of course, have not a single one of the measurements of the typical figure.

The faces are taken from composite photographs. Some 300 faces of young men will be represented in the face of the male figure, and about as large a number in that of the female. The female face is that of a composite representing a number of separate composites from the different female colleges already enumerated. The face of the male figure, which is beardless, is a composite of Harvard men, reinforced by composites from Amherst, Bowdoin and other colleges.

The figures will be completed early next month and will be installed by Professor Putnam before the opening, May 1. Speaking of them yesterday, Professor Putnam said: "This work has been carefully done by Dr. Sargent. His measurements represent a vast amount of labor. The figures will interest the general public and will prove of great value to those who make a study of the physical development of man. This is, I think, the only method that could have been pursued to secure the

real proportions of a typical American Adam and Eve. Replicas of the figures in metal will be furnished all museums that may wish to possess them."

The Fisheries Exhibit.

Live fish are now being placed in the aquaria of the Fisheries Building. These aquaria are ten in number, and occupy the east pavilion of the building. They each have a capacity of from 7000 to 27,000 gallons, and, combined, form the greatest aquaria in the United States.

In the center of the pavilion will be a pool 30 feet in diameter. Workmen are putting the finishing touches upon this feature of the general exhibit, arranging the rockery and placing the aquatic and semi-aquatic plants. The water will be filtered so that it will be as clear as crystal. From crevices in the rocks jets will spray toward the center. And as in this pool are to be exhibited the goldfish, golden ides, golden tench, and the many colored fish from Japan, it will have the appearance of an immense aquatic kaleidoscope.

Surrounding the pool will be the aquaria proper. The tanks are so arranged that the glass portions come within range of vision at about three feet from the floor. They are in two groups; one for salt water specimens, the other for the denizens of the lakes and rivers. Each tank will contain rocks built up in ornamental designs, and specimens of plants indigenous to that section of the world represented by the fish. In this manner will be illustrated as far as possible the bottoms of the principal American rivers.

One of the largest tanks is that in which will be the exhibit from the Mississippi river. It is 70 feet long, 12 feet wide and 9 feet high. This aquarium is to contain the largest specimens of fresh water fish in the building. Specimens of catfish, shorel fish and sturgeons weighing more than 200 pounds each have been captured, and as soon as all is in readiness for their reception will be forwarded to Jackson Park. This tank occupies the eastern half of the first series of aquaria immediately surrounding the pool.

On the west side of the pool will be several large tanks, to correspond with the Mississippi aquarium, in which will be exhibited the sea fish. Then comes an aisle, and in the outside circle around the walls of the building will be rows of smaller aquariums.

Light from the outside windows shines directly through the aquaria, so that visitors in the aisles will have no difficulty in viewing the fish. The system is provided with pumps which keep the water constantly fresh. The salt water will also be made as nearly clear as possible. It will be brought from the Atlantic in tank cars, each having a capacity of 30,000 gallons. A special car has been constructed to transport the live exhibit.

This portion of the fish and fisheries exhibit is under the United States Government Fish Commission. Professor Forbes of the Illinois University at Champaign is in charge. Every noted species of curious, edible and commercial fish of the United States will be exhibited some time during the season. The Fish Commission will have in the Government Building a large display of mounted specimens, fishing apparatus and mounted aquatic plants by which certain fish find maintenance. There will also be a display of the hatcheries of the commission, showing the methods of propagation.

The inanimate collection now in the building contains life-like reproductions of many curious ocean fish, several of which are very large. In this section will also be a collection of fishing boats in use off the Atlantic coast.

Perhaps no building at the park presents in its exterior decorations a more complete story of what will be its contents than the Fish and Fisheries Building. Every column, every cornice and every capital is covered with ornaments that are life-like reproductions of familiar fish, reptiles and creatures that "inhabit the waters under the earth." The friezes over the entrance doors show groups of frogs that are evidently enjoying life as only plaster frogs can do. One pillar of the south porch is decorated with sea crabs in *bas relief;* another is ornamented with scores of plaster flounders, while others glorify lizards, terrapin and lobsters.

The Department of Fish and Fisheries, to which the Government Fish Commission exhibit is a valuable adjunct, will be divided into three classes. In the main building will be exhibited fish products and commercial elements of the fishing industry. In the east wing will be the display of live fish. The western pavilion will be devoted to collections of angling apparatus of all kinds. This exhibit will be competitive, and will include all kinds of fishing tackle and appliances in use in this and foreign countries. In fact this portion of the building will be a fisher's paradise. In it the lovers of the gentle art may assemble to swap yarns and examine the latest wrinkles intended to deceive the wary trout.

The display is intended to embody the perfect articles in use at the present day, and to illustrate for contrast as many of the ancient and barbarous methods of catching fish as possible.

Models of Hell Gate.

To New Yorkers, and in fact to all who have visited the great metropolis of the Atlantic seaboard, one of the most interesting exhibits at the fair will be a series of models illustrating the improvements in the waters in the vicinity of that city. These models are unique in design, and have been in process of construction for nearly two years under the superintendence of Lieut. Col. George L Gillespie, who is in charge of the river and harbor improvements in New York and New Jersey.

Government authorities at Washington, recognizing the general interest in civil engineering, have given the exhibits the place of honor in the Government Building. The visitor entering the Building from the western entrance facing the lagoon will see first a model of Sandy Hook In the immediate vicinity of the Sandy Hook plan will be grouped all of the models prepared by Lieutenant-Colonel Gillespie's force now at work in New York City.

With these in the northwest corner of the building will be displayed representations of work done at the mouth of the Mississippi River; of the harbor at Key West, Fla.; of the iron pier at Lewes, Del.; of the Delaware breakwater; of the pulsometer at League Island and the stone scow at the Delaware breakwater. To afford visitors an opportunity to see these models wide aisles have been laid out surrounding them.

Orders were first issued from Washington August 8, 1891, for the construction of the models, and work has been continuous from that day to the present time. There are in all eight exhibits illustrating the work now being carried on in New York harbor. Five models show the work done by the late General John Newton in removing the Hell Gate obstructions.

One shows a section of rocks near Hallett's Point as it appeared before the first explosion in the fall of 1876, when General Newton's little daughter pushed the button and caused the mass of rocks and water to fly skyward. By turning a crank the surface is made to rise, revealing underneath it the galleries made by blasters and the headings, the short headings, with holes plugged with dynamite cartridges, the coffer dam, and the whole work as it appeared when all was ready for the blast. The topography is reproduced according to the scale of 1 inch to a mile.

Another model represents a general view of Hell Gate as it appeared before 1869, when operations were begun by the Government.

They Have Fallen by the Wayside.

One more projected enterprise on Midway Plaisance has fallen down. It was the concession granted to the Barre Sliding Railway for running trains the length of the Plaisance. The company was notified by the Council of Administration that, having failed to fulfill the terms of its contract, it would have to relinquish its place. The Barre Sliding Railway was a unique project and one that promised to distance railroad trains in the lightning swiftness of its speed. Its cars were to slide over a thin surface of water which coated the rails. These were the usual distance apart, and an elevated structure a mile long on which were the tracks had been practically completed when the company found itself unable to go ahead. The cars were to be propelled by jets of water, and a speed of 60 miles an hour was said to be merely an ordinary rate. The railway was exhibited at the last Paris Exhibition and was reputed to have been one of its wonders. The Exposition Company will buy the elevated tracks from the concessionaires, and the road will probably be used as an electric line. It will be easy to conduct it with the electric cars used by the Intramural Railway in Jackson Park. It is a mile from one end of the Plaisance to the other, and it will be necessary to afford transportation to visitors along that strip of ground.

Another enterprise which seems to have come to naught is the projected lofty tower, known as the Johnstone Tower, on the Plaisance between the Illinois Central tracks and Stony Island avenue. This tower was to be built of steel over 500 feet high, with a circular railway winding nine times around before reaching the summit. At night the tower was to have been illuminated with 10,000 incandescent lamps, which would have made it appear like a shaft of light. The Tower Company were late in beginning their work and it seemed impossible for them to build a structure such as was designed by May 1. Barring a few hundred piles now lying along on the site there are no other evidences visible of progress. A lonely pile driver is started up two or three times a week, and after pounding a few piles takes a rest for another day or so. The Tower Company have until April 1 to furnish evidence that the structure will be built. None of the officials, however, expect to see the project rise any higher than the surface of the ground.

Montana's Silver Statue Well Cast.

The silver statue of Montana's "Justice," for which Ada Rehan, the actress, was the model, has been successfully cast and is now an assured fact. The casting was done on the 18th inst. At ten o'clock on the following morning a number of those interested in the statue were on hand in the foundry of the American Bronze Company at Grand Crossing, near Chicago, where the silver had been cast into the mold, to see what was the result of the undertaking. Julius Berchern, who had charge of the work, had his assistants remove the molds. He was in a state of great trepidation and had been ever since the molten silver was poured in. He had scarcely rested during the night and could hardly retain his patience for the 22 hours necessary to allow the statue to cool. When the mold was removed it was found that the work of the founder was as near perfection as could be. It was expected that the cooling of the white metal would

leave air-holes, cracks, and flaws here or there on the statue, but not one was noticeable. The achievement is noteworthy, as the statue is of the full size of the human figure and nearly a ton of silver was used, a metal with which founders have had little or no experience in casting in large masses.

Exhibits from Ontario.

The mineral exhibit of Ontario, Canada, will consist of 1600 samples of ore from all parts of the Province, and five carloads of it were shipped from Toronto last week and one carload from the Sudbury district. This latter car contains nickel alone, and there is one solid chunk of pure or refined nickel which weighs 4600 pounds. The mineral displays altogether will exceed 100 tons in weight. One of the most artistic as well as attractive and unique displays in the Ontario court will be entirely prepared by Indians of the reserve in the counties of Brant and Haldeman. This will consist of a monument or trophy entirely made of pieces of timber comprising 13 varieties, and all of which have been prepared and fitted without the use of saw or other utensils except a jackknife. Yet the timbers are squared and molded with a perfectness that could not be excelled by the most elaborate machinery, and the pieces are polished by the hands of the Indians. Surmounting the timbers forming the base of the trophy will be five wooden columns elaborately decorated by carvings of native birds and animals, all being done with a jackknife. On the top of each column will be a small belfry, and above all a large belfry. The entire work is the result of six years of labor of two or three educated Indians. The sides of the base will be richly inlaid with various specimens of wood.

In the mineral section some delay has occurred by the necessity of strengthening the floor. One specimen of rich iron ore will weigh over 10 tons. In every department these exhibits of Ontario will be complete, and for their arrangement and care a force of more than 60 men will be continuously employed during the Fair.

Must Have Credentials.

Considerable annoyance has recently been caused in the various departments by persons claiming to represent foreign and domestic exhibitors and State commissions. In many cases the claimants have caused confusion in assigning space, and it has become difficult for the authorities to determine exactly whom they were dealing with. In order to obviate this difficulty hereafter the Director General issued the following general order:

To all Department Chiefs.—No person will be recognized, or permitted to act as agent in the World's Columbian Exposition for an exhibitor, or for a foreign or State commission until he has filed satisfactory written evidence of his authority.

In the case of agents for domestic exhibitors, satisfactory evidence will be a formal power of attorney, which must be filed with the chief of department to which the exhibits pertain.

In the case of agents for foreign exhibitors, satisfactory evidence will be the written authority (preferably power of attorney) of the principal, which must be approved by the commissioner-in-chief of the country of which the exhibitor is a subject, and filed in the office of the Director-General.

In the case of agents for foreign and State commissions, the proper evidence will be the written authority of the head of the commission, which must be attested by the secretary of said commission and filed in the office of the Director-General.

GEORGE R. DAVIS,
Director-General.

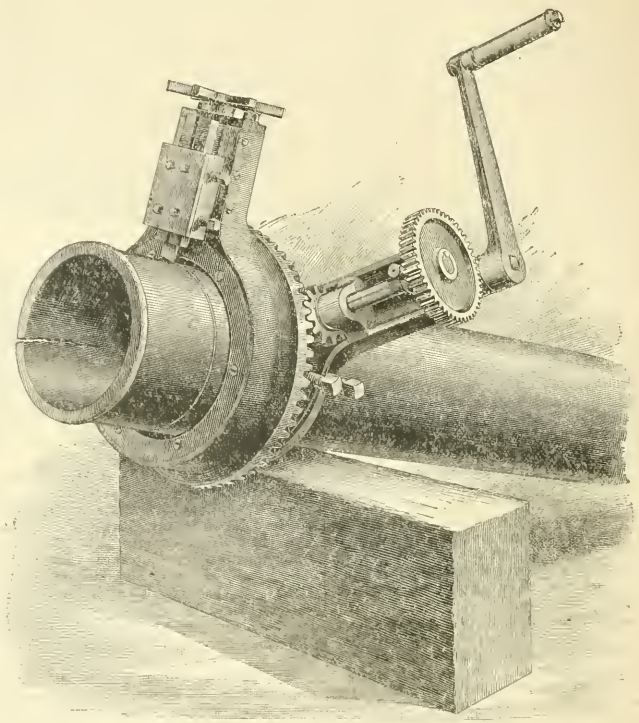
Items.

One of the big pieces of machinery at the fair will be a 1500 horse-power combined engine and dynamo. It is to be exhibited by the General Electric Company, by whom it has been built at Schenectady, N. Y.

The boiler plant at Jackson Park is now being heated by oil. Two batteries of eight boilers have been fired for seven days with this fuel with satisfactory results. No perceptible odor is emitted and the smoke nuisance is avoided.

The claim is made that the largest wood split pulley in the world has just been shipped from Columbus, Ind. It is a part of the Reeves Pulley Company's exhibit which will be made at the World's Fair. It required two and one half kegs of nails and 100 pounds of glue to unite the 2800 pieces of wood of which it is composed. The pulley is 18 feet in diameter and has a face surface of 4 feet.

A pair of light chain tongs is all that is necessary to hold the pipe, and on large sizes, where the pipe is heavy, nothing more than chocks are needed. To cut off a cracked pipe the machine is moved along to the point where the crack ceases, and not a foot behind the crack, as has been customary; by so doing the cost of a foot of pipe is saved every time a cracked pipe is cut. It is possible to cut on a bevel by simply slackening the screws on the top side of the frame and setting them up on the bottom side, and as the machine must cut square to its own axis, the required result is obtained. It is claimed that the economy of this machine is represented by the difference between the work of two men not exceeding 40 minutes each and the work of five or six men from 60 to 75 minutes each on 20 inch or 24 inch pipe, with a proportionate amount of saving on all other sizes.



THE FRENCH PIPE-CUTTING MACHINE.

The French Pipe-Cutting Machine.

This machine—which is the invention of D. W. French and is put on the market by Benjamin C. Smith of 52 Cliff street, New York—is intended for cutting pipe from 4 to 48 inches in diameter. The machine is very simple in design, and while light, so as to be easily handled, it possesses sufficient strength to stand severe usage. In using the machine all that is required is to mark the pipe where it is to be cut, slide the machine along to the point designated and set up the screws which hold it in position on the pipe. The machine is operated by means of the crank shown, which can stand in any position desired. One end of the pipe to be cut is raised about 1 foot, so that the rotary head carrying the cutting tool will clear the ground in passing around the pipe.

The engraving shows the construction of the machine so plainly that but little explanation is needed. On the crank shaft is a pinion engaging with a gear on a shaft having, at its inner end, a beveled pinion meshing with a beveled gear formed in the periphery of the revolving head. This head is formed with suitable guides for the tool carriage, which is fed to the work by means of the hand wheel shown. It will be observed that this train of gears provides ample power to enable the tool to take a deep cut.

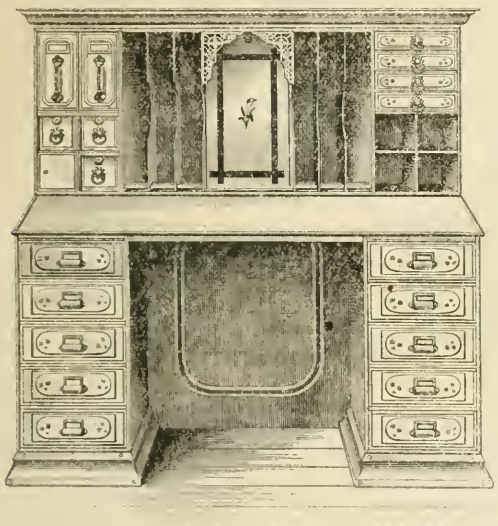
According to *Industries*, alcohol has been found efficacious as a solvent, in place of chloride of calcium solution, of obstructions in gas pipes. The burner is unscrewed and a small quantity of methylated spirit poured down the pipe.

In 1892 there were sent from the post offices of the United States to England 10,057,640 letters, to Germany 5,858,040 letters and to France 1,884,040 letters.

Sheet-Metal Furniture.

The possibilities of sheet metal in the line of furniture are considerably greater than is popularly supposed. That this material can be adapted with effect and utility to the construction of many articles of use and convenience hitherto made almost exclusively of wood was proved recently by the receipt of a photograph and description of a handsome office desk made throughout of sheet steel. The desk, which is shown in the accompanying illustration, is the work of Christian D. Then, 589 North Clinton street, Rochester, N. Y., who informs us that he has made a number of similar articles of furniture. This specimen is constructed of No. 16 to No. 24 gauge sheet metal, riveted together firmly, the rivets being beveled and countersunk. The metal is either japanned or bronzed, and the whole piece handsomely finished and decorated.

A notable feature of this work, to which the maker calls special attention, is that



Sheet-Metal Furniture.—Steel Office Desk.

the desk shown is fitted with outer panels, which form an air chamber, rendering the object nearly fire proof. Comparative indestructibility by fire is a recommendation which would certainly be held by steel furniture, and it is a feature which deserves attention. Mr. Then states, moreover, that he is prepared to furnish, not only steel desks, but any other description of work in a similar line that can be made in wood. A rolled-top desk of steel, which is said to be equally effective, has been lately made by him.

These novelties suggest a new line of usefulness for sheet metal which might be followed up with advantage. We frequently see light metal chairs and tables, and, of course, iron has long been used for bedsteads, camp washstands and other specialties.

The theory has been advanced by an old mariner that the White Star freight steamer "Naronic," now given up as lost, "turned turtle" while battering with heavy seas and went to the bottom. Her commander is reported as having said that "she was the deepest rolling ship he had ever seen." Besides, she had a heavy deck-load, including a 40-ton locomotive.

The Recent Labor Decisions.

There have come in quick succession two decisions, says *The Iron Age*, emanating from United States courts on matters relating to the labor question, which give judicial dignity to doctrines hitherto held only by a few. It is not only the railroad magnates and managers who have believed that Vanderbilt's famous dictum, "the public be d——d," pretty well represented a correct attitude. The men have generally acted with even greater disregard of the third interested party, from whom charters and special privileges spring. The managers have been made to feel that the enjoyment of rights is coupled with responsibilities and duties. The recent decisions alluded to are a departure, in that they impose upon labor obligations which have not been generally recognized as yet.

Judge Ricks of Toledo addressed the engineers and firemen who had declined to handle boycotted cars in the following terms, which cover his conception of the duty of railroad employees:

You are engaged in a service of public character, and the public is not only interested in the manner in which you perform your duties while you continue in that service, but is quite as much interested in the time and circumstances under which you quit that employment. You can't always choose your own time and place for terminating the relations. If you were permitted to do so you might quit your work at a time and place and under circumstances which would involve irreparable damage to your employer and jeopardize the lives of the traveling public. Your employers owe a high duty to the public, which they are compelled to perform under severe penalty, and they have in turn a higher claim upon you and your services than that due from the ordinary employee. This court does not assume the power or compel you to continue your service to your employers against your will, but it does undertake to compel you to perform your whole duty while such relations continue, and does further claim, for the purposes of ascertaining whether its orders have been violated, the right to determine when your relation to your employer legally terminated and when your obligations to observe this order cease. It may, in the meantime, be important for you to reflect and consider whether you can safely proceed to continue in your employer's service with the purpose to quit at a moment when some duty may be required of you which is in violation of some supposed promise or obligation you owe another not your employers. That time for leaving your post of duty might come under circumstances when you would by such act unintentionally imperil the safety and lives intrusted to your employer and do his business vast and irreparable damage. It might, too, unintentionally involve you in conflict with the court because of obstructing its process and interfering with its mandates. I therefore suggest to you and all others who are in similar employment that there ought not to be any strained construction made of the provisions of the court's order. The one safe way to obviate trouble is to quit the service of your employer. If you continue that employment this court will expect you to do your full duty to your employer and to the public, and to observe the orders which have been made in this case.

Far reaching as the establishment of such a doctrine by the highest courts in the land would be, an even more sweeping dictum comes from Judge E. C. Billings of the United States Circuit Court at New Orleans. In November last the employees of the warehousemen of New Orleans went out on a strike. The union men were called out and resisted the effort of their employers to engage other men by intimidation, and in some instances by violence. Proceedings were begun by the United States against the labor organizations involved, but before the suit was argued the strike ended. Although the latter event occurred four months ago, Judge Billings deemed it his duty to pass on the questions involved. After a recital of the facts, the decision concludes:

The question is, "Do these facts establish a case within the statue?" It seems to me this question is tantamount to the question, "Could there be a case under the statute?" It is conceded that the labor organizations were at the outset lawful. But when lawful forces are put into unlawful channels—*i. e.*, when lawful associations take on unlawful purposes and do unlawful acts the associations themselves become unlawful. The evil as well as the unlawfulness of the act of the defendant consists in this, that until certain demands of theirs were complied with they sought to prevent, and did prevent, everybody from moving the commerce of the city. It was the successful effort of the combination of the defendants to intimidate and overawe others who were at work in conducting or carrying on the commerce of the country in which the court finds their error and their violation of the statute. One of the intended results of their combined action was the forced stagnation of all the commerce which flowed through New Orleans. This intent and combined action are none the less unlawful because they included in their scope the paralysis of all other business within the city as well.

For these reasons I think the injunction should issue.

It will be observed that the broad ground is taken that a combination in restraint of commerce is unlawful, and that the organizations themselves are responsible for acts committed with the end in view. Here again the rights of the community are pushed forward. What many have been accustomed to regard as merely a private struggle between the two contending parties is influenced by the rights of the general public.

THE LETTER BOX.

Forming Wash Boilers.

From R. S. T., *Coal Creek, Col.*—In reply to "O. J. B.," Troy, Ind., whose inquiry appeared in *The Metal Worker* of March 11, would say that I have used a wooden roller 3 feet long and 10 inches in diameter at one end and 4 inches at the other, with a pin in each end about 6 inches long, the pins resting on two wooden supports. The manner of using it is to sit straddle of the roll and bend the tin over it by hand. I find that I can form up wash boilers quicker by this means than by using the forming rolls. As the wooden roll is tapered it can be used to form any size of boiler without the use of a mallet, except the two ends, which I start over the mandrel with the mallet.

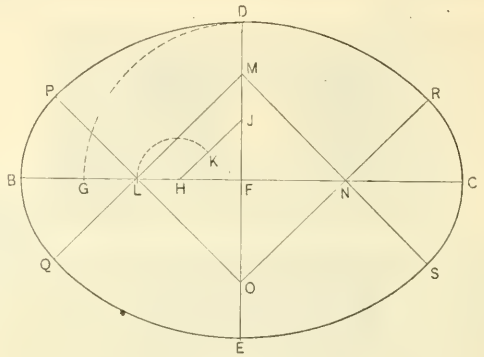
From F. J. F., *Coon Rapids, Pa.*—In reply to "O. J. B.," Troy, Ind., would say that it is rather hard to figure out what he means by a boiler former; but suppose he means an oval-shaped block the shape of the boiler, which may be placed inside the body after it is roughly formed up, and a mallet, used to form the top or wire on the block. There are several ways of forming up an oval wash boiler. Some use rollers, and after adjusting them so that the body will roll straight, the rollers are screwed up five half turns for the oval ends. This, however, makes it too much work, as it is necessary to turn the thumb screws up and down for the center of the body. I once knew a tinner who used 8 or 9 inch stove kettles to form his boilers on, placing his kettles on the mandrel. My way of doing the work is to take some heavy galvanized strips, such as come bound around galvanized iron. One strip should be the length of the half round end, and the other half the length of the first strip. The two strips are then taken and formed to the desired shape of the boiler, the ends being hammered or drawn out so as not to leave a ridge where they start in on the body and where they leave off. Then screw the upper roller as far up as it will go, and after adjusting the back roller to the proper place, form up the boiler to the desired shape. I start the body in with short strip on top of the wire. As they pass through and the short strip falls out you have the half of one end formed up, and the body will pass through freely without moving the rollers. The center and the other end are done in a similar way.

From ON THE ROAD, *New York.*—In the article published in *The Metal Worker* of March 25, page 47, on the subject of wash boilers, a slight error occurs which I desire to correct. Where it says "cut another piece of band iron just as long as the first piece," I should have said, "cut another piece of band iron just half as long as the first piece." This, I think, will make the matter perfectly clear.

An Elliptical Arch.

From SUBSCRIBER, *Paterson, N. J.*—I would like to be informed of a method for describing an elliptical arch.

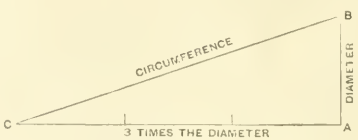
Answer.—A convenient method for describing an ellipse by using two sets of centers is shown in the accompanying engraving. The figure once obtained, either half, as E B D or B D C, can be used for the arch. Let B C represent the length of the figure and D E the width. B C and D E are drawn at right angles to each other, intersecting at their middle points at F. From F on F B set off the distance F D, as shown by F G. Take the distance B G and set off from F, as shown by F H. F J. Then draw J H and bisect J H in K. Set off H K on H B, as indicated by H L. F L is to be set off on F D, F C and F E, as shown at M, N and O. From M, draw M L Q and M N S, extending them indefinitely, and in a similar manner draw O L P and O N R. With L as center and L B as radius, strike the arc Q B P, cutting L Q and L P, as shown. With the same radius, and with N as center, strike the arc R C S. With O as center and O D as radius, strike the arc P D R, cutting O P and O R. From M as center, and with the same radius, strike the arc Q E S, thus completing the figure.



Method of Drawing an Elliptical Arch.

How to Find the Circumference of a Circle.

From W. P. R., *Shenandoah, Pa.*—I notice in *The Metal Worker* of February 25 a letter from "C. W. F.," giving a method of finding the circumference of a circle. I will try to explain my way, which, I think, is the simplest I have ever seen. Take an ordinary square, which almost every tinner has in his shop; measure from one corner the diameter one way and three times the other way, and the diagonal distance between the points will be the length of the circumference. I inclose diagram illustrating my method. Assuming that the circle is 5 inches in diameter, lay off 5 inches on the line A B and 15 on the line A C. Then the distance C B would be the circumference of the circle.



How to Find the Circumference of a Circle.

Stove Pipe for Natural Gas.

From A. H., *Shelbyville, Ind.*—I have a long stove pipe made of iron and used where natural gas is burned. The trouble is that the pipe sweats on the inside and soon rusts out. I would like to know how to keep the pipe from sweating or what kind of material would last under the circumstances?

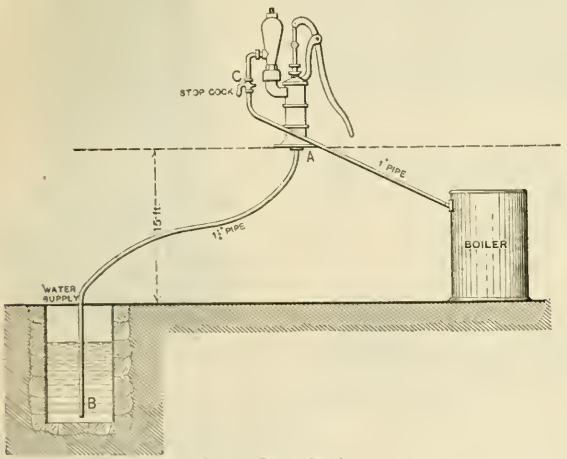
Note.—In burning natural gas water is produced, and in a long smoke pipe the cooling action would condense this water and give rise to the trouble complained of. We presume our correspondent's smoke pipe is of black iron, and if so it is no wonder it rusts out rapidly. Better results would be obtained with galvanized iron or bright tin plate. If our correspondent is willing to go to some little expense, however, we would suggest the use of copper, which will last longer. It must be borne in mind, however, that the water and the heat combined, together with the impurities that are likely to collect in the water, will have a strong corrosive effect; but we think copper would probably give better results than any other common materials. Another plan which might be successful would be to cover the smoke pipe and thus prevent the loss of heat. By this means the water

would be carried off in the form of vapor in the chimney instead of being condensed in the pipe.

Faulty Pump Suction.

From L. R., *Warren, Pa.*—I wish you would explain how to improve the working of a pump that I had some trouble with. A short time ago I set a suction and force pump for the purpose of filling a hot-water heater. The trouble is it don't seem to have any suction. It draws water 15 feet and it works all right when the water is once got, but it takes a long time to bring it. I have new leathered it all around, but its suction is no good. The inclosed sketch will give you an idea of its construction.

Answer.—Our correspondent sends us a sketch, as shown, of the general arrangement of this job, the position of the cistern, pump and the heater boiler, also the pipes connecting these, being as the



Faulty Pump Suction.

sketch and his rather meager description indicate, we are inclined to ascribe the cause of the peculiar action of the pump either to some slight defect in the casting of the pump itself or to a defective leather packing of the plunger. A pump to work satisfactorily must be perfect in casting, the valves must all work properly and the packing must fit snugly in the suction chamber. Then the pipe to the supply cistern must be perfectly air tight from the pump at A to the other end at B. The least amount of leakage, be it ever so minute, often seriously interferes with the proper working. Care must be taken not to have the end B too near the bottom of the cistern. It may be in this case that the bottom of the cistern is covered with sediment. We recall a case somewhat similar to this one, where the opening at B was too far down in a cistern. Every time the attempt was made to pump water it took some time before the water would commence to run. This was owing to the mass of rubbish and mud which had been allowed to accumulate at the bottom of the cistern. After the cistern had been cleaned out and the pipe shortened somewhat, no further trouble was experienced.

Soldering Aluminum

From R. M. W., *Pittsburgh, Pa.*—Please tell me through the columns of *The Metal Worker* how to solder or braze aluminum. What kind of solder is used, and what kind of flux?

Answer.—It is a difficult matter to solder aluminum satisfactorily, and while there are many compositions used for the purpose, and a great deal of this sort of work done, there still appears to be much room for improvement. In the exhaustive work by J. W. Richards on aluminum, or, as he more appropriately terms it, "aluminium," there are several pages given up to the subject of soldering, at the end of which is the following sentence that is worthy of quotation: "I am quite aware of the criticism which the above information about aluminum solders will meet; that much more satisfactory alloys have been discovered and are now used; and this is possibly the case. But it must be remembered that a metal worker who, by searching patiently, discovers such an improvement, considers that his reward is found in keeping to himself the monopoly of its use, and that to obtain these trade secrets is, in most cases, almost impossible, especially since the more valuable they are the more carefully are they guarded." Mr. Richards gives a variety of solders in his work, quoting them from various sources. Also some description is given of the method of preparing the solders. We quote the following as one of the examples: "O. W. Thowless has patented the following solder for aluminum, and the method of applying it. The solder is composed of:

Tin, 55 parts.
Zinc, 23 parts.
Silver, 5 parts.
Aluminum, 2 parts.

"The silver and aluminum are first melted together, the tin added, and lastly the zinc. The metal surfaces to be united are immersed in dilute caustic alkali or a cyanide solution, washed and dried. They are then held over a spirit lamp, coated with the solder and clamped together, small pieces of the alloy being placed around the joints. The whole is then heated to the melting point of the solder, and any excess of it removed. No flux is used."

Adjustable Pot Covers.

From T. E. S., *Bay City, Mich.*—I wish to inquire through the columns of *The Metal Worker* who manufactures a pot cover so arranged as to expand and contract to fit dishes. It is made of tin, with a wire spring from the top to the edge.

Note.—The cover that our correspondent is looking for was, we think, brought out some five or six years ago, and sold in large quantities through the West, but we do not think it proved a commercial success, as we have not seen reference to it lately. If any other correspondent can furnish information about it we will be glad to get it.

Expansion of Gasoline.

From J. G., *Philadelphia.*—If I was to stand a steam drum before the sun and put 60 gallons of gasoline into it—tank being ¼ inch iron and 2-inch cast flat heads, diameter 24 inches, length 6 feet—would it be safe without a safety valve? Temperature is 120° F. at times in July. What pressure would it be likely to have on it caused by the expansion of the gasoline? Would it be advisable to locate a safety valve on it?

Answer.—As gasoline vaporizes, according to quality, at from 75° F. to 120° F., it is evident that, under the conditions described by our correspondent, the substance would be liable to expand to a dangerous extent, whatever the particular quality placed in the tank might be. The limit of pressure caused by expansion of gasoline is an unknown quantity. Practically it is infinite, and the safety of a vessel containing it under stress of heat would be merely in proportion to its stability. It would, therefore, be necessary in this case to place a safety valve on the tank. The best advice we could give our correspondent would be to so cover the drum as to minimize the heat that would strike it; or, if possible, to protect it from the direct rays of the sun; as, even with a safety valve, gas might be generated to a highly dangerous degree under excessive heat.

The builders' trial trip of the armored cruiser "New York" took place last week. Her engines were put to the most severe tests, with remarkable results. Steaming twice over a course from the Five Fathom Bank Lightship to the Northeast End Lightship, a distance of 9.88 knots, in 12 fathoms of water, an average of 19.95 knots per hour was made under ordinary draft. A maximum speed of 20.47 knots was made in 40 fathoms of water under a forced draft of 1 inch pressure, being ½ knot more than the guaranteed speed. It was not necessary to stop the engines for any adjustment and not a journal was heated.

The Supreme Court has affirmed the right of Philadelphia to tax telegraph poles erected in that city.

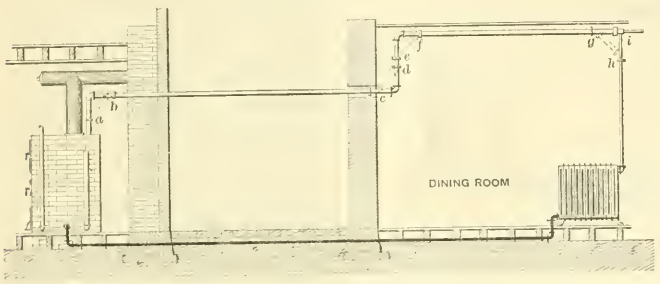
The "monkey-wrench" is not so named because it is a handy thing to monkey with, or for any kindred reason. "Monkey" is not, in fact, its proper name at all, but "Moncky," after its inventor, Charles Moncky, who sold his patent for $7,000.

STEAM AND HOT WATER.

Radiator on Boiler Level.

From M. E. R., *Nashville, Tenn.*—I inclose herewith sketch showing the location of hot-water boiler, and also where I would like to place the radiator, which is in a dining room, the floor of which is on a level with the boiler-room floor. I would like to know if this can be done; also, what size of pipe will be required for the flow?

Answer.—Jobs of this kind are often made to work satisfactorily; but also quite often they give trouble. Radiators for hot-water heating placed on a level with the boiler should have the easiest possible flow through supply and return pipes, and these should be either independent of all other runs, or, better still,

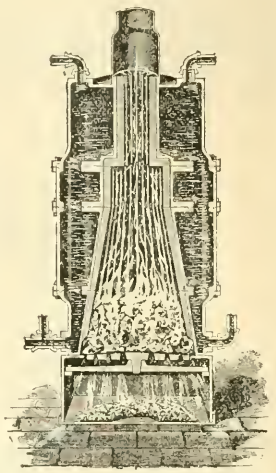


Radiator on Boiler Level.

their supply pipes should be extensions of returns from radiators placed at higher elevations, with a short pass-by run connecting the supply pipe, from a point a little before it enters the radiator, with the outflow pipe from the radiator. The radiator in this arrangement should have the usual supply valve, and the pass-by should have a valve in it also. This arrangement permits the radiator to be shut off when desired without stopping circulation in the higher radiators from which the water flows to supply it. Of course, when this arrangement is used the radiator will need to have a little more surface than is required when it takes its supply at a higher temperature, directly and independently from the boiler. The piping shown in our correspondent's diagram should be not less than 1¼-inch for most successful working, and should have 45° fittings at *a b c d e f g h*, as shown by dotted lines, instead of the right-angled ells. Or, better still, if a fitter having the skill to do it is available, the pipe might be bent, with easy bends, to avoid so many fittings as would otherwise be necessary. The continued run at *i*, indicated in the diagram, will interfere with the working of the radiator below it, and ought to be avoided. If another radiator, or radiators, above it are to be supplied, they should have an independent supply pipe. The supply pipe, in its horizontal parts, should have an upward incline of 1 inch in 10 feet till the point *g* is reached. The reason for recommending so large pipe is that the resistance to circulation will, in any case, be large in proportion to the head produced by difference of temperature in vertical pipes of so little hight above the boiler as occurs in jobs of this kind, and the resistance is lessened by the use of pipes of liberal size. If the directions given are followed we think our correspondent will succeed in obtaining a moderately good circulation; but, as has been said, more or less uncertainty attaches to an arrangement of this kind; while if the first method described be followed, there should be certainty of success, provided the work be done in accordance with good practice in all other respects.

The Caldwell Heating Boiler.

The accompanying illustrations show a vertical section, as well as a larger horizontal sectional view, of the Caldwell heating boiler, made for both hot water and steam, which is being manufactured by the Goulds & Caldwell Company, 22 and 24 North Canal street, Chicago, Ill. The general appearance of the boiler is shown in the vertical section, Fig. 1, from which it will be seen that it consists of horizontal sections, bolted together on the outside, and giving annular water spaces about the fire pot. The principal feature of this boiler to which the manufacturers direct attention, are the vertical ribs placed around the fire pot, as shown in Fig. 1. These ribs, it is pointed out, furnish air passages by which air is supplied at the sides of the fire, producing much more perfect combustion. At the same time, on the upper part of the coal magazine, above the fire pot, they furnish an absorbing surface, for facilitating the transfer of heat to the water. The air taken in these passages, it is said, besides promoting the combustion on the grate, also serves to burn the unconsumed gases in the fire pot and prevent smoke. Even with the use of soft coal, it is stated that no smoke is given off, except just when the fire is started. The boilers are made either surface burning or self feeding, as desired. The sections are connected by a tongue and



The Caldwell Heating Boiler.—Fig. 1.—Vertical Section through Boiler.

groove joint, bolted together with a special gasket placed in the bottom of the groove, so as to make a very tight and strong joint. Fig. 2, which is an enlarged horizontal

Fig. 2.—Horizontal Section through Boiler.

section, shows very clearly the arrangement of the ribs about the fire pot and the air spaces that they form.

Destruction of Pipes by Condensed Steam.

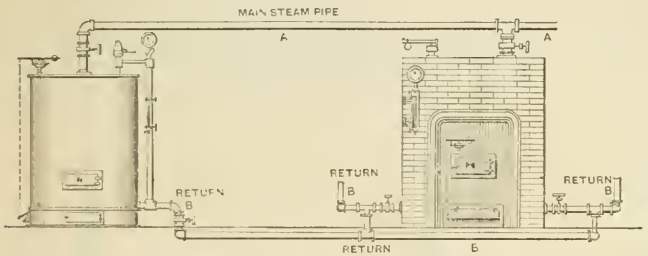
From J. T., *Brooklyn, N. Y.*—In reply to "E. S. & S.," whose letter appears in *The Metal Worker* of March 18, would say that I have had some experience with corroding pipes. I have seen the nipples in the radiators honeycombed their entire length, and in bad spots would corrode through in a single season. This always occurred in plants where exhaust steam was never used for heating. On the other

hand, I have never heard of this trouble occurring in plants where the exhaust was utilized, and attribute the non-corrosion in such cases to the surplus oil from the engines, forming a thin coating on the internal surface of the pipe. I would suggest that "E. S. & S." connect the exhaust with the heating mains, if it is practicable. If any one has experienced the above trouble, where the exhaust steam was used, I would be glad to hear from him.

Brick-Set and Portable Boiler Combination.

From INTERSTATE, *Philadelphia.*—Some time since we furnished a brick-set low-pressure boiler to heat a customer's house. Subsequently he built a large addition to the house, rendering the boiler inadequate for his needs. We then put in a portable boiler, about one-third the capacity of the first, to help out number one, and connected the steam and return pipes, as shown in the sketch. We found, however, that the large boiler draws the water from the small one, so that no water shows in the gauge glass of the latter. The gauge glasses are on a level. Can you suggest a cure?

Answer.—Unless the one or the other boiler foams or primes, or both, which our correspondent would have probably discovered, there appear but two solutions to the difficulty he is experiencing. With the way in which the boilers are connected in the sketch, when both boilers are steaming, in order that steam may issue from the small boiler through the main A, it must have a pressure somewhat exceeding that of the large boiler. This excess of pressure must be enough to overcome the pressure of the large boiler, which is exerted from the outlet in opposite directions after reaching the first tee on the nipple that rises from the boiler. Any excess of pressure in the smaller boiler will cause water to back through the return connections into the larger boiler, and this will continue till the increased elevation of water in the larger boiler balances the excess of pressure. The remedy we would suggest is to disconnect the run between the two boilers, as now arranged, and connect it at some point of the main A to the right of the outlet of the larger boiler, making the new connection into the main at right angles, and making the run as direct and easy as possible from the smaller boiler to the point of connection. If our correspondent adopts this plan, we shall be glad to hear how it operates. Of course, if priming or foaming exists, this may create a resistance in the circulation that is adequate to account for the difficulty; and this would need to be cured before two boilers connected as described could be expected to work harmoniously together. It may be, however, that resistance to circulation arises from an insufficient number of reliefs connecting the steam main and risers with the return main; and, before changing the run, our correspondent might try the effect of a 1¼-inch relief pipe connecting the steam pipe with the return connection, between the two boilers and between the two valves in the return, at a point as near to the return valve of the larger boiler as convenient.



Brick-Set and Portable Boiler Combination.

HEATING NOTES.

THE NASHVILLE MACHINE COMPANY, Nashville, Tenn., are sole manufacturers for the South of the G. & J. R. Bolton improved hot-water heater, they having the exclusive right to manufacture and sell in Delaware, Maryland, West Virginia, Virginia, South and North Carolina, Georgia, Alabama, Florida, Mississippi, Louisiana, Texas, Tennessee, Indiana, Missouri and Kentucky. Since they introduced this department in their business, last June, the company have been over a great deal of their territory and established agencies in a majority of the large cities, except the eastern portion, and are looking forward to a large trade this season. The Nashville Machine Company, besides manufacturing the G. & J. R. Bolton heater, are contractors for steam, electric and hydraulic elevators. They also carry a full supply of pipe fittings, valves, mill and water-works supplies.

RUSSELL WHEELER & SON, Utica, N. Y., send out advertising circulars, together with a letter, addressed to the trade. One of the circulars is a folder, giving full descriptions, with illustrations, of the Palace King hot-water boilers, together with tables of sizes, prices, ratings, &c. The larger publication is a square pamphlet, neatly bound and printed and entitled "A Talk on Hot-Water Heating." The publishers say it is their desire in this little book to answer the questions that are often asked in their every-day business by intending purchasers of heating plants. The book, or rather the earlier part of it, is in the form of a catechism, in which all the usual questions are asked and answered in a simple, straighforward way. The rest of the pamphlet is given up to a comparison of the steam and hot-water heating systems, and at the end is a full description of the Palace King apparatus. In the circular letter accompanying these pamphlets Messrs. Wheeler & Son say: "We have not taken another fellow's catalogue and carefully read up the ratings of his boilers, and, because he said a square foot of grate surface would carry so much of radiation, said and catalogued that ours would do the same." They intimate that their ratings are low and founded on practical experience.

FOSKETT & BISHOP, New Haven, Conn., have been succeeded by the Foskett & Bishop Company, incorporated under the laws of the State of Connecticut. The amount of capital stock is given as $60,000, and is held by William A. Foskett, Noble P. Bishop, Ebenezer B. Beecher, Charles E. Rounds and James R. Bolton.

IN THE CITY OF SCHENECTADY, N. Y., there was recently built a new hospital in memory of John Ellis. The building is 60 feet square, made of brick with terra cotta trimmings, and three stories in hight. It is excellently arranged for hospital purposes, and much care has been given to the heating and sanitary arrangements, which work was done by J. V. Vrooman's Sons of Schenectady. The heat is furnished by a 35 horse-power horizontal tubular boiler, which is set in a pan of boiler iron to prevent any danger of water entering the ash pit. Ample provision is made for ventilating the wards by means of registers under the beds, connected with flues carrying the foul air to ventilating chimneys. In the top of the two ventilating chimneys are 30-inch exhaust fans run by electric motors set in the basement. The heating is done by the indirect method, the radiators being distributed about the cellar inclosed in galvanized iron boxes. The air flues are so arranged that fresh air can be brought into the wards without first passing through the radiators, or the supply can be made a mixture of cold and warmed air. In the main building the heating is by direct radiators set in the rooms and halls. The total surface is 34 direct radiators and 19 indirect radiators, with a heating surface of 2000 square feet. Much care has been given to the plumbing of the building, all the work being exposed so as to insure cleanliness. The plan followed was in conformity with the New York City plumbing regulations, and we understand that the new regulations adopted in Schenectady are largely based upon the plumbing rules of this city.

AMONG the prominent buildings in Chicago that have recently been provided with steam heating and power plants by the Theo. Jacobs Company, 72-74 Market street, Chicago, are: Lees Building, Fifth avenue, 12 stories; Security Building, Fifth avenue and Lake street, 14 stories; Ogden Building, Clark and Lake streets, eight stories; Unity Building, Dearborn street, 16 stories. Plants are being put in Wachusett Building, Van Buren and Dearborn streets, 17 stories; Old Colony Building, Dearborn and Van Buren streets, 17 stories; Park Gate Hotel, Stony Island avenue and Sixty-third street. Also in the following apartment buildings: Pruyn, Enders, Hyde, Hayden and many others.

GEO. D. HOFFMAN, 82 Lake street, Chicago, is to supply the steam-heating plants for the following buildings in Chicago: Two Hoffman locomotive boilers and 3500 feet of radiation for the six apartment houses of C. W. Pardridge, Forty sixth street and Lake avenue; for the Delaware Building, 1435-1439 Wabash avenue, two horizontal tubular boilers will be used to furnish steam for one 80 horse-power engine, one 40 horse power Weston automatic engine and 8500 feet of radiation; for the E. H. Stead Building on North Clark street one Bronson steel boiler and 1400 feet of radiation. The Perfection radiators, manufactured by the American Radiator Company, are to be used in the above buildings.

Justice Bremer of the United States Supreme Court, in an address delivered in Washington last week, expressed himself strongly in disapproval of discrimination against the Chinese while other races are privileged with the rights of citizenship.

PLUMBING AND GAS FITTING.

The New York Trade Schools.

The twelfth season of the New York Trade Schools will be brought to a close on Friday evening next, April 7, when the presentation of certificates to those students who have graduated during the term will take place. The closing exercises will be held in the new auditorium, at the school buildings, First avenue, between Sixty-seventh and Sixty-eighth streets, under the presidency of William E. Dodge, one of the board of trustees of the institution. The following is an outline of the programme that is proposed to be followed on the occasion, subject to possible change :

7 to 8 p.m.—Inspection of the work done by the classes during the past term.

8 p.m.—Address by Guy Culzin, president of the General Society of Mechanics and Tradesmen, New York.

Address by Henry G. Gabay, president of the Master Plumbers' Association.

Address by T. C. Johansmeyer, ex-president of the Master Painters and Decorators' Association.

Presentation of certificates.

Valedictory by Hamilton E. Claflin, of the day plumbing class.

Address by J. Stanley Thomas.

Address by the chairman, William E. Dodge.

There will probably also be other features of interest in the proceedings, and a large attendance of students and friends of the schools is anticipated.

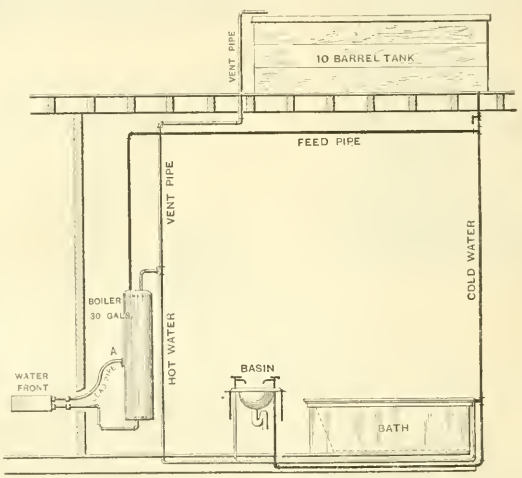
Great regret is felt that Colonel Anchmuty will not be able to be present at this gathering, having recently undergone a severe surgical operation, from which, we are happy to state, he is recovering satisfactorily, but it will be some weeks before he is able to undertake any very active work.

The past term of the New York Trade School is reported to have yielded excellent results. Greater interest than ever appears to have been evinced by the students in the various branches of instruction, and their progress in proficiency has been marked. Gratifying proof of the skill of the youths trained this season is about to be forwarded to Chicago in the shape of a striking exhibit for the World's Fair composed of specimens of work done by the students in the various classes. Unfortunately the limited space allotted to the schools precludes the sending of all the examples of work originally intended to be displayed ; but enough will be shown to demonstrate clearly the value of the work now being done in this admirable institution. The plumbing section of the exhibit embraces very excellent examples of the work of students in that class; and a worthy showing of the work of other trades, particularly of the carpenters' and blacksmiths', is made in the collection.

Vent Pipes Near Windows.

From T. M. R., *Illinois.*—Would it be considered in accordance with sanitary requirements to run a vent pipe from a water closet through the roof on the one-story part of a house, and have it terminate at the level of the second story windows in the second-story part of the dwelling?

Answer.—The New York plumbing code does not permit an opening from the house, soil and waste pipe system at a less distance from a window than 30 feet. In such a case as our correspondent mentions, under the rules of the Health Department, formerly in force, the vent pipe after passing through the roof in its enlarged caliber, was branched over to the rear wall of main building and carried up in the usual manner above the roof along with the soil pipe. Now, however, under the Building Department regulations, only one pipe is carried up, the vent pipe being branched into the soil pipe, above the highest fixture. The soil pipe, however, is carried to the main building, as it is bad and unsanitary practice to terminate a vertical line of soil or waste pipe above an extension roof and on a level with windows, either in the house or belonging to adjacent buildings.



A Noisy Range Boiler.

A Noisy Range Boiler.

From F. H. & N., *Dundee, N. Y.*—We address you for information in water-heating arrangement, as shown in the accompanying diagram. The trouble is that there is a rumbling and snapping at A in the return pipe from boiler to water front. We first had $\frac{3}{4}$-inch iron pipe where the 1-inch lead pipe now is. We think the 1-inch lead pipe helps the trouble a little, but still it rumbles and snaps continually. We have examined every pipe about the boiler and water front to see that none were screwed in too far. We would place the boiler further away from the range, but cannot do so, as there is no place to put it in.

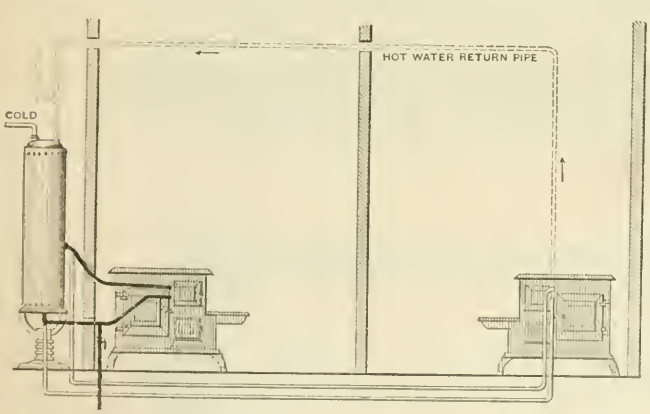
Note.—As our correspondents' sketch shows, there is apparently no trouble with the pipe. It would, however, be better for the cold-water pipe between the water front and boiler to run on an easy curve, instead of the sharp bend shown in the sketch. It is possible that this construction, due to the sharp bends, may retard the water sufficient to permit the formation of steam, and that being expelled from the water front and condensing as it meets the cold water leaving the boiler, gives rise to the rumbling and cracking noise complained of. We would suggest that while this may increase the trouble, not unlikely the real cause is due to the too large exposure of the water front to the fire. Our correspondents might try the experiment of cutting off some of the water back by means of fire brick placed in front of it. There would be no particular advantage in placing the boiler further away from the water front ; the only difference would be that there would be the chance of radiation from the connecting pipes, but this would not have any appreciable effect.

Change of Range Boiler Connections.

From T. V. L., *Holland, Mich.*—One of my customers has a kitchen boiler and stove, with heating coil, set up in the usual position, with flow and return pipes fixed in orthodox fashion. The boiler stands in bath room, which is separated from stove by a partition, but the water is heated and circulates satisfactorily. The owner, however, desires turning the room in which the stove stands to some other purpose, and contemplates moving the stove into another room 24 feet away from the range boiler. The difficulty is in providing for the hot-water circulation pipe, which it is suggested should be brought down from water back and carried, together with the cold-water supply pipe, under the floor for 24 feet, and then connected in the usual way at side opening in boiler. I do not think it will work satisfactorily ; but as the owner desires the job, of which I inclose a

sketch, done in that way, I would like an opinion from *The Metal Worker*.

Answer.—The sketch submitted by our correspondent, as indicating the proposed change, shows the pipes carried under the floor from boiler to stove and return. Such an arrangement would be defective, as regards the hot-water return pipe, which would be trapped, and would not work satisfactorily, while the cold water may be carried under the floor, as shown. The better plan, as regards the hot-water pipe, would be to carry it upward and across the intervening space along the ceiling, finally connecting it at top of boiler. By this means a proper circulation will be established, and no trapping of the hot-water pipe occurs, such as would be the case if run under the floor. The natural tendency of water when heated is to rise, and if this action is reversed, trouble, dissatisfaction and failure to accomplish the desired result will necessarily follow. The diagram which we herewith present gives an intelligent view of the situation. The solid lines show the present or existing method, the stove and boiler in close proximity to each other, and the flow and return pipes discharging their functions properly. The double lines illustrate the hot and cold water pipe arrangement, with the stove removed 24 feet from boiler, as desired by the owner of the building. The dotted lines show the direction which we suggest as the proper one for the hot-

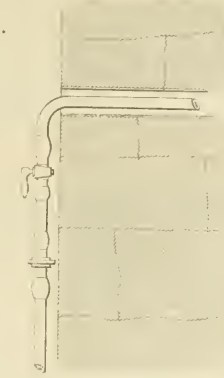


Change of Range Boiler Connections.

water pipe, viz., carried upward from water back and across the ceilings intervening, and connecting at top of boiler.

Thawing Frozen Street Mains.

From S. I. D., *Canada.*—I notice in your issue of February 18 an article on "Thawing Frozen Street Water Mains." Kindly allow me to make a few suggestions. In order to put on a tee, as shown in the article referred to, it will be necessary to wipe on two soldering nipples to provide threads for the attachment of the tee. This will bring the service pipe at least 6 inches from wall, which is not desirable. I think my plan is an improvement. First, cut off the lead pipe a few inches on the house side of the stop and waste and bend the lead pipe so as to give a straight entrance toward the main in street. We have a small boiler which we use in connection with our plumber's furnace to produce steam, which we admit through a coil of $\frac{1}{4}$-inch lead pipe through the spindle of the stop and waste, directly into the main toward the street. The pressure is still on the pipes behind the ice (in nine cases out of ten it can't be shut off on account of the curb-box cock



Thawing Frozen Street Mains.

being frozen also), and in a few minutes the ice plug will be melted and out comes the water. It is now an easy matter to pull out the $\frac{1}{4}$-inch lead pipe and close the stop cock, a good deal easier than it is to start a plug into a tee with the pressure on, when you have 60 or 80 pounds to the inch. If we now wipe on a brass union, as shown in the sketch, we have the thing in shape to thaw out again should occasion require it at any time.

The Chicago Master Plumbers.

The regular semi-monthly meeting of the Chicago Master Plumbers' Association was held at 206 La Salle street, Monday evening, March 27. There was a large attendance and a number of new members were admitted. It was decided to arrange for permanent quarters for the association at 197 East Madison street. A large room is to be secured, which will be connected with the two now occupied by the secretary. Alex. W. Murray, thus affording ample accommodations for the meetings of the association. One room is to be fitted up as a library and supplied with trade papers. Catalogues and circulars of all goods used in the plumbing business will be kept on file for the use of members, and some one will be in attendance to welcome those who may visit the rooms. This arrangement will be found very convenient for those members whose place of business is remote from the business center. If estimates are to be made from plans, they can be taken to the rooms, and by the aid of the catalogues at hand, and telephonic connection with the various plumbers' supply houses, prices readily obtained. The convenience to be derived from having access to the rooms will be of more value than the cost of membership in the association.

TRAPS AND VENTS.

A. J. LAWRENCE, formerly of Johnston & Lawrence, has reopened again in the plumbing and heating business at 211 Alder street, Portland, Ore. We understand that while the trade in that section of the country is quiet at present, there is every prospect of good business in the near future.

A NEW SANITARY WATER PIPE, named the Health, has, we are told, been placed on the market by an English firm. The pipe is formed of an outer casing of wrought iron with a core, or thin lining of pure block tin. It is claimed that as the action of water has no effect upon tin, the water passing through these pipes can have no trace of metallic taint. The pipe is made in all sizes from $\frac{3}{8}$ inch to 4 inches diameter, and in any desired lengths; and connections are made by screw-thread unions, also tin lined, which when screwed on the pipes to be joined, are said to give an unbroken and smooth internal core of tin.

STANDARD MFG. COMPANY, Pittsburgh, Pa., recently shipped by express a carload of enameled baths of special make and design for the Mormon Temple, Salt Lake City. The baths, we understand, are the largest they ever made and are constructed on a scale of great magnificence, the designs being made by Brigham Young's son and Elder Midgely, Salt Lake City. The Mormon Temple is described as a very gorgeous building, the lavatories being finished in onyx, and the baths shipped by the Standard Mfg. Company were made to correspond with their surroundings.

A DELEGATION of the Chicago Master Plumbers' Association, consisting of Daniel J. Rock, J. B. Breen and Alex. W. Murray, accompanied by Wm. T. Geary, vice-president of the State Association, paid a visit to Evanston on Thursday, March 23, to install the officers of the new North Shore Master Plumbers' Association. The visiting delegation was handsomely received and entertained at a banquet.

Tin-Plate Prices.

The fluctuations in prices of tin plates in England during the past 15 years are thus given by Bradley & Burch of London—I. C. cokes, at works, per box, being taken as standard:

Year	Highest	Lowest	Year	Highest	Lowest
1878	$4.00	$3.24	1886	$3.42	$3.00
1879	6.60	3.48	1887	3.60	3.06
1880	7.20	3.48	1888	3.72	3.06
1881	4.32	3.30	1889	3.96	3.30
1882	4.08	3.66	1890	4.20	3.18
1883	3.96	3.84	1891	4.20	3.00
1884	3.72	3.36	1892	3.60	2.82
1885	3.60	3.12			

The explosive character of fine dust made in some processes of manufacture, as in flouring and lumber mills, received another terrible illustration last week, when the flouring mills of Kohler Brothers at Litchfield, Ill., were blown to pieces and burnt, entailing a loss of $1,000,000.

Hot-Air Heating—I.

The following treatise on hot air heating is taken by special permission from the catalogue recently issued by the Excelsior Steel Furnace Company, 110 to 114 South Jefferson street, Chicago. The catalogue has been copyrighted by the company.

Almost all furnace makers give in their catalogues information of a general nature in regard to furnace practice, but as a rule this information is not explicit enough to be of value to the novice who is setting up furnaces, and who desires all the information obtainable, that he may excel in his work and commit no serious blunder. There are to-day in the country, and particularly in the great West, dealers who are deterred from handling furnaces, owing to their lack of knowledge of putting in the work, and who, we believe, will welcome the following treatise, giving, as it does, the results of practical experience in hot-air heating.

In hot-air heating the fundamental principle is that of passing over a heated surface a volume of air and distributing the same by means of pipes and registers to the various rooms to be heated.

The supply of air comes wholly or in part from without the building, and is conducted to the heater by means of a duct, the furnace or heater being located presumably in the basement, cellar or subcellar.

Heaters have been known to be set without any supply of air whatever, and on first-floor jobs have supplied heat to

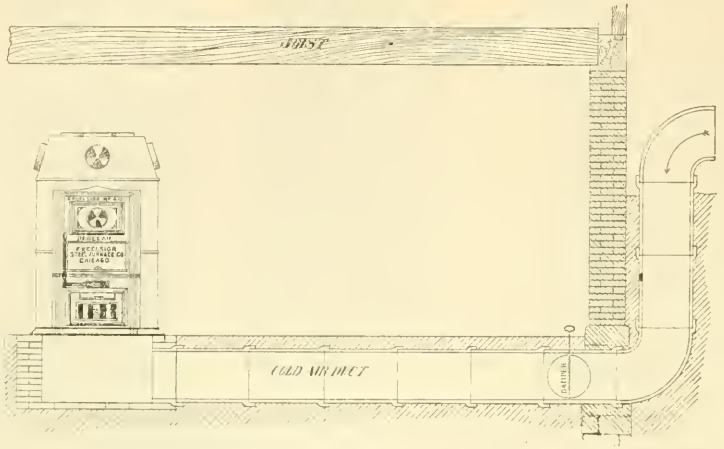


Fig. 1.—Section Showing Cold-Air Duct Running Under Basement Floor and Outside of Wall.

Fig 2.—Plan of Pit and Cold-Air Duct Shown in Previous Figure.

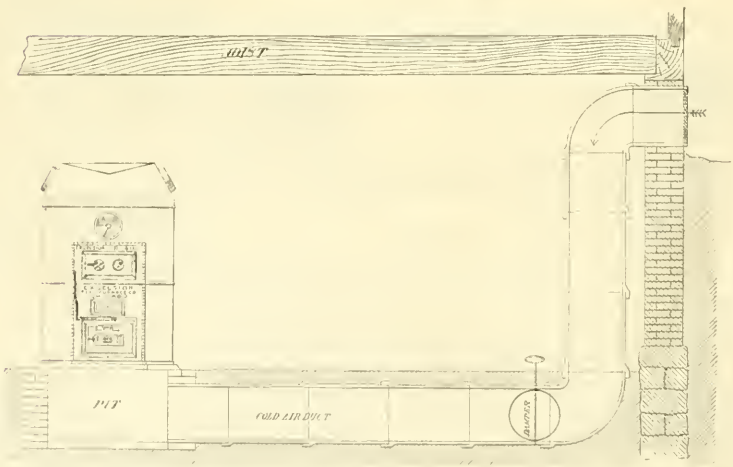


Fig. 3.—Showing Cold-Air Duct Run Inside of Cellar Wall.

the satisfaction of the owners, and, while this is in contravention of all furnace practice, the explanation is simple. The furnace, finding that it is deprived of an air supply, sets about to furnish one of its own, and after heating and expanding the air already surrounding it, within its own casing, proceeds to draw from some one of the pipes leading from it a supply of air. The air thus thrown off is no better than that in any room heated by stoves, and defeats the prime object for which a furnace is placed in a house, which is to provide a healthful heat. No house can be heated successfully without a supply of air to the furnace, and this the next problem is to decide upon the size and character of the cold-air duct which is to convey the air to the furnace to be heated. Inasmuch as the air to supply all the registers and pipes in the house is to come through the one duct, it is evident that the capacity of the duct must be equal to that of all of the hot-air pipes. This does not, however, mean that the area of the cold-air duct must be equal to that of all the hot-air pipes. That would be the case, provided the air without and within the furnace moved at the same pace and that there were no obstructions. The air within the furnace becomes rarefied and expanded, and in rising leaves a the area of the cold-air duct on the inside, which can be reduced to convenient form by the ordinary rules of division. At this point it might be stated that there is no danger of getting the duct too large, for every duct should have a damper for regulating the supply, and if found too large, the capacity can be reduced by turning this damper. Furthermore, if there are various turns and angles in the cold air duct, its size must be greater than set forth, for the progress and velocity of the air will be correspondingly retarded.

Having determined the size of the duct, the next thing is to determine the char-

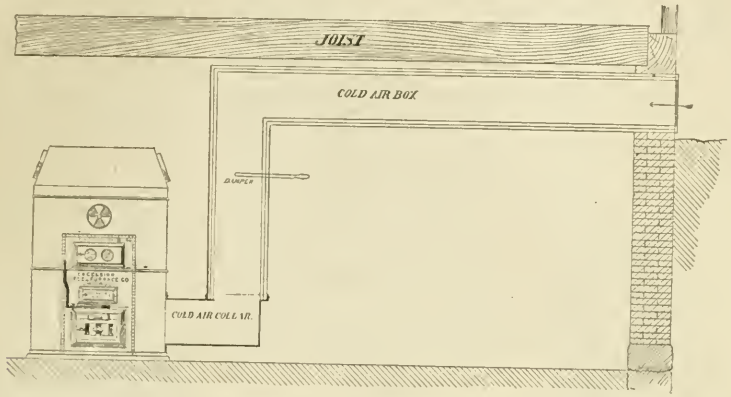


Fig. 4.—One Method of Arranging Wooden Air Duct.

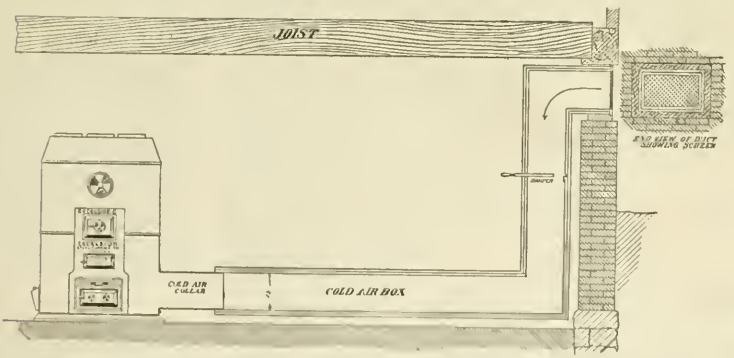


Fig. 5.—Still Another Method.

HOT-AIR HEATING.

supply may come from without or from within, or partly from both.

If only one cold-air supply is to be used, that should come from the outside. It should be taken from the direction from which the prevailing winds come. The reason for this is evident. If taken from the opposite direction when the wind is high, the supply of air from the furnace will be almost entirely or entirely cut off, and cases are on record where the counter current of air from the opposite direction was so strong that a stream of warm air was drawn out from the furnace. Also in sluggish days, when little air is in motion, the furnace needs often more air than it can get unless the wind assists in getting the air into the furnace.

Having determined the direction from which the outside cold air is to be taken, vacuum which the air from the duct makes haste to supply. The air in rising comes in contact with the various parts of the heater, also with the sides and turns of the hot-air pipes and the bars on the registers, and in its division into numerous parts is subjected to more or less friction, which retards its progress, and it is safe to estimate that the air in the duct, when properly built and located, travels 50 per cent. faster than does the air within the furnace pipes. On this assumption, we would say that the cold-air duct should be about two-thirds as great in area as the combined area of all of the hot-air pipes. To ascertain the area of all of the pipes is an easy matter. The square of half the diameter of the pipes multiplied by 3¼ will give the area of each pipe. The sum of the areas less one-third would be acter or construction. This depends upon circumstances. If the soil beneath the house and about it is of a gravelly nature, so that water does not stand around it, an underground cold-air duct of sewer pipe or tile is the best that can be used and can be run from a point without the house, alongside the wall, down to the basement floor level and then turned within the building with an elbow, and continued below the cellar or basement floor to the furnace pit, for in the event of using this form of cold air duct a furnace pit must be constructed of a depth equal to the diameter of the duct. The form and position of this sewer pipe or tile duct are shown in Figs. 1, 2 and 3.

The head or top of this duct should be covered with a wire screen or mesh, so as to prevent mice or vermin or vegetable

matter getting into the duct. If desired, this duct can be begun at a point in the wall near the ground and then turned down the inside of the cellar wall, as shown in Fig. 3, a second turn being necessary in order to change the direction of the duct toward the furnace pit.

The connection between the wall, as shown in this figure, and the underground duct can be made by means of a wooden duct of the same area and constructed of two thicknesses of matched flooring well seasoned and separated by a thickness of asbestos paper to prevent dust or air getting into it in case the boards should draw apart at some future time. The underground section of the duct can also be built rectangular in form and of brick plastered smooth on the inside. These are all variations of the underground duct. The air can also be taken in from all or part of a cellar window, and the connection made to the underground section as described.

If water stands on the soil about the premises, it is not advisable to use this form of a duct, nor should this kind of a duct be placed near to any sewerage pipe for fear that a leakage of the sewerage be absorbed by the duct.

The next form of cold-air duct that we would describe is one made of galvanized iron. This duct can be made either square or round and can be taken from the upper or lower sash of a cellar window or through an opening in the wall. It may take any direction in reaching the furnace, but the straighter the pipe the better. If taken from a sash or from an opening it is a good plan to make a flange to fit the sash or opening and start the duct from this flange, which should extend a foot or more from the opening. The duct can run straight along the ceiling to a point near the furnace, and then by means of an elbow turn down to the base of the furnace and enter the furnace casing by means of a cold-air collar, or, when there is a pit, can connect with a shoulder built out to receive the end of the duct. This form of a duct can be made either round or square.

In building a wood duct from the opening to the furnace, two thicknesses of matched flooring should be used, as before described, and asbestos paper put between. As regards to running of the wooden duct, the remarks concerning the galvanized duct will apply, the duct connecting with the furnace by means of the cold air collar referred to or a shoulder on the furnace pit. (See Figs. 4 and 5, for forms of wooden ducts.)

It is customary in some places, where the ceiling of cellar or basement is not plastered, to take a couple of joists and use them for a duct by inclosing the under side, and then connecting this duct with the furnace by a regularly constructed duct of wood or galvanized iron. The objection to this is the fact that the cold air comes in contact with the floor, and of course cools it, and if there are any openings in the floor the cold air has immediate access to the room. There are times and places when it is impossible to take the cold air from the part of the house from which the prevailing winds come, and in this case the duct should be made one-half larger than directed in the foregoing, and in addition it is advisable to construct within the basement or cellar a reservoir for holding a quantity of air. This can be done by making a compartment about 4 feet square from the floor to the ceiling with matched flooring and a thickness of asbestos paper between, connecting the compartment with the opening to admit the cold air at the top and taking the duct to the furnace from the bottom. This has the effect of making a storage for cold air, and will assist in supplying the furnace on windy days when the tendency would be to draw the air from the furnace.

In city-block houses courts are left between the wings and the cold-air supply is taken from these narrow spaces, and there is much difficulty in getting sufficient air for the furnace, and dealers putting in furnaces in houses so arranged should be chary in giving guarantees, for it is sometimes almost impossible to get enough air when these courts face south and east. When they face the north and west the difficulty is seldom met with.

In setting up furnaces dealers frequently put on the side of the furnace a cold-air slide, and this slide is used in extremely cold weather when the house owner does not choose to burn sufficient fuel to heat the house with cold air entirely, but this slide should not be open at the same time that the outside one is unless there is a shield to prevent the outside air from blowing through the furnace into the basement. Many people depend upon this cold-air slide to supply the furnace and have no outside cold-air supply. The same objection is raised as in case there is no duct or opening, for the air within the house is simply revolved about, and the circulation will be imperfect at the best unless the door leading to the cellar is left open all the time and other conditions are extremely favorable. People having only cold air slides say that if the air is felt to be heavy or impure they ventilate by opening a window in the cellar, but this cools the floors, and, while improving the quality of the air, is not a very satisfactory expedient. The circulation of the air is not materially helped by the opening of a window, for experience shows that to get a circulation an independent duct from the outside must be constructed.

INSIDE DUCT.

The foregoing remarks apply to the outside cold-air duct, and nothing has been said about the inside duct, which is a valuable adjunct to every furnace when used in connection with the outside duct. This inside duct may be built of wood or galvanized iron or of heavy tin and may run from a register placed in the hall or some other room direct to the base of the furnace and enter by means of a cold-air collar or shoulder, as in the case of the outside duct, or it may be teed into the outside duct. In either case care should be taken to prevent the air from blowing from the outside duct up through the inside one. The best place to take the inside cold air supply is from the hall near the vestibule. The reason for this will probably suggest itself. In the first place, the colder the air the heavier and the more readily will it be drawn into the furnace, and near the vestibule in the hall is the coldest place, for whenever the door is opened the cold rushes in at this point and the inside duct will obtain quite a supply in this way of air that is cold and pure. If the rooms open into one another and if the stairs are taken from the front hall the air in the entire house, by leaving the doors open, can be revolved through the inside duct, but if the stairs are inclosed, it is advisable to place a cold-air register in a hall on the second floor and run a pipe duct down through the partition to the basement and connect same to the inside duct from first floor.

The size of register for the inside duct should be equal in area to that of the outside duct, and the advantage in having this duct is that it can be used in connection with the outside one and save fuel, and at night when the lower floor is not being used the inside duct can be used to supply the air to the furnace, for the air not being rebreathed is reasonably pure.

Every cold-air duct whether outside or inside must have a damper for regulating the supply, for in windy weather there are times when it is impossible to heat all of the air that finds its way into the furnace. At night also, when the furnace is not running at its full capacity, the supply of air must be reduced, so it is important that a damper be placed in every duct. In the wooden duct the damper usually takes the form of a slide and in the galvanized and tile ducts it is of galvanized or black iron and round in shape to conform to the shape of the duct.

FOUNDATION.

In case an underground cold-air duct is used, there must be a pit for the furnace as well as a foundation, or rather the pit and foundation are united in one. The pit and foundation are easily constructed. A place is excavated equal in depth to the diameter of the underground duct and about 4 inches larger in diameter than the diameter of the furnace. This pit should be plastered smooth on the bottom with a good quality of cement mortar and the sides walled up to the proper level with good brick laid in this mortar and plastered smooth to prevent water getting in. In the center of a pit thus made it is well to build up a pier of brick about 12 inches square to support the chief weight of the furnace, for without such support furnaces have been known to break down, the rim not being strong enough to carry the weight of the heater and fuel. The depth of the pit should not be greater than the diameter of the underground duct, otherwise the stratum of air below the lower line of the duct will be found to be stagnant. (See plan of foundation in Fig. 2.) Often it is deemed desirable to have a pit even when there is no underground duct, and in such a case the furnace pit is constructed as set forth, but is built with a neck extending out a couple of feet beyond the circle and provided with a shoulder at the top to receive the end of the cold-air duct.

When no pit is required the furnace can stand on a foundation formed of two courses of brick plastered smooth on top. The brick need not be whole, as all that is necessary is a smooth and firm foundation, and bats can be used. In cities the common custom is to concrete the basement floor and then set the furnace on the concrete. This is a good plan and saves the trouble of building a special foundation, and gives the furnaceman some leeway in the location of the furnace. Another and commoner form of foundation in some sections is to build a plank flooring on which to rest the furnace, covering the plank with an iron floor covered with asbestos paper. This is no cheaper than a brick foundation and is not nearly so good, and is not recommended except where brick or stone for the foundation is not accessible.

LOCATION OF FURNACE.

Upon the location of the furnace the successful heating of the house often depends, and it is a matter that requires careful consideration. There are two general rules for locating a furnace which we will give and which in the main should be followed, either separately or together if possible. The first one is that the furnace should be located not in the exact center of the basement nor in the center of the space occupied by the registers, but at a point near the center and in the direction from which the prevailing winds come in winter time. The reason for this is, that air being a vapor, is affected by the winds, and when the wind is blowing strong in bitter weather the tendency is for the rooms on the further side of the house from the wind to be overheated, while those against the wind are poorly heated, the registers on the windward side delivering almost no hot air. Therefore, to counteract this tendency the furnace should be placed some few feet toward the windward side of the building. This rule in general should be followed in order to get a satisfactory heating of the entire house, but there are often in a house two or three rooms that are used for general or

family living rooms in which the greater part of the day is spent, and it is desirable to have these rooms heated even if some others are poorly heated, and in this case the furnace must be so set as to favor these rooms. Should a furnace dealer so set a furnace he should in advance notify the owner of the probable result and protect himself by declining to give an absolute guarantee of the job.

In many plans that are sent us from the country we notice that the bssement or cellar extends under but part of the house and in such cases is usually under the kitchen or dining room, and the furnace has to be located under the dining room, and in many of these houses it is apparent that the furnaceman has no choice in the matter of location, the condition of affairs dictating that the furnace be placed in one spot, even though that spot is not a good one. All that a dealer can do is to do his best and have the house owner understand that the furnace is at a disadvantage and cannot return him the best service of which it is capable. In such jobs the result usually is that the house owner finds a furnace a vast improvement over stove heat, but not entirely up to his anticipations, for he compares the heating of his house to that of his more fortunate friend who has an open basement entirely under his house and the furnace given an opportunity of displaying its accomplishments.

After deciding upon the location of the furnace the furnace setter takes note of the surrounding conditions, the hight of the basement where the furnace will stand, the presence of girders which will reduce that hight, the nearness of partitions that must be considered in running his pipes, and the location of piers, columns or chimneys that impede his operations. He will never find an ideal basement and occasionally will find a basement so full of obstructions that the ordinary rules of locating a heater and running the connections have to be ignored if any satisfactory results are to be obtained, but such cases are rare.

Generally speaking, a furnace ought to stand in a position answering to that outlined in the foregoing, and that part of the basement or cellar where it stands should be at least 7 feet high. If the basement is not that high it should be excavated so as to get that hight, but if the conditions will not admit of excavating, then the basement must be taken as it is and the best work done that the circumstances will admit. If the basement is high the pipes leading from the furnace can be taken off from the top of the heater, but if low the pipes must come from the side of the bonnet. The higher the basement the better, for the greater the elevation of the pipes the greater the velocity of air in them and the smaller the loss of heat by radiation. The cellars of houses when low are at times better heated than the floors above, due largely to the fact that the pipes have very little inclination and lose a goodly share of their heat by radiation. This can be avoided to a certain extent by wrapping the pipes with asbestos paper, but the loss by radiation will still exist to a greater or less extent.

With the location determined and the foundation built, the setting of the furnace is next in order. It is presupposed that the furnace is of good construction and large enough to do the required work, and that ample instructions for setting the furnace have been sent with the furnace, so the only matter to be considered is the way the furnace fronts. The front part of every heater radiates little heat, as that part is taken up to a large degree with the doors and connecting parts, leaving little effective radiating surface, so reason will dictate that the furnace be so placed that the majority of the pipes will be taken from the rear and sides of the heater and that few or no pipes be taken from the part over the front. If the cold air is introduced by means of a cold collar, the collar should be at the back of the furnace, or if at the side, as near the back of the furnace as is possible.

In setting up the furnace each joint should be carefully cemented on so as to render as small as possible the liability of leakage of gas. Most manufacturers send with their furnaces an ample supply of either cement, fire clay or sand for the different joints, but if through neglect these goods failed to come with the furnace they must be supplied. Some joints are better supplied with sand and some with asbestos cement, but as a rule the cement is to be recommended. The article should be the best and used liberally.

The casings sent with furnaces are generally double, or if not double, supplied with a lining of corrugated tin or asbestos paper. If double lining is used sufficient allowance should have been made by the maker for the passage of air between the two. The common flat top bonnet in common use is suitable for general work when the pipes are taken off from the top, but care should be taken to have the bonnet high enough to allow the air to pass freely into the pipes. There should be fully 6 inches of clear space above the radiator of the furnace and the bonnet and if this cannot be had and the pipes be taken from the top of the furnace then another style of bonnet should be used and the pipes taken off from the side of the heater.

Not a little of the success of a job depends upon the form of bonnet used. It will be noticed that some are made with a concavity so that the air is deflected toward the sides and thus given a greater velocity. Also some are made with a 75° pitch, to be used when the basement is somewhat low and others with a 60° pitch to be used when the basement is higher.

Collars are also taken out of the side of the straight bonnet, and this practice is all right when the circumstances demand it, but it is usually better to use the pitch bonnet for side collars.

After putting on the proper bonnet, nothing remains but to cut in the collars and run the connections. It is presumed that the upstairs work has been done, and that the collars are in all boots and boxes so the operation of running the connections would be in this manner:

Take the required number of casing collars of the proper size and style and place them on top of the bonnet, taking care, of course, to place each collar of the right size as nearly in a line as possible with the collar on the boot or box with which it is to be connected. A knowledge of the rooms above will tell you whether any particular room is to be favored, and, if so, in placing this collar place it where it will get more heat than some of the others. This can be done if the collars are taken from the top by placing the collar well in toward the center of the bonnet, while the others you can place near the edge—that is, within 2 or 3 inches of the edge. Having arranged the collars on top of the bonnet, provided the hight will admit, and in their order they can be cut in.

The turn from the hot-air pipe into the register box collar or boot collar is made with a regular square elbow and the elbow should be wired the same as the sections of the hot air pipe.

If the stacks, boots and boot collars, registers, boxes and box collars are already in, the furnace dealer has to make his connections irrespective of whether or not they are of the proper size and properly put in, and though the work of putting in the heater is rightly and carefully done and the basement work is of sufficient capacity, if the work above the basement is not put in properly good results cannot be hoped for. Therefore, it is of importance to consider the way this work should be done, so we will take a glance at the upstairs.

(To be continued.)

Hot-Water Fountains in Paris.

Le Génie Civil, a French engineering journal, describes a novelty in the line of public conveniences which has recently been inaugurated in the city of Paris. The object consists in a device for supplying hot water to the public from street fountains at the minimum of cost. The fountains, of which 20 have already been erected in different quarters of the city, are similar in appearance to the newspaper kiosks so familiar to visitors in the French capital. The hot water is delivered automatically upon the insertion into a slot of a small coin in value corresponding to an American cent, pressing at the same time a button, which sets in motion the mechanism contained in the fountain. The invention is due to a Monsieur Robin, who has brought it to perfection after years of work in similar lines of effort—namely, the utilization of gas for heating purposes.

The water is heated on the spot by an ingenious system, which may be briefly described as follows: A syphon at the base of the column containing the fountain is in communication with the city water supply. On a piece of money being placed in the slot and the button being pressed, a simultaneous motion is given to the various portions of the mechanism. The cold water flows into a receptacle, from whence it is drawn up into a spiral heater, with many coils, formed of 125 feet of copper tubing, placed at the corner of the fountain. The heater forms two separate parts, each heated by a gas burner made with a number of small holes, from which the gas escapes and is lighted by a small central burner, always kept aflame. The heating burners are only lighted long enough for heating the water, the gas for their use coming from the meter only while the water is flowing through the coils of the heater, and then being automatically cut off until again liberated by a fresh start of the mechanism. The heaters, presenting a very large heating surface in their numerous coils, quickly bring the water up to a temperature of 140° to 175° F. After circulating through the heater the liquid flows into a pipe discharging into the vessel placed to receive it under the spout of the fountain. About 10 quarts of hot water are heated each time, and but a few moments are required for the process.

In giving their permission for the erection of the fountains, the Municipality of Paris stipulated that they should be erected near the back stands, in order that the cabmen should be able to fill their heaters readily with hot water, in place of using the dangerous charcoal fuel, which has caused so many accidents in Parisian vehicles. This is one use to which the hot water is put. There are numerous other purposes for which the fountains will furnish a welcome supply of hot water to the poorer classes for domestic use, cooking, supplying hot baths, &c., in quarters where kitchen conveniences are not abundant. In numerous ways a ready supply of hot water for a cent will be a great boon, and should make for cleanliness and sanitary improvements, especially in the crowded slums and alleys of the city, where such improvement is most needed. The innovation seems to recommend itself as a useful and practical boon, and appears to be one which could with advantage be adopted in other cities, provided the initial cost of the fountains be not excessive.

ROOFING AND CORNICE.

Combination Scraper and Tin Cutter.

From W. N., *New York.*—For the benefit of tin roofers, who have more or less repairing to do, I submit a sketch of what I think is a new tool—namely, a scraper and a tin cutter combined in one. When repairing tin or galvanized iron roofs, after the defective sheets have been found, it is usual to use a chisel and hammer and cut out the defective spots, and then use a scraper with which to scrape a smooth, bright surface on the old tin or iron, so that a joint can be made with the new metal.

Or a case may arise where an old tin roof is being ripped up to make place for a new roof. Before cutting, the old tin roof. In practice the tool is grasped near the end B with the left hand, and taking in the right hand an old mallet, which has already done its duty in pounding down locked seams in tin roofing, the blows are struck as indicated in Fig. 6, moving and striking the cutter alternately.

Fig. 7 also shows a section through a tin roof with the scraper in position for use. In using the scraper, the end A, Fig. 7, is raised as shown, and, taking the scraper in both hands, a downward pressure is exerted, at the same time drawing the scraper backward and forward until a smooth, bright surface is obtained.

Gas-Tar Roof Paint.

From BRUSH.—The gas-tar roof painters are abroad in the land, and at present are painter was receiving all the credit, I stopped doing his work, but he continued in the same course, going from one tinner to another to get his work done, while he and his paint received the credit for tight roofs. Will the readers of *The Metal Worker* give their opinions regarding the use of gas tar as a paint for metal roofs?

Note.—The general opinion among roofers is that gas tar is injurious, as the acid or other corrosive principles in the tar causes tin or iron to rust.

Double-Locked Seams.

From A. B., *Portsmouth, Ohio.*—Inclosed you will find a sample of two pieces of valley tin joined together by a double-

Fig. 1.—Slow Method of Cutting a Tin Roof.

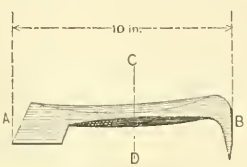


Fig. 2.—Side View of Combination Scraper and Tin Cutter.

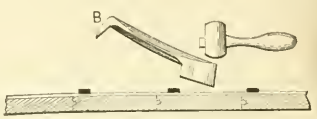


Fig. 6.—Section through Tin Roof Showing Cutter in Use.

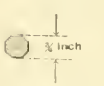


Fig. 3.—Section through C D.

Fig. 4.—End View of Cutter at A.

Fig. 5.—End View of Scraper at B.

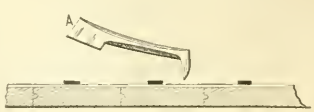


Fig. 7.—Section through Tin Roof Showing Scraper in Position for Use.

COMBINATION SCRAPER AND TIN CUTTER.

roof is usually divided into sections, cut and measured, rolled up and tied and the size and number of square feet in each roll marked on the outside, so that in case a piece is wanted of a given size, it will not be necessary to open the roll again for measurement. If defective sheets, or an old tin roof, were to be cut out, using the hammer and chisel shown in Fig. 1, a great amount of time and labor would be lost. To avoid this, and have the scraper and cutter combined in one, there is shown in Fig. 2 a side view of a combination tool for the purpose. The cutter shown at A is used to cut out the old sheets, and the scraper shown at B is used to obtain a bright surface on the old metal. The scraper is made from ¾-inch octagon steel, and, as shown in Fig. 2, should be 10 inches long when finished.

Any blacksmith or tool maker can make the scraper to order, Fig. 2 giving a good idea of how the tool should look when finished. Fig. 3 shows a section at the line C D shown in Fig. 2; Fig. 4, the end view of the cutter shown at A, and Fig. 5 the end view of the scraper, shown at B. Fig. 6 is a section through a tin roof with the cutter in position when for use.

It will be noticed that the end B is raised so that the point of the cutter touches the painting our town black with the injurious substance, thus doing an injury to those mechanics who endeavor to do good work. The gas-tar painters call on the real-estate agents or owners of buildings and make outrageous statements, claiming the material to be water proof, fire proof and weather proof generally, calling the article by various names, as plastic slate, graphite paint, &c. From what I have learned regarding their operations, they go to the gas works and buy gas tar, which they mix with gasoline, and apply this composition to roofs, charging from 50 to 75 cents per square. Then they promise to make leaky roofs tight by the use of this thin paint. I have been working for one of these roof painters who has taken contracts to paint and repair roofs. When he first commenced operations in town he put clay on the cracks and holes in roofs and gutters. Finding this material would not hold, he engaged me to do the repairing with solder; thus he and his material received the credit for making the roof tight. As he would represent to the owners or agents of buildings that his paint was what prevented the roof from leaking, no extra charge was made for repairs, consequently my bill was a dead loss to him. Observing that the coal-tar locked seam. I use this style of seam for all valley tin, also for gutters, &c. It is not necessary to solder the seams. I have found that they are tight, and will not leak when used for this class of work. What is your opinion of this style of seam, as the sample shows?

Note.—The sample sent us by our correspondent shows two pieces of tin joined together by a double locked seam. This seam is stronger and possesses other advantages which would recommend it to roofers in preference to the common single-lock cross seam for some kinds of work. Although by no means a novelty, it is not used as much throughout the country by roofers generally as its merits deserve.

Measuring Standing Seam Roofs.

From R., *Rhinebeck, N. Y.*—Is it customary for tin roofers to measure in the standing seams when taking a contract for a standing seam tin roof by the square?

Note.—A custom that prevails in one part of the country may not in another; accordingly, it would be difficult to give a

fixed rule for the measurement of standing seam tin roofs. We think it is the general custom, however, not to measure in the standing seams when estimating on roofing by the square. As this is an interesting subject to roofers, we invite our readers to express their opinions and tell what custom prevails in each locality.

Roofing Slate.

In an article contributed by George H. Harris to a recent issue of *Stone* on the subject of Slate and Slate Quarrying, interesting reference is made to the manufacture of roofing slate. He states that a block is raised from the quarry and placed in close proximity to the building occupied by the slate makers. The block is then either sawed across the grain or broken by one of the slate makers, so that a certain sized slate may be made from it. It is then split into pieces 2 inches thick, and the slabs pass to the second slate maker, who cleaves them as thin as the quality of the slate will permit. We quote from the description as follows:

A hundred slate set upon edge and packed closely together should occupy 22 inches in space. Where the cleavage is imperfect the slate makers do not obtain more than three or four slates to the inch. A slate trimmer, which cuts the slate into regular sizes, is indispensable, and is always found in every slate maker's building. In cleaving slate down to the proper thickness there may be a blind seam or some obstacle which breaks the slate. This piece is cut with the slate trimmer into a smaller-sided plate. For instance, the block is first designed to make 24 x 12. Defects may occur so that they may get a few 24 x 12, or a few 20 x 12. The sizes of slate vary from 12 x 6 to 24 x 18 The most salable sizes commence at 20 x 10 and run to 24 x 18. Allowing 3 inches lap, when laid, there are 533 pieces in a square of slate which measures 12 x 6 inches. In 24 x 18 there are 76 slates to the square. A square of Vermont slate will weigh about 600 pounds. In order to furnish a yard so that there is a sufficient number of slate on hand to make sales from it will be necessary to have at least 100 different sizes of slate, and a carload is 50 squares of each size. At W. H. Lloyd's quarry, near Fairhaven, Vt., which is devoted exclusively to purple roofing slate, a gang of three men will make 15 squares of slate per day. The crushing strain of Vermont slate, which has been tested by F. R. Hutton, M. E., of New York, shows the resistance to be 12,870 pounds to the square inch. The durability of Vermont slate cannot be determined, from the fact that the first slate, which were quarried 46 years ago, and the first buildings which were slated from these slates, about the same time, are in as good condition to-day as they were the day they were first placed upon the roof, with the exception of an occasional breakage.

There are slate quarries devoted to roofing slate entirely, while there are other producers who manufacture mill stock and also roofing slate.

Many firms throughout the slate belt, having become well satisfied in regard to the superiority of the Vermont slate, are willing to place their goods in competition with any foreign article of a similar nature. Foreign demand for colored slates has gradually increased within the past four or five years, so that at the present time this branch of the slate industry has become a matter of considerable importance.

Since the "tide in the affairs of men" has changed, it may be proper to mention the first slate quarries developed in the Vermont and New York slate bed, and at a time when the people of New England were entirely dependent upon foreign markets for slate. It has been stated that the first quarrying in Vermont was done by Col. Alanson Allen of Fairhaven, in 1839. In 1847 Mr. Allen commenced the manufacture of roofing slates. In 1848 F. W. Whitlock of Castleton, Vt., opened a quarry in that town about forty rods north of the north line of Poultney, and in the vicinity of a quarry opened afterward and called the Eagle quarry. In 1851 Daniel and S. E. Hooker opened the first quarry in the town of Poultney, Vt. In 1852 John Humphray opened the Eagle quarry, near Hydeville, Vt., and E. D Jones opened a quarry in the same vicinity. In 1853 the Eagle Company were incorporated and commenced the manufacture of roofing slate under the superintendence of Dr. Goldsmith. W. L. Farnham & Son opened a quarry in 1853, and in 1860 Mr. Griffith Hughes opened the "Evergreen," previously mentioned. The year 1860 seemed to be prolific in opening and developing quarries. Six were opened in that year. The increase was slow—about three or four new quarries being added to the list every year up to 1872—when there appeared to be a decided change, and quite a number of new quarries were included in the list that year. The product of the slate quarries amounted to but very little previous to this time, on account of the slow methods of quarrying. But very few if any of the modern mechanical appliances were in use at that time.

The pioneer who commenced active operations in developing slate quarries 40 or 50 years ago is worthy of a great deal of credit for his foresight, his indomitable will, sagacity and perseverance, and yet it must be admitted that the prosperity of the slate industry has been developed within the past 20 years. The demand for slate makers and quarrymen from the old country or from Wales appears to be greatly in excess of the supply. A slate maker in Wales receives about $1 per day wages, while the laborer performing the same labor in this country gets $2 for the same time. A family which consists of a man and his wife and five children arrived in this country last fall. The husband and two boys were given work at the Eureka quarry. The first month's labor revealed the fact that the second boy, who was only 10 or 11 years of age, had earned more as a signal boy in this country than his father had earned in the same time as quarryman in Wales. The father, in the meantime, had more than trebled the wages he had received in Wales.

The importance of the slate industry and the magnitude of its trade is demonstrated in the large number of orders that are being received from foreign markets. The export trade has nearly doubled in the past two or three years.

The annual output of roofing slate throughout the slate belt of Vermont is between three and four hundred thousand squares. Vermont produces a greater variety of colored slates than any other State, while the output of her milled stock is larger than that of any other State.

FLASHINGS.

THE GROWTH of the iron roofing industry has been very marked in recent years, for, whereas a decade since there were not over a dozen iron-roofing concerns in the country, there are now hundreds. This rapid increase is ascribed to the excellence and cheapness of iron for building material and its lasting and fire proof qualities. Corrugated iron for roofing and siding of buildings has been used to some extent for the last 50 years, but in the early days the excellent quality of shingles used and their comparative cheapness necessarily limited the use of iron. To day, however, iron and steel are very commonly employed in building construction. Many persons who have not previously used corrugated iron are in doubt as to its durability and as to whether it is adapted to their particular needs. Such persons are likely to find intereat in a little pamphlet entitled, "The Life of an Iron Roof, or, How Long Will It Last," issued by the Cincinnati Corrugating Company, P. O. box Q. Piqua, Ohio. This book, which the company are sending free to applicants, gives full information to those contemplating the use of iron or steel for building purposes.

E. J. JOHNSON & Co. of 38 Park Row, New York City, have engaged as traveling salesman Wm. Davis, who will solicit trade in the State of Ohio. This concern are now large shippers of all grades of roofing slate.

M. H. DEVEY of Chester, Pa., has patented a roofing cement, which he claims to possess many advantageous qualities. It is made from formulas covering glass, slag, slate and marble mixed or compounded with linseed oil and other materials. He states that it is undisturbed by the greatest alternations of heat, frost or thaw, and is as well adapted for a complete roof as for repairs. It is put up in 2 pound cans.

R. B WHITTEMORE, secretary of the American Roofing Company, St. Louis and Cincinnati, will shortly leave for an extended trip in the interest of his company. Among the points he will make are the principal Texas jobbing centers, through New Mexico and Arizona and Southern California; then north to San Francisco, Portland, Tacoma, Seattle and Spokane; thence east, stopping at Salt Lake, Denver, Kansas City, &c. The American Roofing Company have built up an extensive trade in the sections above enumerated, and advise us that their business on the Coast is steadily increasing.

WE HAVE RECEIVED from the Kansas City Metal Roofing & Corrugating Company, successors to Jerome Twichell & Co., Kansas City, Mo., a sample of the sheeting which they are furnishing the trade. This sheeting is claimed to be water proof, clean to handle and obnoxious to mice and vermin of every description. It is made 3 feet in width and put up in rolls of 500 square feet. It is referred to as being warm in winter, cool in summer and healthful all the year.

THE HEBERLING METAL ROOFING COMPANY of Havana, Ill., issue a four-page circular relating to their Quick-Laid and Matchless brands of iron, steel and American tin roofings. Illustrations are presented showing how the seams are made and the manner of applying the roof to a building. Descriptive particulars also tell how the work is done. Attention is invited to steel brick siding, iron weatherboard siding, beaded and panel ceilings, and also to the company's steel paint.

THE ANNOUNCEMENT is made to the trade that the firm of Holmes & Whitney, West Superior, Wis., are dissolved. In order to meet the requirements of the largely increased business of the I X L Cornice Works and provide additional capital and facilities for the prompt execution of contracts, a copartnership has been formed between A. E. Holmes of the former firm of Holmes & Whitney and J. E Lecour, formerly of the firm of Burdick & Lecour, the new firm to be known under the name of Holmes & Lecour. It is the intention of the new firm to conduct a general cornice, skylight and roofing business. They also mention that they have secured the exclusive agency for the hot-air furnaces and heaters manufactured by the Superior Furnace Company of New York, and will make a special feature of heating and ventilation.

"The Metal Worker" Competition in Skylight Pattern Cutting.

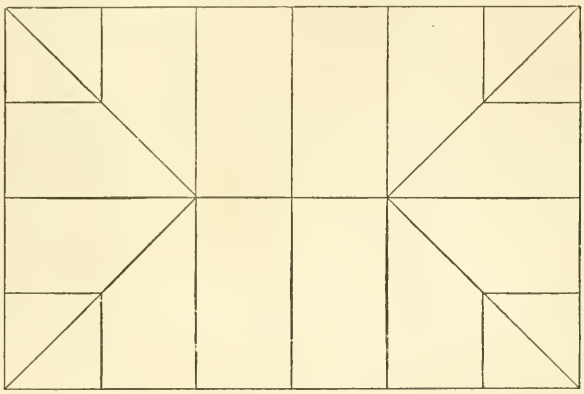
FOR the purpose of calling forth from the readers of *The Metal Worker* the best method for obtaining the patterns of a hipped sheet-metal skylight and to advance the art of pattern cutting, it has been decided to present a prize competition, the particulars of which are as follows :

Each contestant will be required to furnish the plans, elevations, necessary sections and profiles of skylight, also to design the various parts of same, giving to each part the shape that may be considered best adapted for the purpose ; drawings to be of such size as required for publication in *The Metal Worker*.

The skylight to be so constructed that the condensed moisture from below will be conveyed outside, the frame work of skylight to be made of sheet metal, and the usual thick glass to be used in connection with same ; the method of securing glass and caps to bars or rafters to be clearly shown.

While the plan may show a certain size of skylight, indicate the method by which one of similar pitch but different size can be constructed, the same miter patterns being used.

Show method of obtaining length of the various bars or rafters, using for the purpose any diagram, plan or elevation that may be necessary. Also show method of obtaining shape or section of hip bars.



Outline Plan of Skylight.

The skylight for which the patterns are required is such as would be placed over a light shaft, or on a roof or bulkhead, the size of opening being about 4 x 6 feet. As there is no particular rule governing the pitch of the skylight, it can be given such pitch as may be desired. While the wooden curb or frame of air shaft, roof or bulkhead is supposed to extend a sufficient distance above the roof to give ample opportunity for securing skylight to same, contestants will be at liberty to use such methods as appear best adapted for the purpose of fastening skylight, where brick and angle iron constitutes the frame.

The accompanying plan is not intended to give details of construction, but to indicate in a general way the shape of skylight for which drawings and patterns are required. Where there are two or more similar parts in the skylight, so that the pattern for one part will answer for the other, it will be only necessary to show details of one part. As indicated in plan, the skylight is to have a hipped roof, and as previously stated, the roof can be given any desire pitch.

PRIZES.

In the contest above described, two cash prizes are offered, as follows :

First prize.....$75.00.
Second prize..... 50.00.

The drawings and accompanying description may be sent by either mail or express, charges prepaid, and must reach the office of *The Metal Worker* not later than April 1, 1893.

They are to be addressed as follows :

THE METAL WORKER,
96–102 Reade street, New York.
(Skylight Competition.)

Each contestant is to select a fictitious name or device, which is to be placed on the description and each sheet of the drawings. The real name and address of the writer is to be put in a sealed envelope, on which is to be placed the fictitious name or device used on the drawings. This envelope is to be inclosed with the drawings and description.

The manuscript and drawings are to be sent flat, not rolled, and the writing should be on one side of the paper only. It is also suggested that legal cap paper be used for the description, the same size of paper for the drawings, and that ink be used for writing the descriptions ; the drawings to be either ink or pencil.

The various drawings and descriptions received up to the time set for closing the competition will be submitted to a committee selected for the purpose, who will decide between competitors.

In deciding between contestants, four points will be given consideration, as follows :

1. Originality.
2. Mechanical completeness of the method proposed.
3. Neatness of drawings submitted.
4. Clearness in description.

The right is reserved to publish all the drawings and descriptions received in this competition, and also to return to the authors the drawings and descriptions received in the competition in case they are not considered suitable for publication or worthy of an award of prizes.

THE RETAIL STORE.

Stove and Tin Store.—IV.

BY VETERAN.

The dull season is what dealers dread, particularly those who are not prepared by abundant capital to stand the loss that often follows long seasons of depression as well as the regular and expected dullness of others. When the question comes up whether it pays to make tinware, the answer depends upon what else could be done if it was not made. Good workmen can usually command steady employment and it would be better to have them make tinware than do nothing but kill time, as they will rather than get laid off, or for the employer to lose their work. A good IX tin wash boiler has from 75 to 80 cents worth of stock in it, and a man can make ten in a day. They sell at retail for $1.50. Some are sold as low as 90 cents at wholesale that are called IX tin, but they are in no respect equal to a good workman's job. They are coke tin and are not fit to sell for a good boiler. Extra heavy tinware shows still larger margins for the work, and in all leading articles can be made in the shop if the workman has the spirit of enterprise in him and does not think it too great a tax on his mental faculties.

A good workman will study his employer's interests and show a willingness to do what he can to help out in the dull season. Such a man will go from an outdoor job to making tinware and not pretend that they are two different classes of work in which he cannot do both well. I do not think this applies to all small or very fine work, like tea and coffee pots; but there was a time when these were made in regular jobbing shops, and made well and in fancy styles. In large factories of pieced tinware there are not many machines used except the regular set, but they are used lively and kept in good order. Most of what the wholesale dealer makes on it is saved by cheap labor and purchasing material in large quantities. To offset against that, the retail dealer has no extra office or shop expense, no traveling men to pay, and can often work in his own labor.

The dull season can also be bridged over by special effort to obtain a share in the furnace work, which is often done when the stove and tin work is at a standstill. July and August are good seasons for furnaces, and also for conductor pipe—or "leader," as the country boys will call it. There is a good deal of talk of the superiority of patent conductors, but I took one down lately that had been up but four years, completely rusted out, and replaced it by a plain pipe of heavier material. Within a few days I also took down a 3-inch tin conductor, hand made, and well made of IX tin, that had been up 17 years. The owner insisted on its being of the same material, and I soldered the seams and painted it inside and out—the inside by placing one end in a pail and on a slight incline, pouring the paint into the upper end and turning it around as it went down.

When I hear a tinsmith who is not driven with work all the time say he can buy his tinware pipe and stove trimmings cheaper than he can make them, I hear other things about him also. Usually he had rather take life easy and tell stories than work. I have no intention or desire to cry down the large manufacturers; they are a necessity to the business and set an example of skill and enterprise that gives points to any workman. While many are flooding the country with worthless goods, the buyer is to be blamed for it alone. When a man attends to his business faithfully during the busy seasons and pays his bills at maturity, he can't employ a portion of the dull season any better than in taking a rest and bracing up for the fall trade. Valuable inventions have often come through resting the body and allowing the mind and eyes to do fine work.

T. P. CARRUTH, Orange, Mass., who was completely burned out about a year ago and since then has carried on business in temporary quarters, has re-located in a handsome new building, where he has a store of convenient size and arrangement, which was opened to the public with dedicatory ceremonies March 16.

The American Gas Range.

The illustration presented herewith shows a new gas range brought out for the season of 1893 by Robert Schueler & Co., 615 Ogden avenue, Chicago. This range, with water heater, has six cooking holes, making a very large top cooking surface The water heater, placed at the left side of the range, as shown in the cut, contains a coil of six pieces of ¾-inch heavy wrought-iron pipe, under which are placed two long burners, which distribute the heat evenly over the entire surface of the coil, thus raising the temperature of the water very quickly. The manufacturers thus describe the general construction:

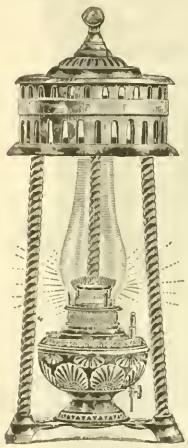
American Gas Range.

The body of the range is made of cold rolled heavy refined steel, with cast-iron front, top and doors. Doors, name plate and trimmings are heavily nickel plated. The oven is heated by double radiating burners placed underneath a sheet of steel ½ inch from the oven bottom. In this way the flame from the burner never comes in direct contact with the oven bottom. The flues are so arranged that the heat passes up both sides over the top and down the back, escaping at the flue in back. Every square inch of the oven surface is thus exposed to the action of the heat. It is obvious that under this arrangement the fumes from the burning gas do not come in contact with the contents of the oven. The range has large, powerful burners of the latest design, having no

loose caps to cause leakage of gas. An automatically hinged drop door forms a strong and convenient shelf when open, the desirable features of which will be readily appreciated by all housekeepers. The hight of the range is 33 inches. The top cooking surface is 25 x 34 inches, with 6 and 7½ inch holes. The oven is 17½ x 18 inches and 12 inches high. The broiler is 17½ x 19 inches and 8 inches high.

Edwards Parlor Lamp Stove.

In the accompanying illustration is presented a general view of what is known as the Edwards Parlor Lamp Stove, which is being placed upon the market by the Edwards Parlor Lamp Stove Company, of 238 East Lake street, Chicago, Ill. The manufacturers claim for this device that it is so constructed that it may be used for both heating and cooking purposes. It is 34 inches high, 13 inches in diameter and is finished in nickel plate, highly polished. The lamp may be used independently either as a hanging or standing lamp for lighting purposes, the makers claiming that it gives a light of 300 candle power. The illustration which we present herewith shows the device as used for heating purposes, the air in the room passing through the tubes into the

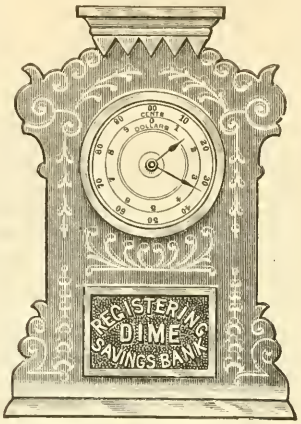


Edwards' Parlor Lamp Stove.

radiator, where it is raised to a high temperature, and then escapes to the room, thus maintaining, it is claimed, a constant circulation. By removing the two covers the heating stove may be turned into a cook stove, and the makers claim that it operates without any disagreeable odor, smoke or soot. The device is simple, entirely new, and is offered the trade in a variety of styles, adapted for burning either oil or gas. By removing the lamp from the footpiece and placing it on top of the radiator, the heating and cooking stove is changed into an ornamental parlor lamp.

Clock-Registering Savings Bank.

T. G. Ellsworth, 85 Chambers and 67 Reade streets, New York, agent for A. H. Walker, Brooklyn, N. Y., is introducing the dime clock bank, as herewith shown. The minute hand registers the cents and the hour hand the dollars that are in the bank at any time. The operation of the bank is described as follows: The bank is automatic in its operation; the first dime that is put in locks the bank and registers 10 cents. Each subsequent dime deposited is indicated upon the clock dial, and the one hundredth dime deposited unlocks the clock so that the door may be opened and the $10 taken out. The clock is finished

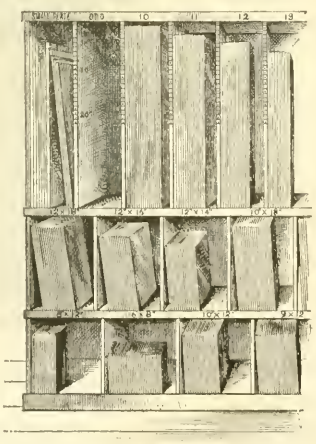


Clock-Registering Savings Bank.

in three colors of bronze and presents an attractive appearance.

Glass Rack.

We are indebted to the Hawks Hardware Company, Goshen, Ind., for a sketch of the Glass rack shown, which is referred



Glass Rack.

to by them as very convenient. A feature of this rack is the marking of sizes on the upper row of openings. The width only is marked above the openings, accommodating Glass from 10 to 24 inches wide; and spaces are also provided for small Plate Glass and odd sizes. The length of the Glass is designated on each partition, the markings running from 40 inches down to 18 inches. The smaller sizes of Glass are designated as usual, length and width of each size being marked above each opening.

T. S. Stewart, formerly of Springfield, Mass., has opened a new store in Orange, Mass.

The Hardware Club of New York.

A meeting of the recently elected Board of Governors was held at the office of Wiliam H. Williams, March 24, when in accordance with the requirements of the constitution the governors were divided by lot into three classes, holding office for one, two and three years respectively, with the following result:

For one year: Eugene Bissell, Thomas F. Keating, James H. Kennedy, John L. Varick, R. R. Williams.

For two years: Alfred D. Clinch, Charles Daly, Brace Hayden, Mortimer C. Ogden, Webster R. Walkley.

For three years: Arthur G. Sherman, Robert H. Swayze, Peter McCartee, W. H. Williams, E. C. Van Glahn.

The governors then proceeded to the election of officers with the following result:

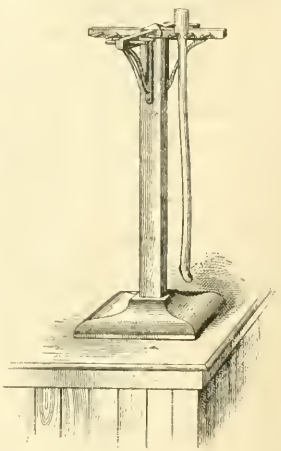
President, William H. Williams.
Vice-president, Robert H. Swayze.
Treasurer, Thomas F. Keating.
Secretary, John L. Varick.

It will thus be seen that the former officers were re-elected.

In accordance with the resolution adopted at the annual meeting of the Club, the treasurer was authorized and instructed to issue a circular calling for the payment of initiation fees.

Axe-Handle Rack.

We are indebted to S. J. Smith of Miller, Smith & Co., Chadwick, Ill., for a sketch of the Axe Handle rack shown. The post, which is 38 or 40 inches long, stands upon a base, the whole designed to stand on the counter. The cross pieces at the top of the post are held in position by brackets and have pegs or prongs 11



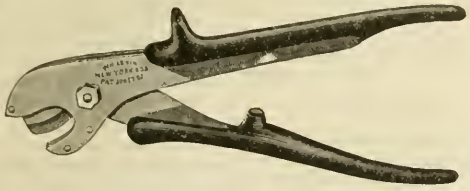
Axe-Handle Rack.

inches apart, between which the Handles are hung. The racks are made in three different sizes.

D. S. Decker of Wells, N. Y., has recently purchased a half interest in the stove and tinware business of Hon. John J. Hanson of Gloversville, and the firm name will be Hanson & Decker.

The Levin Pruner No. 2.

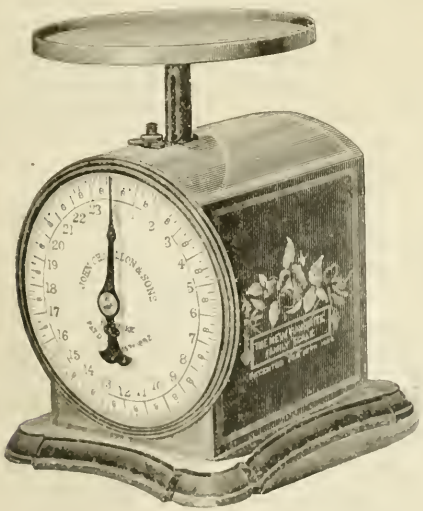
The Levin Pruner Company, 37 Dey street, New York, are offering the pruning shear herewith illustrated. It consists of two steel plates riveted at the three points shown in the cut, between which the cutting blade is pivoted and works, while the handles are of malleable iron. A long flat steel spring concealed between the plates of the upper handle opens the pruner. In operation the blade after the cut is made passes between the plates of the lower handle and is prevented from cutting against the rivets by the stop between the handles. The point is made that the pruner makes a smooth, clean cut like a knife. The manufacturers claim that though the pruner is capable of cutting through half an inch of dry oak it does not hurt the hand, jar the arm, or tire the operator in any way. The pruner is made in two sizes, No. 1, 7 inches long, No. 2, 9 inches long, and put up one each in neatly finished paper box.



The Levin Pruner No. 2.

New Favorite Family Scale.

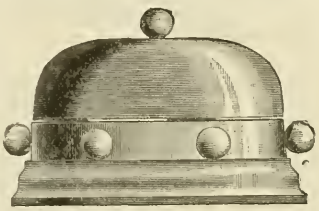
John Chatillon & Sons, 85–89 Cliff street, New York, are offering the scale here shown, which will be known as the New Favorite. The main difference between this and the Favorite is the material of which it is made and the method of construction. This scale is manufactured of sheet steel, making it light and strong, instead of cast iron, as heretofore. The risk of breakage in handling or shipping is minimized, and the freight charges reduced, as its weight is but about one-half of that of the cast scale. They will be made in four sizes, 5, 12 24 and 48 pounds, and in three styles, with platform, platform with scoop, and fork with scoop; These goods will be known by the same numbers, descriptions, &c., as applied to the Favorite, the manufacture of the cast scale being entirely discontinued.



New Favorite Family Scale.

Improved Revolving Table Bell.

The Hardware Specialty Company, Newark, N. J., C. F. Guyon Company, 99 Reade street, New York, agents, are offering the revolving table bell here illustrated. The central portion, to which the knobs are attached, revolves on a pinion attached to the base. When operated, a simple gearing connecting the base and center causes a circular brass plate, to which two loose hammers are attached, to revolve, which, striking against the gong, produces the effects of an electric bell. It has no complicated mechanism, springs or wires to get out of order, requires no winding, and is always ready for use. It is made in two sizes, 3 and 4 inch, and two finishes, nickel plate and quadruple silver plate.



Revolving Table Bell.

Myers' Combination Spray and Vermorel Nozzle.

F. E. Myers & Bro., Ashland, Ohio, are furnishing this nozzle, as illustrated herewith, in combination with their bucket spray pumps and barrel spray pumps.

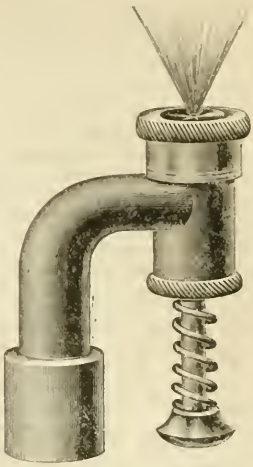


Fig. 1—Combination Spray and Vermorel Nozzle.

The spray nozzle is arranged so that the male end will thrown a solid stream. It is explained that by placing on the sprinkler tip it becomes a complete sprinkler for use in connection with flower beds and for any purpose where a sprinkler is required, and that the spray nozzle throws a spray as fine as mist. The point is made that with this combination the operator is able to throw a solid stream, to sprinkle or spray, giving the full use of the pump for any requirement necessary. The vermorel nozzle is constructed to throw a spray as fine as mist, and is supplied with two different caps, so that the quantity can be changed. It is also provided with a needle attachment to open up the port should it become closed with any sediment or particles that may be in the material used in spraying. The manufacturers state that the nozzles cover the requirements for spraying fruit trees, shrubbery, &c., and that they are furnished in connection with the Myers barrel and bucket spray pump

Fig. 2.—Solid Stream and Spray.

Fig. 3.—Spray Sprinkler.

Waste in the Store and How to Avoid It.

FIRST ARTICLE.

By W. T. Warsop.

This is a subject worthy of attention, as the losses which occur to the dealer in the course of the year, from what may be termed waste, are considerable.

One of the first items is over weight and measure. Good

WEIGHT AND MEASURE

may be due the customer, but need not run to excess, and the salesman who makes a practice of throwing in a little more after weighing correctly is working against the interests of his employer, and if continued in will easily lose from 1 to 2 per cent. of the net profits for him. Very often this overweight and measure are given by salesmen who are not accustomed to weigh and measure goods, and it would be to the merchants' interest to give them a few lessons to perfect them in weighing and measuring goods.

Let them take 100 pounds of some article and weigh it up in 2, 3 and 5 pound packages so carefnlly as to make the requisite number of pounds. I think the result will surprise them.

OMISSION TO CHARGE

goods sold on credit is something that has cost most dealers quite a sum during their business career. Various reasons would doubtless be given for this should the salesman be questioned, but a very common reason is because it is not quite convenient to step to the desk to make the charge.

This could be corrected in a great measure if the salesman was obliged to carry a memorandum book for that purpose in his pocket, and to make the charge on same so that it will not escape his attention until he has an opportunity to report or make charge himself on the proper book.

Neglect to charge goods will also occur when the customer uses a passbook; the charge often made on the passbook is neglected on the store book. The way to avoid this is to first make the original charge on either of the books mentioned before, then copy same into the passbook.

KEEPING BOOKS POSTED.

Losses occur from neglect to keep books posted. A customer calls for the amount of his account; the merchant turns to his account on the ledger and gives him the amount, but finds in a few days (or sometimes weeks) in posting that there are a few more items that should have been added to his account, and these items, if small, are often lost, as the customer, if spoken to about it, refuses to pay, or does so unwillingly, or his trade may be lost because the customer is not a regular one.

A TRIVIAL MATTER.

There are many instances, too, when a thoughtless clerk has purloined from his employer goods for his own use. At first it may be a trivial matter, a cheap Rule, Pocket Knife or other small article, but if the practice is not stopped it soon ends by his taking something of more account. Merchants should insist upon being consulted when clerks want goods, and should, if the goods are to be charged or paid for, attend to the matter personally.

MARKING PRICES.

Many merchants lose because of failure to mark goods, thinking they can remember the cost price. The custom of not marking goods is a poor one, for if the proprietor should remember prices himself (which is doubtful), they are very apt to be offered for sale by a salesman who is obliged to guess at the price, and many times does not get cost for the goods. The best plan is to have all goods marked, either on the article, box, package, or by list prices put up in some convenient place.

COLLECTING.

Losses will sometimes occur by not collecting for all goods sold for cash. Several articles may in turn be wrapped up as they are purchased, and the clerk in adding up the amount of the purchase overlooks some of the articles, thus failing to get pay for them. This would not happen so often if each article was itemized separately in figuring up the amount, after which the goods should be counted and checked off.

PACKAGES OPENED.

Many salesmen use goods about a store as if they cost nothing, and new tools are allowed to become soiled, packages of goods opened and part used and part left to spoil, such as Paint, Colors; Putty left to become hard; Glass left where it is liable to get broken, and are wasteful in many other ways. Merchants should insist upon order in the store and should be consulted in regard to the use of new tools and goods liable to become damaged, as all goods of this character, if they are not entirely spoiled, must be sold at a sacrifice.

GOODS AT THE DOOR.

Goods are often stolen when placed outside the store and are neglected until darkness comes on. A practice should be made of bringing in all goods that are set out each day at an early hour.

SHORTAGES.

Loss sometimes occurs because invoices of goods are not looked over by the purchaser. There is willful waste in salesmen throwing in with goods to be fastened a handful of Screws, Bolts or Nails because it is too much trouble to count them.

LENDING TOOLS.

Hardware merchants are sometimes censured because they will not lend tools that persons wish to borrow. Unfortunately he cannot say he has none, for all around, displayed to good advantage, are Saws, Hammers, Axes, Wrenches, Screwdrivers, Squares, Plyers, Bits, Braces and numberless other things which the borrower wants to use, will not injure and will return in a minute! Some of these may be lent, but should be charged to the person and marked loaned, and if not returned to be paid for the same as if purchased.

UNDERESTIMATING COST.

The article of Mica is often sold at a loss as it is bought by weight and sold by the light. A good way to arrive at the cost and selling price is to take each package upon arrival and split it into sheet of the right thickness for use, throwing out any which may be too thin or broken, then weigh and count, dividing the cost per pound by the number of lights.

MEASURE A BARREL.

There are losses from goods bought by weight and sold by measure, such as Oil, and if the dealer will take the trouble to measure a barrel of Linseed Oil he will find it often run short from 3 to 5 gallons if a clean measure of standard size is used. This means a loss to him unless he uses a measure that will hold just the number of pounds he buys for a gallon, which is, I think, 7½ pounds.

The losses that occur from

SHOPLIFTING

by those who visit the store in the guise of customers are considerable. This class of thieves succeed best in stores where there is not much attention paid to customers. The incomer should be promptly met at the moment of entrance and not left to wander about the store from one article to another; by so doing losses in this way would in many instances be avoided.

UNPROFITABLE BUSINESS.

The losses I have mentioned many merchants fail to take precaution against or make allowances for them in their calculations as to their present worth. It frequently happens that when the year expires, inventory taken and accounts made up, the business, which seemed so flattering, is unexpectedly found to be unprofitable, or showing a profit much less than was expected.

Future prosperity will greatly depend upon the discovery of the cause of the discrepancy between calculated and actual results.

MONEY DRAWER.

Many small dealers use the money drawer as their private purse, taking from it whatever cash may be needed, and also take for their use articles kept for sale, and often neglect to make any charge of them. To such dealers, "Waste in the store and how to avoid it" is a subject which I am safe in saying would be of little interest.

MEMORANDA.

W. J. McKay & Co, 51–53 South May street, Chicago, Ill., were visited by fire on the night of March 21 and their establishment pretty well burned out. Their stock, however, was fully protected by insurance, and the fire means simply a removal to new quarters. The concern are located for the present at 399 West Madison street, where they are stocking up to place themselves in a position to promptly meet the requirements of their customers.

Young & Norwood is the name of the concern just started in the stove and furnace business at 114 Lake street, Elmira, N. Y. The new concern will handle Garnet and Peninsular stoves and the Palace Queen and Kelsey furnaces, together with a full line of hollow ware. The firm have a factory at Nos. 154–156 Exchange Place, where they turn out tin, sheet iron and copper ware.

The stove and heating business at present conducted by James Walp on North First street, Lehighton, Pa., changes hands, he having sold out to George L. Geibel of Danbury, Conn. Mr. Walp has

accepted a position with H. M. Norton of Easton, Pa., as superintendent of steam and hot water heating work, and will remove to that place shortly.

PHILLIPS & Co. of Niagara Falls, N. Y., are about to move into their new quarters in the Gluch Building, where they will have one of the largest and finest hardware stores in Western New York. The interior is to be entirely of oak; the offices will be located in the rear of the store, and also finished in oak. A line of the J. L. Mott Iron Works' plumbing samples will be displayed in the rear, next to the offices. They will all be connected so that the operation of each with water may be shown. The back of the samples of plumbing will be entirely of tile wainscoting, while the base of each fixture will be of marble. There will also be arranged 20 sample drawers of finished hardwood, showing samples of real bronze builders' hardware in different finishes, oxidized silver, antique brass, antique copper, nickel plated, old copper, dull brass, polished brass, in fact, all styles of door and window trimmings. The stock of house furnishing goods will be a very complete one. Half of the second floor will be devoted to the tin shop, with seven benches in a direct line with each other, each bench having a window, assuring plenty of light. There will be an 8-foot cornice machine in this department. Back of the tinshop will be the sample room for plumbing goods, steam heaters, stoves, &c. The basement will contain heavy stock and the plumbers' and steam fitters' departments. In this room will be set up two pipe cutting machines. These will both be run by power from an engine connected with the building. The entire place will be lighted by electricity and heated by steam.

J. WALTER DAVIS, West Gardner, Mass., has recently opened a new store, 31 x 100, three stories and basement, heated by steam and fitted up elaborately.

Returned Goods.

FROM THE JOBBER'S STANDPOINT.

While passing through the receiving room a few days ago my attention was directed to a strange medley of articles in the space allotted to returned goods, the accumulation of only two days—average ones at that.

There were small packages, large packages and lots of goods in no packages whatever. As it was quite an interesting conglomeration, I took a note of some of the articles which constitnted it and give it here:

An Iron Pump.
One-half dozen Post-Hole Diggers.
Two bundles Garden Hose.
One coil of Wire Rope.
Three bundles Shovels.
Two boxes Loaded Shells.
One-half dozen Cast Griddles.
A broken Spring Hinge.
A box of Calf Weaners, broken open and some parts missing.
Several packages Carriage Bolts, some of them in very bad condition.

Also several other articles in various conditions.

Being somewhat interested, I inquired the history of the various lots, and learned that the Calf Weaners, the Post-Hole Diggers, the Wire Rope and one number of the Loaded Shells were goods not carried in stock regularly, and had been picked up as an accommodation.

The Pump was specially ordered from the factory, and was returned because the dealer's customer had found one which suited him better before this arrived.

The Wire Rope was ordered and cut too short through dealer's mistake.

The Shovels were sent wrong by one of our order clerks.

The Hose was ordered in good season, but was delayed through negligence of the railroad company, and was not delivered till after close of season, consequently our customer refused it.

The Spring Hinge was not what carpenter wanted, so it was negligently wrapped and sent back, and arrived broken and worthless.

The Cast Griddles were returned for some reason or other—our fault I think—and as they had not been packed at all, they are very badly rusted and will be worthless until they have been repolished.

Thus it was through the entire list. Some of the mistakes rested with ourselves, but more with the dealers. Some of the goods came back accompanied by a terse letter, something like this: "We have retnrned the following goods. Please give us credit, &c." As much as to say, we can't sell them; you must take them off our hands.

This matter of returned goods is a very serious one to the jobbers of the country. At various times action has been taken on it and some good effects resulted.

A year or so ago, a number of the leading houses issued a circular, stating under what circumstances goods might be returned. Some refused to allow anything to be returned which had not been sent wrong through their own mistake; others were rather more liberal. Few adhered strictly to the rules for any length of time. At first they would make exceptions of old and favored customers, who had overloaded themselves, and as one step led to another, the matter is now virtually where it was before the agitation.

This really means a dealer can buy goods, keep them as long as he pleases and, finding them unsalable, return them to the jobber from whom he purchased them. If A remonstrates, the dealer calmly says he will transfer his trade to B, who will accommodate him. A knows this to be true, so generally gives in and is obliged to receive into stock goods which often are shopworn and damaged, and in many instances have to be sold at an actual loss.

This reveals a bad state of affairs which should not exist. The close competition of late years has led many jobbers to make rash agreements with their customers in order to secure their trade. In their zeal to gain and hold patronage they allow themselves to be imposed upon, and often make concessions which are uncalled for and certainly unbusiness-like.

The privilege of returning goods under many circumstances is right enough, but like nearly every other, it is shamefully abused. About the only remedy I can see is to do as the Edge Tool people have done with their warranty—shut down entirely. Nothing but concerted action will accomplish much.

I am glad to say that dealers, such as I have mentioned, are the exception rather than the rule, but they are numerous enough to be quite a thorn in the side of the jobber.

A word to all who may have occasion to return anything to jobber or manufacturer will not be out of place here. ALL GOODS SHOULD BE CAREFULLY PACKED to withstand the rough usage of the transportation companies. I thought while looking over the aforementioned heap what a howl would go up if the very same parties who shipped those goods to us were to receive goods packed as those were, and in the same condition.

Express companies are not responsible for goods merely wrapped in paper so as to hide the contents. Good strong wood boxes should be used for heavy articles. Surely if the jobber is expected to accommodate his customers, they should see to it that the goods are properly packed and shipped, thus doing all they can to insure delivery in the best possible condition. It is no more than fair, to say the least.

SCRAP.

FOR TWO OR THREE YEARS PAST we have followed the proceedings of the Tinned Plate Manufacturers's Association, which, at the time of the revision of the duty on tin plates, was an active agent in bringing about concerted action among those who contemplated going into the new industry. Rumors are gaining currency, however, that affairs with the association are not going altogether smoothly, and in fact there are some so skeptical as to believe that the association has not a very long future ahead of it. It has been pointed out that many prominent concerns are not members of the body, and what is perhaps more ominous, at the recent meetings a number of prominent members have not attended. However, all associations go through periods of varying efficiency, and it is by no means inevitable that the Tinned Plate Manufacturers' Association will cease to be conspicuously useful.

THE NEW SHEET AND TIN MILLS of the Falcon Iron & Nail Company of Niles, Ohio, will be completed so that the fires can be lighted the first week in April. All the machinery is in place and only trivial matters now require attention. The engines were tested on Thursday and found to work perfectly satisfactory. This mill will be one of the finest and most complete ones in the country.

A LONDON EXCHANGE reports that E. Morewood & Co., South Wales Tin Plate Works, Llanelly, have completed their new steel works, and arrangements are being made for the commencement of operations. The new plant includes a three high cogging mill. It is estimated that the new mills will be able to turn out nearly 1000 tons of bars weekly.

A SERVICEABLE PAPER WEIGHT comes to us from John Hamilton, Pittsburgh, Pa., who uses the useful device to call attention to Hamilton's Best American Redipped Roofing Plate, which is described as made by hand by the palm-oil process and fully guaranteed. The paper weight is of glass with rounded edges and corners, and the reference to the firm John Hamilton, Tin Plates, is applied to the bottom in black and white, so as to show through.

Paterson, New Jersey, has 597 manufacturing establishments, representing 73 industries and employing more than $27,000,000 capital. Ten years ago the number was 52 and the capital employed was only about $11,500,000.

STOVE TRADE NOTES.

Advice to Stove Buyers.

Managers of stove houses in Chicago are very properly endeavoring to prevent the World's Fair from interfering seriously with the usual course of their trade. They foresee that many of their customers will visit Chicago during the coming summer, and will arrange to purchase stocks for the fall trade at that time. It is quite natural to suppose that selections can be made to better advantage when the buyer has large sample rooms to inspect than if he merely looks over photographs or through catalogues. Numerous country merchants have but seldom, or perhaps never, had the opportunity to thoroughly inspect actual samples of the goods they order in the stove line, and may think they will be able to do better in this way than by accepting the statement of the silver-tongued traveling man. There is also, perhaps, a deeper impulse in the thought that direct contact with headquarters will give a man better terms or higher consideration than the ordinary second-hand acquaintance through a salesman or by the mails. Chicago managers believe this to be a matter which promises seriously to disarrange their business, and are, therefore, trying to provide against it. Rathbone, Sard & Co. have issued to their customers the following circular letter, and other houses are about to do something in the same line:

To the Trade: We would urge upon our patrons the very great importance of placing their orders this year for their fall stocks with the traveling men, the same as in previous years. We expect and look forward to seeing as many of our friends as possible in Chicago during the World's Fair, and will do all in our power to make the visit as pleasant as possible to them; but, at the same time, we would advise that the visit on us should be a social one, and not a business call, for several reasons:

1. The World's Fair will be worth all your time. It will use up all your strength and energy to properly see it, and you will not care to talk stoves and prices after a day at the fair.

2. Our offices and show rooms will, most likely, be crowded all the time, and we would not be able to give that careful attention we always aim at toward helping you to select a stock of goods.

3. You can better determine in your own office and store what you expect to need the coming season. You will then know what you have carried over, and have all the necessary information to make up an order.

4. The traveler that has always seen you, and knows better than we do the peculiar wants of your trade, will call on you as usual. You will not be able to see him in Chicago, and he may help you in estimating your wants.

5. Our travelers will start out, as usual, June 1, with every information about new goods and prices. They will advise you well in advance when they expect to reach your town. If you expect to be in Chicago at any special time, our travelers will arrange to see you either before or after your trip, if you will let us know when it will be.

6. When you come to Chicago to see the World's Fair, you will probably be accompanied by some members of your family, and you will see the difficulty of giving much attention to business without neglecting them.

We think you will agree with us as to the merits of these arguments, and we hope that you will call and see us, and have your time entirely free from business cares and worries.

The force of the suggestions made in this circular must be admitted by every stove buyer. The World's Fair will be no ordinary occasion of interest for but a few days and to a limited number of people. It will be a source of great attraction for months, and will draw vast crowds from all sections of the country, but more especially from the West by reason of its geographical location. It will readily be seen that, at times, there may be so many visitors calling upon the Chicago stove men that it will be a matter of great difficulty to give them proper attention. Every effort will, of course be made, but to properly handle a constant stream of customers it would be necessary to call in all traveling men, and this would leave those customers uncared for who may be disinclined or unable to visit the Fair. Further than this, experienced salesmen point out the difficulty stove buyers in general will have in deciding exactly what they want, unless they thoughtfully take an inventory of their stock before they leave home and know just what stoves and what sizes they are short.

The Chicago managers emphasize one point, namely, that whether their patrons come to buy or not, a most cordial welcome will be extended and every pains be taken to make the visit enjoyable. They are not trying to diminish the crowd of visitors; but, on the contrary, are endeavoring to shape matters so that the visitors and themselves will enjoy the World's Fair better.

American Stoves Abroad.

The project of sending American stoves to Europe concurrently with the shipments of anthracite coal to that market, which was noticed in *The Metal Worker* some weeks ago, appears to have evoked considerable interest on the other side of the water. One of our London contemporarics, in commenting on the matter, commends it to the consideration of English manufacturers, remarking as follows: "If the closed, or American pattern, stove will sell where our open grates and stoves find no purchasers, it is obvious that our manufacturers should meet the requirements of the would-be buyers by producing stoves in the American style. To do so might possibly be flattering to our friends on the other side of the Atlantic, but 'business is business,' and we must produce what will sell rather than what we ourselves may happen to prefer. It is important to remember, in this connection, that most other European countries have much severer winters than we have in the United Kingdom, and particularly that almost everywhere on the Continent closed stoves of porcelain or metal are in general use. With our facilities for producing and shipping and our nearness to the Continental markets, we certainly ought to be able to compete with the American makers."

Another English trade journal, in referring to the proposed venture, expresses the opinion that, looking to the perfection to which American stoves have attained, and their advantages over the open grate in economy of fuel and superior heating qualities, combined with the comparative smokelessness of the hard fuel used in them, American manufacturers are quite justified in looking to Europe as a possible outlet for surplus production at home. Nevertheless, the journal referred to regards the proposal to extend the American stove trade to the other side of the Atlantic as a singular phenomenon and a proof of "the restless energy and fertility of resource shown by our American cousins, which are such invaluable qualities in forcing open the doors of new markets."

The Woolson Stove.

The *fac simile* of an old stove catalogue which we published in these columns some weeks since, together with an illustrated description of Woolson's stove, has brought out a letter from the son of the maker of the stove which is highly interesting. As there are no doubt many readers of this department of the paper who would like to hear what the writer, H. C. Woolson of Buffalo, N. Y., who is 74 years old, has to say, we make a few extracts, as follows:

I was much surprised to see in *The Metal Worker* of March 4 a cut of my father's old stove. I did not suppose there was any one living who knew anything about it. It was invented in 1816 at Claremont, N. H., but our cuts were burned up, together with the patent papers. I think I can say, without fear of contradiction, that it was the first good working stove ever invented in the United States. It was a good baker and boiler. At the time it was made my father had never seen a cook stove, as there was none in the market. I did not think, however, to ask him until it was too late where he got the idea. There was no pattern maker in those days, and therefore nothing to start on. My brother told me the first stove he made was all sheet iron. He did not like it, so he built the Woolson stove. The sheet iron stove was afterward invented and is made to-day. It was then called the Yankee Notion. It is known now as the elevated oven, but every foundry has its own local name. The Woolson cook was made in New Hampshire, Vermont, Massachusetts, Detroit, Mich., and Cleveland, Ohio. When it was first made the farmers complained that it did not burn half enough wood. When it was laid one side the com-

plaint was that it burned too much wood. I do not know how my father got the patterns made, as there were no pattern makers at that time. The patterns were made of wood, with stays of wood and iron. The molders used to carry them out in the sun and down cellar to get them straight. The doors of the stove had wrought-iron hinges and latches. The stays of the patterns were stopped off when molded. There were some plows of cast iron made at that time. There were a good many stoves produced in New England after 1830. There were no railroads, so the stoves were carted out 40 or 50 miles and left with country merchants to sell on commission. Stanley did more than any one else to improve the stove business, and about the first heating stoves were those which he made.

It is a great pity there are no cuts of some of the old stoves. I think, however, some of them can be found. There were the Wilson, the James, the Premium, the Tenplate, Sixplate, the Box and some other stoves. In 1835 I drove a team to Albany and received a portion of my load at Pratt & Treadwell and a part at Joel Rathbone's. My load was made up of wood Franklin stoves, and I hauled them over to New Hampshire, 110 miles away.

The Stove Trade of the South.

ITS PAST, PRESENT AND FUTURE.

By On-the-Road.

Fifteen years ago a range was almost unknown south of the Ohio River. However, since bituminous or soft coal has been so extensively mined in the South, coal cooking stoves and ranges have been growing in popular favor. The Pennsylvania stove founders, with those who had branches at Baltimore, controlled the market in the Atlantic and Gulf States, while the Ohio River and St. Louis foundries catered to the States bordering on the Ohio and Mississippi Rivers. Pennsylvania stoves, with their peculiar basket grates, took the lead and have held their trade against the Southern-made articles. The new stove foundries of the South have, however, found a ready market for their stoves at home. The great trouble has been the idea on the part of the Southern stove founder to see who could make the cheapest goods regardless of style, finish and workmanship, with disastrous results financially as a consequence. Up to the present time there have been no fine grades of stoves made in the South. Baltimore and Louisville make some Franklins and direct-draft coal stoves for heating purposes of merit and moderate cost. South of these places the entire stove output consists of the cheap step, square cook and plain cast and sheet iron or steel range, with the wood box heating, egg and cannon coal stoves. It seems strange that with all their advantages the Southern stove founders have not attempted the better grades instead of leaving the Northern stove founder the entire field for the finer ranges, cooks and heaters. The Northern manufacturers of stoves need have no fear, for Northern stoves, with their superior get up, style and finish, will continue to find a ready market in the South, and sooner or later some of these Northern manufacturers will pack up, bag and baggage, and move their plants below Mason and Dixon's line, were iron and coal is much cheaper. As to skilled labor, that's another thing. Will our best mechanics go South? Why not? They can live cheaper there and the climate is milder.

A few years ago a Western maker of so-called steel ranges (he called them cast malleable) flooded the rural districts of the whole South with a sheet-flued range, having sheet-iron sides, bottom and oven, with cast malleable fire box and top. The sheet flue gave the range an easy draft. It drew like a house on fire, caught the "wimmin folks," and, it is unnecessary to state, there were "millions in it" to the maker of the range.

The writer has often wondered why stove manufacturers catering to the Southern trade did not "catch on" to the sheet flue long ago, for the Southern trade at least, and adapt it to their line of cast ranges; for nothing so quickly condemns a range in the pitch pine and soft coal sections as an ordinary two-flued range, made North for burning anthracite or hard coal. It is a failure in the soft coal section, though it may be lauded to the skies here in the North. For the benefit of those who do not understand the meaning of sheet flue, I will state that a sheet-flued range has no dividing flue or partition in the end of the range where the fire passes over and around the oven, but allows the products of combustion to occupy the entire width of the oven, passing to the underside, where a short bottom strip or flue keeps the fire along the front of oven to a point where it passes back to a flue bolted on the rear of the range, then up into the stove pipe, instead of going back up over the oven again. Such a flue, be it in a cast range, or in a steel range, or better still, a cast range with a steel oven, is the coming style both North and South, as the sheet steel or iron oven heats quickly, and does not crack and let ashes through, while at the same time it saves those exasperating jobs incidental to a top oven plate. Some of our Northern stove foundries have a line of sheet flue ranges, and they are a pronounced success, even with hard coal; for a range of a given body measurement can be made with a larger oven and sheet flue than the same body of range could with two end flues. Granting that a sheet flue range with 18 or 20 inch oven costs a little more to make than the same size range would cost with two end flues, owing to the fact that the flue on the rear or back of a sheet flued range adds that much more to the cost, the additional outlay for the sheet flue (which really is very little) is more than made up in the added length of the oven. This is owing to the fact that a sheet flue takes up nearly one-half less room than the two flued construction, which must have a wide flue to draw at all, as it requires a much stronger draft than the sheet flue.

I notice that four hole ranges are becoming very popular, and I think they will eventually drive the cook stove from the market, unless we except the cheapest of the coal and wood cooks. The range has as much room on the top, in the oven, on the hearth and shelf, and takes up much less room in the kitchen, while being far more convenient. Ten years from now a cook stove will be a rare sight, to my way of thinking, as cast as well as steel ranges are rapidly taking the place of the old cook stove where coal is used.

PROSPECTS FOR THE FUTURE.

The prospects for a future stove market are nowhere so brilliant as in the South. When once the tide of emigration turns from the West, where the long winter months hold their sway, with the consequent expense and suffering, and the benefits of the glorious climate of the South are more fully understood, there will be a hustle on the part of manufacturers to get there. Few realize the immense quantities of stoves now being sold in the South during a season. The writer has sold bills to some of the retail dealers of the South equal to any in the North, one customer buying nine carloads in one year for the retail trade; another dealer seven carloads; another five, and so on. And it is such a pleasure to do business with a Southerner (no offense, brothers of the North). Yet a Southerner always has that welcome: "Come in, sir. Have a seat, sir." (Gets up and offers you his seat.) No matter how busy, how tired; whether he wants any goods or not, he is always the gentleman. And there is another item that counts with me. The hotels of the South, as a rule, have a comfortable office or reading room, free from the saloon and saloon loafer, where the drummer can read and write in quiet. There are very few hotels up here in the North that have not either a bar in the office or in the adjoining room with open screen doors between, the noise and language making it next to impossible to read or write. And usually, the clerk up here is the bartender, all one and the same person, and when you want any information you have to wait until the barkeeping clerk has first waited on the thirsty ones.

While there are not as many fine goods sold in the South, proportionately, as in the North, yet the larger cities and towns have dealers who carry the latest base burners and large handsome six and eight hole ranges. Many of the largest stove manufacturers of the United States send their best travelers South hustling for trade, and being only too glad to equalize freight rates to most points, which often means an allowance of from 15 to 35 cents per 100 pounds. The South is growing rapidly, and now is the time for the capitalist, the mechanic, and the man of energy and push. Those had better stay at home who have none of these qualities, as it takes every inch a man to go down there and hold his own against the young Southerner of to day.

FIELD FOR GAS AND VAPOR STOVES.

To the makers of gas, gasoline and oil stoves, I would say the field is large and open for improvement. Yet, owing to gasoline being rather high, retailing at from 15 to 20 cents per gallon, mostly at the latter figure, those stoves are not as extensively used as further North. And again, wood is from $2 to $2 50 a cord, and coal from $2.50 to $4 50, which makes gas and oil stoves rather too much of a luxury for a darky to use.

The coming season will likely be the most prosperous the South has ever had. The crisis which had been threatening and which overtook that portion of the country in 1891-2, was caused principally by the ruinous system of long credits. An overstocked cotton market with low prices at the opening of last season kept merchants from placing their orders. However, later in the season, cotton jumped up out of sight, and then it was discovered that there was not only a short crop but a shorter acreage. It was a common thing last season for a merchant to tell the drummer he did not want any stock, as he would have to trust it out. Now stocks are very small, in the stove line especially, and for the past two years the Southern farmer has been raising less cotton and more corn, hogs and potatoes. The scarcity of cotton now in sight and good prices will, necessarily, bring a lively trade this fall. Never were prospects for the stove trade so good as they are for the season of 1893-4, in the North as well as in the South.

HEATING APPLIANCES.

And it will not be out of place to put in a word for the fire-place heater, the hot-air furnace and the steam and hot-water heater. The first two have long been used down there, though not so much as further north. Steam and hot water are the new things, and are being used now in most of the larger, especially public, buildings. But so long as steam or hot water are used to heat by direct radiation, they will never be popular for private residences.

Rathbone, Sard & Co.

now have architects at work on plans for another extension of their plant at Aurora, Ill. A new molding shop is to be added to the foundry, which will double the molding capacity and will make room for about 200 more men. The Aurora Works have been enlarged every year since they were built, and eventually the whole tract owned by the firm will be practically covered by buildings. The Chicago sample rooms are now undergoing re-decoration by way of some preparation for the World's Fair. The walls have been newly papered in a delicate pattern, with a rich frieze of oak leaves, which was the nearest approach to acorns to be found in wall paper stocks. The Chicago branch reports a large range trade this spring, exceeding that of last spring, which in its turn was heavier than for previous years. Special attention is being paid to this branch of their business, no less than six new ranges having been brought out this year, namely, Natural Acorn, a six-hole hard coal range; Magnet Acorn, six-hole, for hard coal; the same for soft coal; Puritan Acorn, six hole, for hard coal; Prince Acorn, four-hole, for wood; Senator, five-hole, for hard coal. These ranges give 14 different sets of patterns for the new catalogue, making what is claimed to be the largest line of ranges on the market. These new ranges are of a distinct type of finish, being built with semi-rectangular lines and panels, yet having all corners curved and softened The new back railing is a particularly fine piece of molding, having an acorn in the center from which open scroll work gracefully curves to either side. Designers this year have had an additional incentive in the approaching World's Fair, at which these goods will be exhibited.

The Thatcher Furnace Co.,

No. 33 Peck Slip, New York city, have issued from the press an exceedingly neat catalogue of warm air furnaces and ranges, which they manufacture. The size of page is sufficient to permit the use of cuts of liberal proportions, together with ample descriptive letterpress. The paper used is of good quality, the printing is well executed and the binding is in colored paper covers. The opening pages are devoted to an illustrated description of the Thatcher tubular furnace, which is furnished in portable form, and also for brick setting. The heater is fully described and directions are presented for setting. There is also illustrated the Thatcher tubular furnace with hot-water attachment, made in two sizes, and arranged for brick work if desired. A new heater which has been added to the company's assortment is known as the Scorcher. It is a steel radiator, low price furnace, having patent triangular grate, dust flue, large feed door and corrugated surface. It also has a diaphragm and radiating ring, which forces the smoke and gas first to the top and then down around the lower part of the ring, thus making two circuits before leaving the furnace. The manufacturers claim that by this method the gases are retained much longer and insure more heat than is generally obtained from furnaces of this class. The dome is of cast iron, made in one piece, while the fire pot is nearly straight and the casings heavy. This heater, we understand, is having a large sale, and the company are confident it will continue to grow in popularity. Several pages in the catalogue are devoted to the Thatcher range, made with fire box on either the right or the left side, as may be desired. The range is made in both portable form and for brick work, and with horizontal or vertical boiler. The ornamentation is neat and attractive without being pretentious. Tables give the dimensions of pit and trench for portable Thatcher tubular furnace; also capacity of warm-air pipes and registers. A few practical hints on warm-air heating constitute a feature of the volume. Several pages at the close are given up to testimonial letters from some of those who have used the goods made by the Thatcher Furnace Company, which show in a striking manner their great popularity. The Thatcher tubular furnace has been sold, it is said, for 40 years in every part of the country, and many thousands are now in use. As an evidence of the popularity of these goods the manufacturers state that among the large real-estate owners the Astor estate have used the Thatcher furnace in their houses for the past 30 years. The company are enjoying a good demand for their specialties, and thus far this year there is a large increase in the volume as compared with a year ago, when their business nearly doubled as against the preceding year.

ODD PLATES.

As our readers are aware, the Molders' Union made a request a short time since for an advance in the wages of stove molders of 15 per cent. At a recent meeting of the manufacturers the matter was considered and a reply sent to the Molders' Union. We understand that the molders are not satisfied with the answer of the Defense Association, and have requested a conference for the purpose of reaching an adjustment of the matter which will be entirely satisfactory to all concerned. The conference is to be held some time the coming week, probably in Chicago.

The many friends in the trade of George F. Dodge, president of the New York Nickel Plating & Mfg. Company, 227 West Twenty ninth street, New York, will be glad to learn that he is able to be at his desk once more and looking after his business interests. He has been confined to the house for something like three months past with a fractured limb, which resulted from an accident at his home. Mr. Dodge, personally, is the most genial of men, and has hosts of friends in Beekman and Water streets.

H. Rendtorff & Co, 16 Lake street, Chicago, Ill., have just issued their sixth annual catalogue of vapor, gas and oil stoves. The leading place is given to the Ideal process, shown with two burners in the top surface and one in the step at the left The company state that it is new in design, has double tubes, the return one encircling the drip tubes, and when in use constantly heating it, and thereby greatly increasing the evaporation. The burner drums are of brass, while the burner caps are easily removed. This stove is made in a number of sizes. The Ideal High and Low Juniors are next shown, together with the official price-list adopted by the Vapor Stove Manufacturers' Association of the United States on August 3, 1892, for the season of 1893. The company also show the Ideal gas range, made in a number of sizes and several modifications, together with the American Junior gas stoves, the American gas heater, the New Beauty oil range, the Royal lamp stove and the Electric oil heater.

A sheet-metal stove with cast iron top forms the subject of a patent recently granted to C. H. Melvin of Minneapolis, Minn. All the plates of the stove are flat in shape and so arranged as to be easily dismounted when required. The plates have flanges on their edges by means of which they are fastened together. Some of the flanges interlock directly with each other, while others are connected by removable hook-like corner pieces, which slide endwise over the joining flanges.

The Stuart & Peterson Company have issued under date of March 20 an announcement to the trade to the effect that they have removed their works to Burlington, N. J., where they have property embracing an area 410 x 200 feet, and a foundry which is thoroughly equipped with modern appliances for conducting their business. They state that they are but 17 miles from Philadelphia, on the main line to New York, and thus enjoy unusual facilities for the rapid handling of goods. With the greatly increased facilities which they now possess, the company feel confident that they will not only retain all their old customers, but add many new ones to their list. While their Philadelphia office is at 1120 Arch street, the company desire all communications addressed to the main office at Burlington, N. J.

The W. J. Loth Stove Company, successors to the Waynesboro Stove Company of Waynesboro, Va., have leased the grounds and buildings, bought the balance of the last named company's property, and have been running full blast since March 1. They are at present giving employment to about 20 hands, and are getting things well into shape. The foundry is 160 x 90 feet, and the mounting shop 160 x 60 feet, two stories in hight. There is a capacity for 50 molders. The company hope to run full in all departments by midsummer. In a very short time they contemplate erecting a warehouse 150 x 50 feet in size and two stories in hight. The works are located in the Shenandoah Valley at the junction of the Chesepeake & Ohio and the Norfolk & Western railroads, and in the heart of the iron and coal fields of Virginia. W. J. Loth, formerly manager of the Southern Stove Works of Richmond, Va., has supervision of the affairs of the company.

The Quick Meal Stove Company, St. Louis, Mo., manufacturers of Quick Meal gasoline and gas stoves, are running to their full capacity, and report a large increase in their business over the corresponding period of last year. As an evidence of the business they are doing, it might be stated that the demand for their gasoline and gas stoves has outgrown the capacity of their present factory, and they are now compelled to equip another factory, some blocks from their present plant, for the manufacture of ovens and ware only. This will give them additional room for the manufacture of stoves, and by this means they hope to keep abreast of their orders.

The Portsmouth Stove & Range Company, Portsmouth, Ohio, are increasing their manufacturing facilities by the addition of machinery, tools, &c., in order to promptly meet the demands of the trade for the wrought-steel range known as the Model. More room is being provided and the force of workmen increased. Special reference is made by the manufacturers to the patent oven door device, which is meeting with great favor at the hands of the dealers. The manufacturers have inaugurated a number of important features in the range named, and upon which, we understand, patents are now pending.

F. A. Root has been appointed manager of the Chicago branch of S. S Jewett & Co. Mr. Root is well known to the stove trade throughout the West, having been on the road for a number of years representing prominent houses, a part of which time was devoted exclusively to the Pacific Coast trade. The Chicago branch is now enjoying an excellent business in steel ranges and in gas stoves. Their line of gas stoves and ranges is now very complete and is proving remarkably popular. A catalogue recently issued gives illustrations and full descriptions of these goods. Large wrought-steel ranges are made, of

great capacity, for hotel use, with eight burners on top and six compartments below, which are respectively used for baking, roasting, broiling, warming and heating water. The water front is in the central lower compartment, with a warming oven above, which is operated by the surplus heat. The whole construction of this range is in the style of the best steel ranges for coal. Smaller steel gas ranges of various sizes are made for family use, also portable gas stoves, combination broilers and griddles for restaurants, double broilers having two chambers, and combination broilers with two cooking holes on top.

GEORGE WILLIAMS and GEORGE A. CUMMER, of Cleveland, Ohio, have patented a form of burner which is claimed to be economical, and which can be used without waste in lighting and starting the burner into action. The burner is said to be self cleaning and a constant generator. It consists in the union of a preliminary vapor generating and combustion chamber, and a mixing chamber, so arranged with the necessary details as to produce the objects sought. Mr. Williams has assigned his interest in the patent to P. J. Cummer of Cleveland.

THE ART STOVE COMPANY of Detroit, Mich., have brought out a very handsome new range, made with six boiler holes and embodying the modern improvements. The decoration involves the use of cast ornaments, nickel, and art tile, all judiciously combined, producing pleasing results. The stove has a very substantial appearance, and the company state that "it catches the popular idea and sells quicker than any six-hole range yet produced." It is known as the New Home Laurel, and is supplied to the trade at a reasonable figure.

F. H. BEECHER, for many years closely identified with manufacturing in the Naugatuck Valley, has been made treasurer and general manager of the H. A. Matthews Mfg. Company, Seymour, Conn. The concern were established in 1890, and their products include Stove Trimmings, Lamp Burners, and Fancy Brass Goods.

THE DURAND MFG. COMPANY of Medina, Ohio, have made some important improvements in their Medina oil stove for the season of 1893. The burners have been enlarged, leaky pipes discarded, and other parts simplified and rendered safe to handle and easy to operate, without smoke or odor. The stove for this season is known as the Oil Queen, in order to distinguish it from the Oil King of 1892, which was provided with a smaller burner and wick.

THE ELECTRIC OIL STOVE COMPANY of Homer, Mich., are vigorously pushing the sale of their Electric oil stoves, for which many claims are made. They refer especially to their new wick raiser and rewicking attachment combined as being the simplest and most complete device for the purpose ever applied to a stove. Their lamp goods are constructed with brass oil reservoirs, and are guaranteed not to leak. The base and top castings are nickel-plated and highly polished, thus giving a very attractive appearance.

THE NATIONAL ASSOCIATION OF STOVE MANUFACTURERS expected to hold their annual convention in Chicago this year. In view of probable difficulty in securing hotel accommodations, on account of the World's Fair, there is a movement on foot to change the place of meeting to Detroit. The suggested change is being very favorably considered by the members, so far as expressions of opinion have been obtained.

H. LEONARD WILTON of the Art Stove Company of Detroit, Mich., has recently started on an extended tour through the Western States. It has been the custom of the company for some time past to have one of their officers call upon the larger dealers at least once a year, and Mr. Wilton is now making one of these annual calls.

J. A. COMSTOCK & Co. of Kansas City, Mo., send us a copy of a neat catalogue of 80 pages relating to stoves, ranges and heaters which they handle. The line includes the Economy six-hole range for soft coal, hard coal or wood; the Noxol, also for coal or wood; the Irving, Fidelity and Dome ranges, together with a line of cook stoves, made under such names as Prize Economy, Golden Economy, Bessemer, Kaw and Omega. The wood-burning constructions are represented by the Eureka and Economy ranges; the American, Alpine, Economy, Stately, Iroquois, Magnolia, Sunrise and Mascot cook stoves. There is also shown a line of steel ranges. The heaters are represented by the Art Rosemont, made in several styles and sizes; the Radiant Gem, Social, Economy, Tulip, Motor, New American Oak, Garnet, Live Oak, Topic, Carbon, New Banner Cottage, Redwood, Solar, Tribunal, York and Duke. The pamphlet closes with a net price-list of cast-iron hollow ware, a few remarks to dealers, and the statement that, in addition to their large line of stoves, the firm carry in stock a full assortment of pieced tinware, stamped ware, galvanized iron, and black sheet iron, and all other goods used in connection with stoves.

THE MUCH-MOOTED PROJECT of a joint pavilion for the entire stove exhibit at the World's Fair has been abandoned. The different manufacturers will erect booths or inclosures according to their own ideas. It was found too difficult a matter to adjust the expense properly among the many exhibitors interested.

THE FULLER-WARREN COMPANY'S Chicago sample room will be greatly improved in appearance after the renovators get through with it. A metal ceiling has been put in, and the fittings generally have been overhauled. With a line of brand-new samples on the floor, including the Fuller & Warren Warming and Ventilating Company's school furnaces, a very attractive appearance will be presented to World's Fair visitors this summer.

CRIBBEN, SEXTON & Co. are not to be outdone by their competitors in the Chicago stove trade, but are making vigorous preparations for the proper entertainment of visitors to the World's Fair city. Their sample room has been thoroughly overhauled and brightened up, and the display of stoves and ranges will be a whole fair in itself.

A bill has been introduced by the Government into the British House of Commons, dealing with accidents in certain specific works. The aim of the measure is that employers may be compelled to give notice to the Board of Trade of any mishap occurring at their works which incapacitates a person from following his employment. It also gives power for investigation by an official of the Board of Trade into the cause of any disaster which may have happened. The bill has been called for primarily by the frequent casualties which have occurred at the Manchester Ship Canal Works. Some 1200 accidents involving injuries to workmen have taken place there, in addition to 130 accidents of a fatal character.

There are now about 15,000,000 bushels of wheat in store at Chicago and 10,500,000 at Duluth. The wheat in sight at lake ports approximates 4,000,000 bushels, which is above the average and will be an important factor in making strong freight rates on the lakes.

Prize Competitions

$25.00.

Prize Competition No. 18.

SUBJECT:

The Extent to Which Merchants Should Devote Their Attention to Outside Interests.

This competition is designed to call out views as to the desirability of merchants taking prominent part in the local interests of the place and as to how much time can thus be spent to the advantage of their business. Among these interests may be mentioned school matters, industrial development of the town or city, elections, boards of trade, railroad projects, good roads, manufacturing interests, public improvements such as water works, sewerage, gas and electric lighting, street railways, &c. Practical examples will add interest to the discussion. It will probably be generally agreed that attention to such matters increases the influence of the merchant in the community, and in that and other ways contributes to the success of his business, while at the same time it is a question as to how much time should be given to them. The subject is thus a broad one, covering the question as to the position which the merchant should occupy in regard to the public interests of the community.

This competition will remain open until April 22, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than April 22, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96-102 *Reade street,*
New York.
Prize Competition No. 18.

The committee to whom the contribu-

tions in Prize Competition No. 4 were referred have awarded the prizes as follows:

First Prize to BERNARD B. NEAL, New York.

Second Prize to J. E. BACKENS, Eureka, Cal.

Third Prize to G. B. KORBETT, New York.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 15. Closing April 1.

Suggestions in Regard to the Sale of Athletic and Sporting Goods.

No. 16. Closing April 8.

Three or More Rules to be Observed in Buying.

No. 17. Closing April 15.

How Merchants Should Treat Traveling Salesmen.

No. 18. Closing April 22.

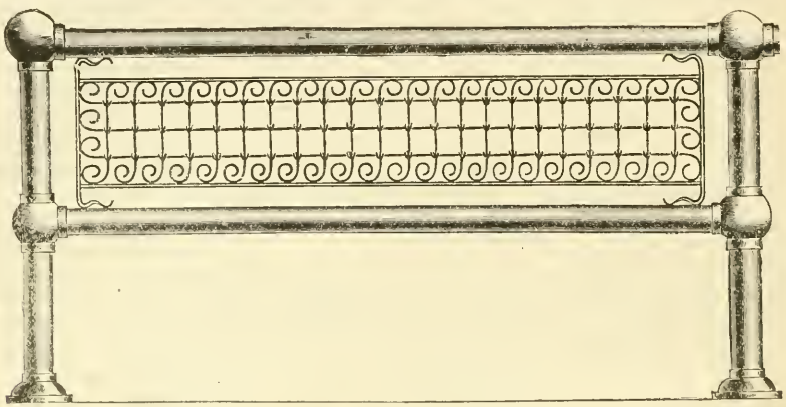
The Extent to Which Merchants Should Devote Their Attention to Outside Interests.

Another subject will be announced in our next issue.

It is acknowledged, observes an English gas exchange, that the best way of "earthing" lightning conductors is to connect them with gas or water mains; but it is important that the connection should be good, in order that there shall be no trouble at this point in the event of a heavy discharge. Herr Müller of Darmstadt sends to the *Journal für Gasbeleuchtung* a description of an arrangement of this kind, which is recommended as cheap, reliable and easily applied. The end of the conductor is wrapped once round the main pipe, and secured in place by means of a clamp made in halves and bolted together. The conductor passes up through a hole in the upper half of the clamp. When this is fixed, the whole thing is packed round with clay, and run in solid with lead, after which a coating of asphalt is applied to make a neat finish. The connection has been tested by Dr. Kittler, who found the resistance to be less than $\frac{1}{1000}$ ohm. It is, of course, wholly a question of obtaining and preserving, between the lightning conductor and the pipe, a clean metal connection large enough to carry off any charge that the conductor itself can withstand.

Exposition Railings.

The Crane Company, Randolph and Jefferson streets, Chicago, are devoting considerable attention to the manufacture of railings for the inclosure of exhibits at the coming World's Fair. These railings are made from 1½ to 2 inch pipe, and, together with the fittings and trimmings, are finished in four styles, namely, plain black for painting in any color, antique copper, polished steel and heavily plated brass. A variety of patterns has been designed to meet the views of purchasers, covering very plain forms, with single rail, a little more expensive with two rails and quite elaborate designs with ornamental panels. A section of the latter is herewith illustrated. Gates are made in a number of styles, such as a lifting bar, a telescopic tube or swinging on hinges. The company have issued a circular describing these railings, also stating that through an exclusive concession they have established on the exposition grounds a branch store and shop, where they can cut, thread and prepare any style of railing for erection.



Exposition Railing.

The Canning Industry.

The importance and economic value to the country at large of the canning industry has been constantly insisted upon, and with evident results for good, judging by the large yearly rate of increase reported in the number and capacity of canneries. In an article on this subject in the *Manufacturers' Record*, special attention is drawn to the facility of the canning operation and the small outlay necessary for setting up a factory. The preparing process requires no particularly expert knowledge beyond that possessed by any capable house wife who is used to cooking and preserving fruit and vegetables in her own kitchen. It can be easily learnt by any ordinarily intelligent person, while the manipulation of the cans—capping, tipping and sealing—requires but the most elementary acquaintance with the use of the soldering iron on the part of the operator. The article above referred to goes, in detail, into the cost of establishing and running a canning factory, showing with what a small investment of capital a canning plant may be started. For example, a plant having a daily capacity of 2000 cans of 3 pounds each, can be equipped with all necessaries for $100, exclusive, of course, of bricks and building. Similarly one for 3000 3 pound cans would cost $150; 4000 cans, $200; and 10,000 cans, $300. Once started the only outlay will be the payment for material and labor; the latter expense being calculated at $25 daily for a plant packing 3000 3 pound or 4000 2 pound cans. The wide field of agricultural products and fruits which can be treated by a canning factory ensures constant work pretty well all the year round, especially in the South, where the industry appears to be making long strides. Canned tomatoes—of which nearly 3,500,000 cases were packed in the United States last year—peas, beans, corn, peaches, pears, plums, berries, and an infinite variety of vegetable food, not to speak of meats and fish, find a ready market throughout the world, while the encouragement the canning industry gives to certain agricultural and other industries upon whose products it depends is considerable.

Soldering Metal for Aluminum.

An ingenious inventor in Norway claims, says the London *Plumber and Decorator*, to have realized the much-felt desideratum of a soldering metal for aluminum. It consists in combining cadmium, zinc and tin, mixed in substantially the following proportions: fifty parts cadmium, 20 parts zinc, and the remainder of tin; the zinc being first melted in any suitable vessel, the cadmium is added to this, and then the tin in pieces—the mass to be well heated, stirred and poured. The proportions of the various ingredients may be varied in accordance with the use to which the substance is to be put. Thus, where a strong and tenacious soldering is required, a large proportion of cadmium may be used; where great adhesion is desired, a large proportion of zinc would be essential; and, in case of an attractive and durable polish being sought, a greater per cent. of tin would be called for. The alloy produced in this manner—independent of its use as a solder for aluminum—is light in weight and capable of taking a very considerable polish; and, though as a soldering metal it can be satisfactorily employed for a variety of the ordinary metals, experience shows it to be of special adaptation to aluminum.

TRADE REPORT.

The Iron Market.

Various conditions have prevailed in the Iron market in different sections of the country during the past week. While there has been a demand and a somewhat stiffer market in some locations, the prevailing condition of trade in Iron and Steel is conservativeness, which manifests itself in a disposition to place orders only for immediate requirements, irrespective of any advancing tendencies in prices. The Eastern markets show very little change from last week, although on the whole the feeling is probably a shade firmer. The continued firmness in Steel and in Steel Stock has a sympathetic influence on the general market, although as yet without developing any actual change in prices. The next ten or fifteen days ought to test the situation, but for the present consumers are not placing much reliance in higher prices. Purchases, therefore, while fairly liberal, are not in marked contrast with the supply, consequently prices remain about on the same level as they have been for some time past. On general principles one might be inclined to look for a slight advance all along the line, but that point has not been reached yet, and until it becomes an actual demonstration it will be very hard to convince consumers that the market is going higher. At the same time, while they are open to conviction, they are not inclined to give much aid in bringing it about. The advance in Bessemer, and in Steel stock generally, has not aroused any great enthusiasm, because they doubt if it can be maintained. Prices are higher on paper, but so far as this vicinity is concerned they are not higher on actual transactions, and nominal quotations do not make much impression. It is admitted that the market may take a sharp upward turn, but when urged to place orders the general reply is that "we will risk the delay; if prices are going higher we shall be entirely satisfied to pay the advance." It therefore simply resolves itself to a question of supply and demand, which at present are evenly balanced, with perhaps a slight tendency toward scarcity at the inside figures, but at every 10¢ or 15¢ ℔ ton beyond that there are evidences of an increasing desire to market liberal quantities.

In Western markets, while the Iron trade appears to be in a mixed condition, the volume of business is steadily increasing, and the prospect for further trade brightens as the spring advances. A more confident tone pervades business circles generally, and some notable instances of advanced prices are reported, and yet at the same time there are sellers at very low rates, showing that some concerns are still exceedingly anxious for business. It is possible that the good volume of trade may in time enable these weak brethren to get in better condition. But as some withdraw others are ready to take their place. The advances in raw material made at Pittsburgh are looked upon as the most encouraging feature of the situation, and have played an important part in contributing to the better feeling.

Southern markets show some increase in the volume of business in Pig Iron during the week, and the general tone of the market is more confident; prices are not any higher for Southern Iron for immediate delivery, but there is less disposition to sell for long forward delivery, except at an advance of 25¢ ℔ ton; and, in fact, the leading furnaces discourage such orders, for they anticipate that Iron will be worth more money when the time of delivery arrives. There have been sales of several lots of 1000 tons for short forward delivery, as well as numerous carload lots, and buyers insist upon prompt delivery, for it is evident that they are leaving a narrow margin in purchasing over their present necessities, and stocks in consumers' hands are reduced to the lowest terms. The largest sale was 5000 tons of Gray Forge at $8.25, f.o.b. Birmingham, deliverable in equal quantities each month for five months. Small lots of this grade are selling at $8 for immediate shipment. Mottled Iron is in light supply and is difficult to buy for any less than Gray Forge.

The week has been uneventful in the New York Pig Iron market, no movement of any consequence having taken place. Northern brands are quoted at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14.25 @ $14.75 for No. 1; $13.25 @ $13.75 for No. 2 and No. 1 Soft.

At Philadelphia stocks of good Pig Iron are in small compass, so that prices are steadily held and have a strong undertone. Consumers claim to be able to buy at concessions, but when it comes to a point they usually take their regular brands in preference to those that are nominally lower. It is inferred, therefore, that, quality considered, current quotations are about as low as they are likely to be, and that buyers are not inclined to experiment with new brands, unless at larger concessions than are now available. Several furnaces that furnish considerable Iron to this vicinity are temporarily out of blast, and as others are well sold up, there is an impression that it will result in a scarcity of good Irons after a while, and that in any event prices of such cannot be lower. Southern brands are not specially abundant, but at quoted rates there is sufficient for all present requirements, so that prices just about hold their own. In fact, the entire situation appears to be one of easy uniformity, whatever disparity there is being due to quality, necessity for realizing, or some feature not directly connected with the market. General quotations are about as follows for Philadelphia and equivalent deliveries, with 25¢ to 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X.....	$16 25	@	$16.75
American Scotch, No. 2X.....	15 25	@	15.75

For the week under review the amount of Bessemer Pig Iron changing hands at Pittsburgh was considerably less than for the preceding week. This was due principally to the fact that buyers have covered their immediate requirements, while those who have not bought very largely ahead are buying in small lots and taking their chances on the future of the market. The heavy sales of Bessemer made during the past month have placed consumers in a better position as regards supply, and the scarcity of prompt Iron has disappeared to some extent. One of the largest consumers in this district, who bought very largely within the past month or six weeks, is reported as having asked some of the shippers to defer shipment for a time, and this will place some Iron on the market that otherwise would not have been available. The closing of the Duquesne plant for a month or six weeks will decrease consumption materially during the time the plant is off. Prices during the week were maintained on a basis of $14, Pittsburgh, with several buyers claiming to have been offered Bessemer at $13.90, Pittsburgh. We quote as follows:

No. 1 Foundry.....	$13.75	@	$14.00,	cash.
No. 2 Foundry.....	12.75	@	13.00,	"
Charcoal Foundry No. 1....	17.00	@	18.00,	"
Charcoal Foundry No. 2....	16.50	@	17.00,	"
Bessemer Pig.....	13.90	@	14.00,	"

Three sales of Bessemer, aggregating 2300 tons, have been made for April and May shipment, at $14, Pittsburgh.

Quite a good business has been done at Chicago the past week in local Coke Iron. Buyers appear to have gained more confidence in the stability of prices and little difficulty is now found in getting advance of say 25¢ ℔ ton as compared with rates current a couple of weeks since. The situation would be very much better if it were not for the low price now being quoted by Southern producers. Soft Irons are in pretty good demand, but sales have been made at the lowest rates ever known here and there seems to be no immediate prospect of an advance. Southern Foundry grades appear to be in

greater supply than Soft Irons and, if anything, are a little weaker, and special efforts have been made to push sales. Consumers realize that they have a golden opportunity in being able to buy at the rates now prevalent, and it is likely that the next few weeks will see a great deal of business in this direction. Southern makers, however, are not disposed to sell at these terms on very long deliveries. Lake Superior Charcoal is in some demand, but only in small lots. Large consumers are deferring their purchases until later in the year. There is as yet very little doing in Iron Ore here and it is probable that not much will be done in this line for two or three weeks. We revise our quotations as follows, cash, f.o.b. Chicago :

Lake Superior Charcoal	$16.50 @ $17.00
Local Coke Foundry, No. 1	13.75 @ 14.25
Local Coke Foundry, No. 2	13.00 @ 13.25
Local Coke Foundry, No. 3	12.75 @ 13.00

The foundries in the Cincinnati district appear to be full of work, and the melting of Iron in the aggregate is apparently larger than it was a year ago. There is not much Charcoal Iron selling, but there is a good demand for No. 2 and No. 1 Foundry Iron. The sales for the week aggregate about 25,000 tons of all kinds of Iron. Many of the Southern furnaces are sold so far ahead that they will take no more orders for early delivery. Quotations unchanged.

Foundry.

Southern Coke, No. 1	$13.25 @ $13.50
Southern Coke, No. 2	12.00 @ 12.25
Southern Coke, No. 3	11.25 @ 11.50
Ohio Soft Stone Coal, No. 1	16.00 @ 16.25
Ohio Soft Stone Coal, No. 2	15.00 @ 15.25
Mahoning and Shenango Valley	14.75 @ 15.00
Hanging Rock Charcoal, No. 1	19.00 @ 19.25
Hanging Rock Charcoal, No. 2	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 1	15.50 @ 15.75
Tennessee and Alabama Charcoal, No. 2	14.50 @ 14.75

Metal Market.

Copper.—All the strong points that have been brought forward of late in the shape of reduced output of Copper, and prospective increase in the demand, seem to be barren of anticipated results. In any event, the larger demand is extremely slow about materializing, while the offering is strongly suggestive of some anxiety on the part of sellers. Certain it is that 11¾¢ has become a common selling price for Lake Superior Ingot and that business has been effected "on the quiet" at a shade less in more than a few instances. In fact, 11⅝¢ would appear to be very close to current market value for spot or near future deliveries. Speculators have offered August delivery at as low as 10½¢, without result in the way of attracting custom from any quarter. Casting Copper is not offered with the same persistency, but the fact has been brought out very plainly that buyers for round lots have only to bid 10¾¢ to be accommodated, although the nominal quotations are 10¾¢ @ 11¢ for ordinary quantities. Taken as a whole, the market seems to be disappointing and not without signs that the intended effect of reduced production in this country and Europe is, for the present at least, offset by the indifference of buyers. The possibilities for a large demand for Copper for electrical purposes exist, but, like other prospective outlets, this turns out to be rather disappointing up to the present time, and it is only in sporadic cases where immediate delivery was involved that sellers have secured the nominal quotations.

Pig Tin.—The finest work engineered by the "bulls" in the speculative arena to sustain or advance prices has been ineffective. As a matter of fact, the weight of heavy supplies seems to have outbalanced manipulation as a factor in regulating prices, and the outlook is shrouded with more doubt than it has been at any time since the McKinley duty boom was started in motion. Surface appearances are that distributors and consumers have been rather hasty and that the burden of heavy stocks on spot and about and afloat has become a little wearisome. Certain it is that the premium on spot stock has disappeared in this market, although nominally about £3 ℔ ton in London. April contracts are fully 15¢ ℔ 100 lb lower here at the present time than they were a week ago and 10 ton or larger lots have been offered in the interior as well as here at that reduction, without stimulating business. The Banca and Billiton sales in Holland realized prices somewhat below previous valuation and indicated that Continental as well as English markets are somewhat unsettled.

Pig Lead.—Some sales were made early in the week at 4 05¢ for good-sized lots and 4.07½¢ for single carloads, but the market has become quieter, and, with the turn in demand, there is some softening of values. That is to say, sellers at 4.05¢ are more numerous now than were buyers at that time, while the demand is extremely tame. It is not clear that supplies at primary points are heavier, but the offering for last half of April and later shipment is freer, indicating that prospects are favorable for a liberal supply of metal in the near future.

Spelter.—Ten car loads or more of Western Spelter have been sold for early shipment at about 4.30¢, delivered in the East. The demand has slackened during the past few days, however, and sellers are now more numerous than buyers at that price. Nothing new has come to light regarding the proposed combination of producers, and at present negotiations for sale of Spelter are carried on as though nothing of the kind had been contemplated.

Antimony.—Dealings have been moderate and prices are without radical change although rather soft. Current quotations are 10¢ @ 10¼¢ for Hallett's, 10¼¢ @ 10½¢ for LX and 10½¢ @ 10¾¢ for Cookson's.

Tin Plate.—In roofing sizes of Terne Plates there has been rather more business, but not enough to have any decided bearing upon values. Otherwise the market has presented a tame appearance and orders for both prompt and future deliveries have been filled at practically the same prices that ruled a week ago. Business with retailers remains in an unchanged condition, with no change in prices.

Coal.

The Anthracite Coal trade is slumpy and weak, notwithstanding the lower schedule of prices, and there are signs of growing dissatisfaction with the general management, some of the operators thinking that on the part of a prominent leader at the agents' meeting there is too much dictation, which may result in open warfare, perhaps, within a month. The independent coal miners are said to derive considerable advantage from their opportunity. It is certain that there is some cutting—that nobody, in fact, expects to realize more than $4 for Stove, though the schedule says $4.15, and other sizes are shaded in proportion. Pea and Buckwheat are scarce and firm. Operators deny that the new schedule is received with satisfaction, claiming that, on the contrary, it excites discontent and invites demoralization. The best that can be said is that the market absorbs a fair amount of Coal, but a period of continued weakness is not improbable as the spring advances, even if accompanied by activity. Respecting lower railroad tolls, the Philadelphia *Ledger* says that if the rate of tolls from the Schuylkill region is made $1.70, the rate from the Lehigh will be fixed at $1.75, and from the Wyoming district $1.80. The total shipments to market for the week ending March 18 were 766,126 tons, compared with 574,037 tons in the corresponding week last year, and for the year to that date, compared with the corresponding period of 1892, there is an increase of 368,570 tons.

Financial.

There is no special animation in business circles, due mainly to questions concerning the currency, though a tempestuous March and bad roads, interfering with the ordinary course of trade, have had much influence. Conjectures recently rife respecting the possibility of gold going to a premium are at least temporarily dismissed, the supposition being that the United States Treasury is no longer embarrassed by a lack of gold, the foreign demand having diminished, while bankers in all parts of the country readily surrender gold in exchange for notes. Henry Clews says: "The large outflow of currency to the West and other points which came so unexpectedly has suddenly abated, and the indications now are that, so soon as we have turned April 1, money will flow back to this center in considerable volume. Borrowers, therefore, feel assured that, so far as concerns the local money market, it is now only a matter of bridging over for the next two weeks; which is an assurance worth much as a contribution toward confidence." The fact is recognized, however, that the causes of the recent gold drain are still operative, and are liable to become intensified, should there be no improvement in foreign trade conditions and no definite prospect that the accumulation of silver shall cease. With low rates of interest in Europe foreign capitalists have no motive for withdrawing their invest-

ments from this side so long as confidence is not disturbed. A special feature this week has been a fall in the price of bar silver in London to 37 1/8 pence ℔ ounce, the lowest on record, caused by rumors that the Indian Government will close the mints against silver. Two notable events closely related to business interests are the decisions rendered by Judges Ricks and Billings, of Toledo and New Orleans respectively, the former holding that railway employees and railway officials are alike amenable to law and cannot sacrifice public interests in seeking their own advancement, while the latter discusses fully the rights of labor unions and finds that the merchants in New Orleans who asked for injunctions against combinations in restraint of trade are entitled to them.

The settlement of the cotton strike in England and the coal miners' strike in the Monongahela Valley had little effect, except as the former event caused a decline of several points in cotton quotations, due to heavy selling orders telegraphed from the South to Liverpool. Spot cotton was steady with a good export demand. Coffee was dull and slow. Coal was weak and irregular, and there were indications of dissatisfaction with trade managers. Sugar was stronger and advanced all round. Dry goods jobbers report that the condition of the market and of manufacturing are the best witnessed in many years. The mills of every description are full of orders. Wheat declined between 1¢ and 2¢ ℔ bushel, with nearly a corresponding reduction in value of corn and oats. Pork products were also lower.

Chicago Report.

Scrap.—Cast Scrap is in very good demand, but Wrought grades are comparatively quiet. Dealers' buying prices are as follows:

	Per net ton.	Per ℔
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12 00	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	6.00	....
Horseshoes	12 50	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9¼¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	2¾¢

Anthracite.—Carload lots of 12 net tons are still quoted as follows:

	Egg, Sto. and Ch.	Grate.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

CONDITION OF THE

Hardware Trade.

OUR REPORTS WITH SUBSTANTIAL unanimity refer to the volume of business as very satisfactory, and in some lines, among which Heavy Hardware and seasonable specialties may be mentioned, is especially active. With the advance of the season there is a general quickening in the demand, which has, however, been retarded somewhat by severe weather. Retailers are evidently placing orders carefully and are indisposed to purchase beyond their requirements, but throughout the country the prevailing prosperity and the prospect of excellent trade during the summer are having their effect on orders. In a few lines prices are slightly stronger and the market is characterized by a better tone than for some time. Quotable changes in price are, however, few and unimportant. There is more or less complaint in regard to collections, which are not as easy as could be desired, and in some sections are particularly slow.

Advices from Chicago.—Better weather in part of this section has stimulated the demand for Shelf Hardware to some extent. The business of the past week was certainly larger than the previous week, but there is still plenty of room for improvement. The roads are in exceptionally bad condition throughout the Northwest, and even with good drying weather considerable time will be required for them to get in good shape. Snow storms have also been prevalent during the past few days, and last week traveling men were again snowbound in some localities, which is rather a setback for this time of the year. The prices of goods are hardening in quite a number of instances. Stamped ware is dearer and staple goods are steadily moving upward. The strike in the Chicago carriage factories is affecting the trade of the Heavy Hardware jobbers, who have been enjoying an excellent demand from that branch of business. Collections are still bad and the prospects are not bright for an early improvement. It is expected that as soon as farmers are able to get in the fields they will be so busy seeding that they will be disposed to attend to nothing else for some little time.

Notes on Prices.

Cut Nails.—The Cut-Nail market is steady and without specially new features. Trade is continuing in very satisfactory volume, the aggregate of transactions being large. The market in the matter of price is represented by the quotation of $1.20 for carload lots at mill and $1.40 for similar lots on dock, New York. The new card is being adhered to remarkably well and is used with general satisfaction by the trade. While there is a disposition to regard orders with a high average with exceptional favor, the understanding that quotations are to be made without regard to average is very well carried out by the mills.

Advices from Chicago.—A very fair trade is reported by local manufacturers. They now quote $1.40 on account of the lower freight rates from the East after April 1, but express themselves very confidently as to their ability to maintain this price, notwithstanding the report of some cutting in other localities. Small lots from stock are held at $1.50.

Wire Nails.—The Wire-Nail market is in what is generally regarded as a very satisfactory condition, the volume of business being heavy and dealers evidently purchasing freely in confidence that Nails bought at ruling prices are a safe purchase. Quotations are on a basis of $1.50, f.o.b. factory, with Cleveland as the point of equalization for the West and Pittsburgh for the East. This quotation is maintained with exceptional firmness, and it is thought not unlikely by some well-informed parties that higher figures will be named in the near future. Small lots from store in New York are quoted at $1.75 to $1.80.

Advices from Chicago.—Manufacturers report a very good demand from the large trade, and in numerous instances very prompt shipment is wanted, showing that stocks are being run quite close. Prices are maintained very firmly, as is shown by the inability of manufacturers to purchase odd sizes from each other at anything less than the current market quotation. Inquiries are coming forward from large buyers who were supposed to have covered their wants for the greater part of the spring trade. The demand bids fair to continue in full tide longer than usual. A reduction of 2 cents per hundred in freight rates from Ohio mills goes into effect on April 1, but if the volume of business keeps up it is not likely that the reduction will be made on prices here, which are now $1.65 for carload lots and $1.70 for small lots from stock.

Barb Wire.—The Barb-Wire market is firm on a basis of $2.45 to $2.50 for Four-Point Galvanized in carload lots at mill. The volume of business is large and the condition is, on the whole, very satisfactory to the manufacturers. Anticipations are expressed that the year's business will be exceptionally heavy, some indications pointing to an unusually large demand. Carload lots on dock in New York are held at $2 65 to $2.70. There has been no recent change in the price of small lots from store.

Advices from Chicago.—Manufacturers note a steady improvement and expect a very heavy trade as soon as the weather improves throughout the Northwest. Jobbers are now in line, quoting prices no lower than those of manufacturers. This has given a better tone to trade, as it shows that jobbers' stocks are being worked off. Small lots are now selling at $2.30 for Painted and $2.70 for Galvanized. Carload lots are quoted at $2.20 and $2.60 respectively.

Tackle Blocks.—The market is very irregular and prices are probably lower than ever before, with a tendency still downward. This condition of things affects not only the Iron Strapped Blocks, but also the fancy and patent Blocks to some extent. This line as a whole is in a very unsatisfactory condition and characterized by a good deal of irregularity owing to the very animated competition between the manufacturers.

Carriage Bolts. — Common Carriage Bolts are in a somewhat more satisfactory condition than a few weeks ago. There is evidence of a reaction from the extreme prices which have lately ruled and some of the lowest quotations have been withdrawn. The market is still somewhat uneven, but there is an evident improvement in its tone. The volume of business is large and many of the manufacturers are full of orders.

U. M. C. Loaded Shells.—The Union Metallic Cartridge Company, Bridgeport, Conn., have issued a revised price-list of their New Club, Smokeless and Trap-Loaded Shells, in which some additions are made to their former line on which the list prices remain unchanged. It is subject to a discount of 40 and 10 and 10 per cent. In connection with it they issue a circular under date March 15, in which they give information in regard to the principles on which the Shells are loaded.

Steel Mortar and Brick Hods.—These goods are put on the market by the Avery Steel Mfg. Company, Chicago, for whom Wm. H. Jacobus is agent, 90 Chambers street, New York. They are sold from the following list, which is subject to a discount of 40 and 10 per cent.:

	Per doz.
No. 50 Steel Mortar Hods, galvanized, 24x12x13 inches	$45.00
No. 60 Steel Mortar Hods, black, 24x12x 13 inches	39.00
No. 55 Steel Brick Hods, galvanized, 21x6½x9 inches	34.50
No. 65 Steel Brick Hods, black, 21x6½x9 inches	28.50

Concentrated Soldering Flux.—Paul Thomas, Richard and Delevan streets, Brooklyn, N. Y., states that this flux manufactured by him, makes no poisonous fumes, does not discolor or stain the material, contains no free acids, does not injure tools or hands, runs free and easily, unites as strong as possible, is suitable for all purposes, and is absolutely non poisonous. He also states that, as the flux is of the highest possible concentration, it must be diluted with about two to three parts of water to one part of flux, bringing the actual cost to 1¢ ℔ lb. The flux is sold at the following net prices, f.o.b., New York:

	Cents.
In Barrels, per pound	4
Smaller quantities	5

Rosin.—As shown in our Metal and miscellaneous quotations, there has been a slight change in the price of Rosin. The change is in the nature of a reduction of from 1¢ to 15¢ ℔ barrel of 280 lb. The higher grades are the ones in which the greatest changes occur.

Pittsburgh Tin Plate Works, New Kensigton, Pa., are manufacturing a line of Roofing Plates, upon which the following prices are quoted, applying to New York and Chicago:

Kensington, IC, 14 x 20	$6.75
Kensington, IC, 20 x 28	13.50
Kensington, IX, 14 x 20	8.00
Kensington, IX, 20 x 28	16.00
Westmoreland, IC, 14 x 20	6.25
Westmoreland, IC, 20 x 28	12.50
Juno, IC, 14 x 20	5.75
Juno, IC 20, x 28	11.50

Avery Steel Tote Shop Box.—Avery Steel Mfg. Company, Chicago, for whom Wm. H. Jacobus is agent, 90 Chambers street, New York, are manufacturing this article. It is sold from the following list, which is subject to a discount of 40 and 10 per cent.:

Steel Tote Shop Box.

	Per 100.
No. 2, plain, 18 gauge, 18 inches long, 10 inches wide, 5 inches deep	$100
No. 4, plain, 18 gauge, 21 inches long, 10 inches wide, 5 inches deep	120
No. 6, plain, 16 gauge, 20 inches long, 10 inches wide, 5 inches deep	143

The above sizes are carried in stock; other sizes will be quoted on application.

Harvard Pants Stretcher.—This article is put on the market by Geo. H. Gregory, 35 Arch street, Boston. It is sold to the trade at $6 per dozen.

The W Stake Irons.—The malleable Surface and Mortise Stake Irons, manufactured by the Minnesota Hardware Company, St. Paul, Minn., are sold to the trade at the following net rates:

No. 1, Surface Iron	10 cents each
No. 2, " "	13 " "
No. 3, " "	16 " "
No. 4, " "	20 " "
No. 20, Mortise Iron	14 " "
No. 30, " "	17 " "
No. 40, " "	21 " "

Steel Web Picket Fence.—The De Kalb Fence Company, De Kalb, Ill., are manufacturing this Fencing. The list price of the Fence, 6 cables, 37 inches high, is 13 cents per lineal foot, which is subject to a discount of 30 per cent., f.o.b. De Kalb.

Wire Board and Ornamental Strip.—This article, which is manufactured by the De Kalb Fence Company, De Kalb, Ill., is sold to the trade at 3½ cents per pound, f.o.b. De Kalb.

Lake Superior Stone.—A. W. Chase, 107th street and First avenue, New York, has issued a new price-list of Lake Superior Stone, which is as follows, subject to a discount of 40 per cent.:

	Per pound.
Stone, 8 x 2 x 1½	$0.26
Slips, 3½ to 5 inches long	.40
Penknife Pieces 3½ to 5 inches long	.48
High Rounds	.40

Mounted in Polished Cases.

	Per dozen.
3½ x 1	$3.50
4 x 1½	4.00
5 x 2	5.00
6 x 2	5.50
7 x 2	6.00
8 x 2	6.50

Scythe Stones are quoted at $12 per gross, subject to a discount of 40 per cent.

Glass.—There is little of interest in the Glass market at present and no changes in prices or in the condition of trade. Local dealers report a moderate amount of trade, while factories are represented as shipping their product so that stock is not accumulated. Improved conditions in weather are likely to increase the demand for Glass in the near future. At a meeting of the National Window Glass Company, held last week, no action regarding lower discounts was taken. It is understood that the Glass importers of New York and Boston held a meeting at Boston on the 28th inst., looking toward concerted action in regard to prices. The Plate-Glass Market continues in a satisfactory condition, both in regard to prices being sustained and in the demand. We quote prices as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount to 80 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	....	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	....	@	.03
Large Hose, ℔ ton	....	@	9.00
Wringer Rolls, ℔ lb	....	@	.04½
Wringer Wire Rolls, ℔ lb	.01	@	.02
Syringes, ℔ lb	....	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb 9½¢
Light and Tinned Copper	℔ lb 8½¢
Heavy Brass	℔ lb 7¢
Light Brass	℔ lb 6¢
Lead	℔ lb 3½¢
Tea Lead	℔ lb 3½¢
Zinc	℔ lb 2¾¢
No. 1 Pewter	℔ lb 14¢
No. 2 Pewter	℔ lb 7¢
Wrought Scrap Iron	℔ gross ton, $13.00
Heavy Cast Scrap	℔ gross ton, 9.00
Stove Plate Scrap	℔ gross ton, 6.00
Burnt Iron	℔ gross ton, 4.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags	℔ lb		4 ¢
No. 2 White Rags	℔ lb		3 ¢
Mixed Rags	℔ lb	1½ @	1¾¢
Blues and 3ds	℔ lb	1¾ @	2 ¢
Hard Sized White Shavings	℔ lb	2¾ @	3 ¢
No. 1 White Book Shavings	℔ lb	2¼ @	2¾¢
No. 2 White Book Shavings	℔ lb	1½ @	1¾¢
Light Book Shavings	℔ lb	⅞ @	1 ¢
No. 1 Mixed Shavings	℔ lb		1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @	⅞¢
No. 1 Printed Books	℔ lb	1⅜ @	1½¢
Ordinary Mixed Books	℔ lb	¾ @	⅞¢
Newspapers	℔ lb		½¢
No. 1 Manila Paper	℔ lb	1⅛ @	1¼¢
No. 2 Manila Paper	℔ lb	¾ @	1 ¢
Bogus Paper	℔ lb	⅝ @	¾¢
Common Paper	℔ lb	½ @	⅝¢
Straw Chips	℔ lb	⅛ @	¼¢
Binders' Clippings	℔ lb	⅛ @	⅜¢
Jute Butts	℔ lb		1¼¢
No. 1 Jute Bagging	℔ lb	1¼ @	1⅜¢
Mixed Bagging	℔ lb		1 ¢
No. 2 Bagging	℔ lb		¾¢
Hemp Twine	℔ lb		2½¢
Manila Rope	℔ lb		2¾¢
Jute Rope	℔ lb	1½ @	2 ¢
Mixed Rope	℔ lb	¾ @	⅞¢

The Cut-Nail Card.

TOUCHING on the advantages and disadvantages of the new Cut-Nail card, we have the following letter from a leading house in Georgia, who express. it will be observed, their desire that the Cut-Nail manufacturers should adopt a card based on the value of each size, whether or not the Wire-Nail manufact-

urers should see their way clear to taking similar action:

We are pleased with the new Steel Cut-Nail card, for the reason that it does away with averages; that it prevents small dealers, who buy on very high averages, from demoralizing the market by quoting Nails on a lower base price in consequence of their advantage in buying on high averages; that it makes the comparative cost between Wire and Cut Nails easy to arrive at, and that it necessitates salesmen remembering only one instead of two cards. While these are good, strong reasons in favor of the new Nail card, we think it was founded on a dangerous policy rather than on true business principles; that is, it was adopted through necessity rather than on the relative value of the various sizes of Nails, and for this reason we believe the card cannot be of any great duration.

We would be very much pleased to see the Cut-Nail manufacturers adopt a card based on the value of each size, even though it did not conform to the advances as made by the Wire Nail manufacturers.

Trade Notes.

Among the novelties for which the Stark Machine & Tool Company, Buffalo, N. Y., are manufacturing Dies and Presses are, Novelty Soap Powder Holder, for A. F. Stowell, Rochester, N. Y.; Automatic Garden Sprinkler, R. G. Parks, Walla Walla, Wash.; Improved Refrigerator Traps, for Baldwin Refrigerator Company, Burlington, Vt.; Ice-Cream Freezer Cups, Shepard Hardware Company, Buffalo, N. Y.; Improved Ice Cream Spoons, M. L. Sebech, Lewisburg, Pa.; Novelty Tea Pots for Aldrich & Ray, Buffalo, N. Y.; Improved Dinner Bucket for Grier Bros. Company, Dubois, Pa., and Improved Dinner Pail, Star Dinner Pail Company, Pittsburgh, Pa.

E. B. Finch, 239 Front street, New York, manufactures the New Daisy and the Popular Oil Stoves; also the Daisy Lamp Stoves. Cuts of these goods and some interesting particulars are given in an announcement elsewhere.

The J. F. Pease Furnace Company, Syracuse, N. Y., make an interesting announcement elsewhere in this issue relating to the Economy Heaters and Furnaces of their manufacture. The apparatus include combinations in a number of patterns, Steam Heaters, Hot-Water Heaters and Warm Air Furnaces in several patterns.

F. H. Lawson & Co., Cincinnati, Ohio, direct attention in an announcement elsewhere to the Lawson Old Process and Kalos Old Style Roofing Plates. The former is described as made of the finest Siemens steel, heavily coated, each sheet squared and stamped and the Kalos, which, from its name, must be a beautiful article, is described as an old style Roofing Plate, stamped and squared, with extra heavy coating.

The Otis Steel Company, Limited, of Cleveland, Ohio, are preparing an exhibit for the World's Fair, showing some very intricate shapes made out of Otis Steel by the Avery Stamping Company of Cleveland, Ohio.

John Grossus' Sons, 389 Main street, Cincinnati, Ohio, in an announcement in the advertising columns this week, direct attention to Warm-Air and Ventilating Apparatus of their manufacture. Cuts of Heaters are shown and the general advantages are stated.

In the advertisement of Gummey, Spering & Co., Philadelphia, Pa., they direct attention to Gilbertson's Old Method Roofing Plate, the special features of which are noted, and also refer to the Pennsyl Old Method Roofing Plate. They likewise state that they are manufacturers of Climax and Phenix Roofing Plates.

The Joseph Dixon Crucible Company, Jersey City, N. J., favor us with a calendar for the month of April. It is carried on a card measuring 3¼ x 5½ inches, which is embellished with a design consisting of scraggy boughs of a tree supporting what we assume to be a bird's nest made of Dixon's American Graphite Pencils. Above the design are lines by Margaret E. Sangster, as follows:

"And the prettiest thing in the world will be
The building of the nest."

Among recently authorized corporations in Illinois are the following: The Jackson Stove Mfg. Company, at Chicago; capital stock, $150,000; for the manufacture of stoves and fittings; incorporators, Thomas E. Paxton, C. E. Conway and L. L. Conway. The International Radiator Company, at Chicago; capital stock, $100,000; for the manufacture of materials for heating railroad cars with hot water and steam; incorporators, Charles Pfeifer, Joseph Shackelton and P. H. McCarthy. The Farquhar Heating Company, at Chicago; capital stock, $150,000; to conduct a general house heating and manufacturing business; incorporators, Albert F. N. Hambleton, Milton J. Farquhar and Charles Loughridge. The Chicago Electric Headlight Company, at Chicago; capital stock, $200,000; for general manufacturing and to deal in electrical goods; incorporators, John T. Van Smith, Arthur Horton and Clarendo B. Eyer. The Elevator Safety Appliance Company, at Chicago; capital stock, $20,000; for the manufacture of elevator appliances and novelties; incorporators, Richard Robins, Henry L. Norton and John J. Hayes. Chicago Steel Company, at Chicago; capital stock, $100,000; for the manufacture of iron and steel; incorporators, Roswell H. Buckingham, E. M. McKenney and A. Lehmann. Havana Metal Wheel Company, at Havana; capital stock, $15,000; for the manufacture of wheels; incorporators, Lewis E. Waterman, Harvey J. Phelps and Orland B. Thorp. The Electric Propeller Company, at Chicago; capital stock, $200,000; for the manufacture of electric propelling apparatus machinery; incorporators, William C. Marshall, David C. Kling and Louis C. Depproft.

The Chicago Stamping Company, Chicago, will remove their store rooms and offices May 1 from their present location to their new buildings adjoining their factories at Harrison, Green, Peoria, and Congress streets. The increase in their business has made it desirable to concentrate their factories and stores to facilitate the execution and shipment of orders with the least delay.

Walbridge & Co., Buffalo, N. Y., issue an artistic catalogue of Fine Builders' Hardware, which shows to advantage the line of goods displayed. The cover is finished in cream and gold with embossed work and raised letters, the plates and covers being held together with colored silken cord. The above company have recently fitted up a special room for the display of fine house trimmings, in which samples of the different finishes mounted on all the natural woods ordinarily used are shown. In this catalogue a photographic view of the interior of the room is given, and also larger views of each of the sample boards. The sample boards are made of oak, mahogany, cherry, white enamel, sycamore, maple, &c., which show to advantage the various finishes of Polished Bronze, Old Copper Bronze, Gold Enamel Bronze, Bower-Barff, Oxidized Silver, &c. The assortment shown is varied and comprehensive. The firm were led to fit up their bronze room to facilitate the selection of suitable Hardware by architects, builders and owners, as the necessity of harmony between the style of architecture of a building and the patterns and finish of the trimmings was fully recognized by them.

The Hart Mfg. Company have been incorporated at Troy, N. Y. The capital stock of the company is $50,000. The company are to manufacture cans, pumps, faucets, &c., in Troy. The directors for the first year are: William A. Thompson, James F. Cowee and Charles W. Hart.

A. B. Olsen, Kansas City, Mo., manufacturer of Olsen's Automatic Ejecting Rotary Corn Poppers, reports a heavy demand for all the different sized machines made by him. He is at present engaged on an extensive order for his Poppers, to be used in the World's Columbian Exposition in Chicago. Mr. Olsen also advises us that he is forming a stock company, with headquarters in New York City, to manufacture his Corn Poppers for the New England States, New York and Pennsylvania. This company will have a capital of $25,000, and will sell only in the localities above mentioned.

Matthai, Ingram & Co., Baltimore, Maryland, manufacturers of Tinware and kindred goods, who suffered recently from fire, announce they are not as badly damaged as they at first supposed. They have already commenced to rebuild and will push along vigorously. The damage to the retinning department proved to be not as great as at first appeared, and operations there have already been resumed. A large stock of Dripping Pans were stored in another building and, barring a few sizes, shipments are being made as promptly as usual. They will have the retinning and galvanizing departments entirely isolated hereafter from the other buildings and made as nearly fireproof as possible.

The Allerton, Clarke Company, 23 Lake street, Chicago, is a recent incorporation of which S. W. Allerton is president, C. C. Clarke is treasurer and C. A. Rosecrans is secretary. They are sole Western agents for L. A. Sayre, Norwich Lock Mfg. Company, The Arcade File Works, Columbia Tin-Plate Company, Columbia Encaustic Tile Works and Irondale Steel and Iron Company. The officers of this new company are men of high standing and long business experience, and, as the foregoing list shows, they represent a number of exceptionally high-class manufacturers of articles handled by the Hardware and allied trades.

New uses are being found for aluminum by the Illinois Pure Aluminum Company, Lemont, Ill.; an aluminum slate pencil is their latest product. The pencil is light, and, the makers claim, indestructible; the marks are erased with a wet sponge. The pencils are about the length and size of an ordinary slate pencil, and are partially covered with assorted colored paper. A crease around the blunt end of the pencil affords a place for fastening a string.

The Pecora Paint Company, 3600 North Fourth street, Philadelphia, Pa., have a very striking advertisement elsewhere in this issue respecting various Cements and other articles of their manufacture. The announcement in blue and red calls attention to the Pecora Roofing Cement, the Indestructible Stove Cement, the Pecora Asbestos Furnace Cement and the Pecora Plumbago Paint. All these goods are commented upon, and users of Cements and Paints will do well to note the advantages mentioned.

A slight change in the *personnel* of the firm of James M. Robinson & Co., manufacturers of Sheet Metal Working

Machinery, Cincinnati, Ohio, has taken place. William Moser, the "Co.," retires from the firm, having purchased the Tobacco Tag department of the business, while J. M. Robinson will conduct, as heretofore, the Sheet Metal Working Machinery department of the business, and will give to the latter more attention. He will also increase the facilities for the production of that class of machinery, including the Globe Cornice Brake.

The company recently organized at North Tonawanda, N. Y., for the manufacture of the Spang Pressure Blower and Exhausters have been incorporated as the North Tonawanda Mfg. Company. It has been announced that the company would be known as the Electric City Machine Company, but it was not possible to obtain articles of incorporation under that title. The company begin business with a large number of orders booked.

Berger Brothers, 237 Arch street, Philadelphia, Pa., have a page announcement elsewhere of the various goods that they manufacture and handle. Illustrations show eave-trough hangers, tinners' trimmings, registers, pipe straps and very many other goods, and the text gives a further notice of them.

The Thatcher Furnace Company, 3 Peck slip, New York, refer to the Thatcher Furnace as having a large and rapidly-increasing sale in all parts of the country, and they intimate that dealers will do well to secure agencies.

New Publications.

The Standard Guide to Chicago for 1893. World's Fair edition. 552 pages. Scarlet cloth. Published by the Standard Guide Company, 358 Dearborn street, Chicago.

This is a completely revised edition of Flinn's publication on Chicago, which has now become thoroughly known as one of the best of its kind. It is profusely illustrated and contains a great deal of interesting matter pertaining to the business interests of the city as well as the usual details regarding points of general interest which are handled in guide books. Those who propose to visit Chicago and the World's Fair this summer will do well to provide themselves with a copy of this work, as they may then be able to lay out their time to better advantage.

Geologic Atlas of the United States. U. S. Geological Survey, J. W. Powell, Director. Washington, D. C., 1892.

The first installment of the great geologic atlas of the United States, just issued from the engraving department of the U. S. Geological Survey at Washington, includes maps of the Chattanooga and Kingston districts of Tennessee, Hawley district of Massachusetts, and Sacramento and Lassen Peak districts of California. These five sections are treated in a manner which bears ample evidence of the thoroughness of the surveys which they record. Each separate district illustrated is accompanied by a sheet of text explanatory of the general principles of the geologic atlas. Other sheets appended to the maps are descriptive of the topography, stratography, geology, structure and mineral resources, &c., of the different districts treated, together with a special sheet outlining their geological history in a very comprehensive manner. The maps descriptive of each district are 21 x 18 inches, the scales used being 1 inch to 1 mile, 1 inch to 2 miles, or 1 inch to 4 miles. These atlas sheets are beautifully engraved, and embrace distinct maps showing the topography, areal geology, structure sections, economic geology and columnar sections of each district. In the map of structure sections the sections are introduced in profile across the topographical map at intervals, upon the exact line of country which they represent. The atlas sheets being parts of one great map, are laid out without reference to political boundaries of any sort. They are not State, county or town maps, but only parts of one map of the United States, although for convenience of reference they are given such names as will readily suggest the region shown. A glance at these initial sheets will give some idea of the vastness of the work undertaken by the Geological Survey when it is known that several thousand of such sheets will be required to complete the large topographic and geologic maps of the United States now being made by the surveyors.

Progress of the South.

The Southern section of the United States is now rejoicing in a gratifying revival of prosperity after a time of business depression which has taxed their powers of endurance to the utmost. The cotton, iron and coal markets are in a sounder condition than they have been for some time. Credits are good, and there is every prospect of large business for some time to come. But, notwithstanding the period of financial difficulty through which the Southern States have passed, their progress has all along kept pace with the general growth and prosperity of the country to a greater extent than is generally conceived. Practical evidence of the commercial and industrial advance which has taken place is given by a writer in the *Manufacturers' Record Magazine*, who says that: Ten years ago the South's agricultural, manufacturing and mining products aggregated in value about $1,200,000,000. Now they are about $2,100,000,000 and are annually increasing. The increase in population during that period was only about 18 to 20 per cent., as the South has no heavy immigration to swell its growth. So, practically, the same people who ten years ago were producing $1,200,000,000 a year are now, by reason of being more fully employed, able to turn out nearly $1,000,000,000 a year more than they were then doing. They have doubled their railway mileage and quadrupled the traffic. In addition, they have increased their coal and iron production four-fold, trebled their cotton mills, added $2,000,000,000 to the assessed value of their property, doubled their banking capital, and more than doubled their manufacturing interests. That this gratifying progress has been accomplished during a decade, several years of which have been marked by great commercial depression, which materially affected all the agricultural and manufacturing interests of the Southern States, augurs well for their prospects of advance in the future, should this ratio of progress continue.

A novel apparatus is reported to have been recently fixed in front of the show windows of a few stores in Paris, pioneering the way for the introduction of the invention. It consists of a small pipe laid along the exterior of the window, from which pipe, through numerous holes, is emitted a gentle current of warm air, slighly scented, which is very agreeable to the olfactory nerves of the window gazers, while it serves the purpose, so it is said, of keeping the window clear and bright, thus more effectively displaying the contents.

There appears to be no longer any reasonable doubt that the Canadian Pacific Railway Company intend carrying into effect without delay a scheme to secure an independent terminus at New York City, by means of connecting roads from Ogdensburg, opposite Prescott in Canada.

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THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, April 8, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....220 South Fourth Street
BOSTON.....146 Franklin Street
PITTSBURGH.....Room 509 Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....312 The Cuyahoga

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

The Metal Worker Skylight Competition.

So far as can be judged from the number and general appearance of the plans and descriptions received in response to *The Metal Worker* Skylight Competition that closed a week ago, the results are exceedingly satisfactory. The work of preparing drawings and descriptions conforming to the requirements stated in the announcement is very considerable, but the contributions show that a large number of pattern cutters throughout the country have been enough interested in the matter to submit plans. The several contributions will be very carefully read and analyzed with a view to determine their relative merit, and as soon as practicable announcement will be made of the names of the prize winners. We hope to follow this with the publication of some of the more interesting designs. The task of making a decision is, however, one that cannot be accomplished by merely glancing over the articles, and we have arranged to reach a decision by combining the opinions of several experts, each one of whom will carefully review the plans and descriptions.

Indirect Radiators as Dirt Collectors.

If the reader has ever examined the interior of a stack of indirect radiators that has been in use for five or six years, the cold air box leading to it, and the radiator connection leading from the radiator box to the register box, he has found therein the following things, or things of a similar order: Dead bodies of spiders and other insects; cobwebs and a fuzzy substance that looks like carpet sweepings, and which upon examination with a good pocket magnifying glass proves to be chiefly carpet sweepings and fiber from door mats. In some instances, where work has been carelessly done, or where wooden air boxes have been used without tin linings, he has perhaps found a deserted mouse nest, or even a brood of young mice quietly enjoying life in the cozy quarters they have appropriated. He also found a quantity of accumulated dust whose origin, as relates to its several ingredients, is as hard to trace as that of the North American Indian. Closely examined, one may find in this dust minute bits of wood and straw; earthy materials; coal ashes; fragments and fibers of paper; tobacco (almost always present if the radiators have been used in houses where tobacco is used), which in contact with the heated surface of the radiator gradually becomes dry and pulverulent like snuff. Traces of salt, spices and similar substances used in the culinary department and of medicines employed in sick rooms may be discovered. Much lint from textures used for clothing, bedding and window drapery will be found, and numbers of other substances that no use or occupation of the building appears to account for. These accumulations are distributed throughout the passage from the exterior inlet opening to the register box; but in the radiator proper they gather to clog its air spaces, to cover over with a non-conducting medium its heating surface, and to more or less vitiate the air that enters apartments through the registers.

How the Dust Gets In.

Everywhere, and under all circumstances, the processes of decay and disintegration are going on. The moth gnaws. The very brushes and brooms used to remove dust are machines for manufacturing dust. Every step taken on a carpet or floor or a gravel walk removes therefrom a part of its substance. Road surfaces are ground into powder by passing wheels. All organic substances of a solid or semi-solid texture, if left to themselves, decompose, and the solid residue turns to inevitable dust, which is borne everywhere by passing air currents and dropped in corners or wherever obstructions exist that can arrest it. In every building there is a flow of air in and a flow of air out; and these air currents carry any floating dust that is within their influence. If strong enough, they will even pick up particles of dust from retaining surfaces and cause them to float. No substance is too dense to float in moving air if only sufficiently reduced in bulk. Gold, which is one of the heaviest substances, will float with the greatest ease when reduced to the thinness of gold leaf; and by a very moderate current of air it can be carried long distances. In buildings, during that part of the year when they are required to be heated, the flow of air is principally from the exterior to the interior, and during this period accumulations of dust generated in the house do not take place to any material extent in indirect radiators; but at this time considerable dust of the heavier kind is liable to get in the register boxes where registers are placed in floors; and it may be remarked, in passing, that, as compared with wall registers, floor registers are objectionable on this account. They are, however, so convenient in other respects, that their limited use is not likely to be dispensed with. Warming the feet on floor registers when the soles have remnants of street mud clinging to them is responsible for much of the earthy matter slowly accumulating in indirect radiators. Falling in a semi-dried state into the register boxes, this mud lies and slowly disintegrates there into fine dust. In summer, when windows and doors are opened, currents are often set up through the registers in exactly the opposite direction from that of the flow when the radiators are in operation. The dust accumulated in the register boxes is thus carried along to and into the radiators, and meeting with many angles and obstructions which arrest its further progress, some of it remains permanently there, forming, together with fibrous materials, a flock that, in proportion to its thickness and extent, is almost as thorough a non-conductor of heat as felt. This must necessarily affect adversely the efficiency of the radiators so clogged by a variable but very appreciable amount. In spite of settling chambers, screens, or other appliances for removing dust from air entering cold-air boxes, much dust enters from the exterior air and insects nearly always get in from the outside. Such a mass of mixed fibrous material is a most potent retainer of floating disease germs, and no building can be kept in a thoroughly antiseptic condition when its air for ventilation is caused to pass over and through such substances.

The Remedy.

What is needed for sanitary heating and ventilation is such a construction of indirect radiators, cold-air boxes and radiator connections as will permit thorough and convenient removal of dirt as often as may be needed; and such cleaning ought to be done at least twice a year, namely, at the beginning and close of the heating season. Carried out in some systematic and economical way, appliances for effecting the result would deserve to be called a system as much, or more, than some arrangements for heating and ventilation that have appropriated that title. It is not the purpose here to suggest peculiar modifications in radiators, cold-air boxes and registers, whereby the end sought can be attained. To think out the best way of accomplishing it will take some time and a good deal of careful attention to mechanical details. Our object has been to point out a defect and to show that it is remediable. The time is ripe for the introduction of anything that can clearly be shown to make for the highest sanitary conditions in dwellings, hospitals and schools. A large class of American people have now become possessed of wealth that enables them to have the best of everything; and in the selection of their personal surroundings they care little for cost when it fairly promises to them increased health, comfort and luxury in living. We do not know of any data in existence from which to calculate the loss of efficiency in radiators through accumulations of dirt, but the information could be obtained by a series of experiments.

The Evolution of Advertising.

A gradual change has been noticeable of late years in the methods by which men advertise their business, and—incidentally—themselves. A tendency to some artistic effect, combined with originality and greater simplicity may be observed in the various channels utilized for this purpose. The crudeness and wordiness of old-time advertising notices are giving way to a style which is very much more pleasing and concise. Pithy sentences replace the old long-winded announcements which the public has no longer the time or inclination to stop and perruse. The advertisements which are to-day the most effective are those of few and striking words, presented so that he who runs may, nay must, read. These are often embellished by decorations of a very meritorious kind, with a choice and blending of colors which show that the artistic perception has been employed in their arrangement. This kind of advertising board or notice is usually flanked by others embodying quaint conceits in phraseology or illustration which equally command attention and perusal. In a word, modern advertising to be effective must be artistic, original and concise. "no others need apply" for public favor. This change and improvement in matter and method is almost equally observable in the press "ads." of to-day. We refer here, primarily, to those in trade journals; the daily press is still hopelessly unartistic. A comparison of the advertisements placed by manufacturing and other firms 20 years ago, or even less, in the columns of trade journals, with those of the same concerns to day shows a marked improvement in style and effect. The cuts are better and clearer, the text more readable and to the point.

Catalogues and Signs.

The circulars and catalogues now issued by manufacturers are a striking proof of the general tendency to art in advertising. Many of these documents are gotten up in the highest style of artistic excellence, gilding and glorifying even the most prosaic and homely of wares by presenting them in a setting so attractive as to compel recognition. These catalogues are consequently prized and preserved where their more unassuming predecessors usually found a short road to the waste basket and an ignominious end. An advertising circular which is also an artistic production will, as a rule, command sufficient respect to be at least read, which, after all, is the end and aim of all advertisements. So art in advertising pays, as bad taste or ugliness does not pay. People will not be attracted by a commonplace or homely announcement any more than they will be attracted by a human face of such a character, no matter how meritorious the inward reality of either may be. Similarly in the cities the obvious tendency in the matter of store signs is to less ostentation and a rich simplicity. The ponderous painted signs conveying name and business at length are, in common with the great hanging signs which once so universally projected over the sidewalks, visibly yielding to a plain board, or, more often, to a brass or metal plate usually bearing no inscription beyond the name of the firm or owner. The business is allowed to advertise itself in the show windows. There is no longer thought to be any necessity to announce in large letters what one sells, when the information can be obtained by the object lessons placed for that purpose in the windows. The old time realistic signs—a boot, hat, glove, umbrella and so forth, which mutely told their owner's trade, are, like the Arab, silently stealing away, and will probably be only known by tradition iu the next generation. Now-a-days, a neat but massive plate of metal with the name engraved or imposed upon it in artistic lettering, is placed over the door, or in the form of a shield at its angle, while some of the most modern and up-to-date establishments are content with a single name carved in stone over the portal. This is supposed to give an idea of opulence and substantial elegance which could not be conveyed by the sprawling decorative signs covering square yards of the store frontage, which formerly prevailed. They are calculated to inspire confidence in the respectability of the establishment, and the change is, it must be admitted, more soothing and pleasing to the eye than the old store front covered with advertisements and bristling with sign boards.

Dear Building Material at Chicago.

All classes of building material, except iron and steel, have greatly advanced in price in the vicinity of Chicago on account of the heavy demand created by preparations for the World's Fair. Brick, lime, stone and lumber are all considerably dearer than they were a year since. The most notable rise seems to have taken place in sash and doors and inside trimmings. Discounts on manufacturers' lists which were 65 per cent. last spring are now only 40 per cent., showing an advance of over 70 per cent. on the net price then realized. The World's Fair demand has been a grand harvest for these manufacturers, whose trade had previously suffered most keenly from overproduction. It is now feared that the sudden curtailment of this demand, which will take place in May or very shortly thereafter, will have a disastrous effect. Numerous building projects, however, have been deferred for this very reason, and the building trades of the Northwest may be sufficiently well employed on miscellaneous work during the summer to counteract to a great extent the expected depression following the World's Fair rush.

Right of Seller to Hold or Reclaim Goods Sold.

A universal principle of law of the greatest importance to the seller of goods is that which gives him a lien on goods sold for the payment of the price thereof, commonly called a vendor's lien. Not only is this recognized at common law, but in most of the States, if not in all, there have been enacted specific laws providing that the seller of goods shall hold a lien for the price over them. But, of course, before this right will arise, the property in the goods must have passed to the purchaser, for a person cannot have a lien on goods belonging to himself. Neither will this lien extend to anything beyond the price of the goods. It will not cover a claim in the seller for storage of the goods, even if it is by the purchaser's default that the goods are kept in warehouse, or other charges are incurred in detaining them. The seller of goods has this lien upon them for their price, unless it is otherwise stipulated, so long as they remain in his possesssion, and, as against purchasers who become insolvent, until something occurs to make it inequitable for him to maintain it. A seller cannot follow property beyond the purchaser from him, as against the claim of any one, save one who purchases from such purchaser with notice. So if a creditor in good faith takes a mortgage, without notice of the unpaid purchase price of the mortgaged goods, he has a lien superior to a subsequent attachment for the purchase price. One who loans another money with which to purchase property, or pays for the property of another, has no vendor's lien or privilege thereon. A very interesting case arose in Massachusetts, where the owner of a large quantity of wood, which was lying in a pile on his own land, having sold a portion of the same, and measured off and marked the part sold, with all agreement that the purchaser might remove it within a year, gave the purchaser a bill of sale of the wood, and received from him his promissory note for the price, payable in six months, before the expiration of which time the purchaser became insolvent. On the one hand, it was contended that the title to the wood had so passed that when the purchaser made an assignment it vested in his assignee. While, on the other hand, it was insisted that notwithstanding the peculiar nature of the transaction, as the wood remained as it originally lay on the seller's premises, it was in his actual possession, and on the purchaser becoming insolvent, the seller had a right to detain it until payment or tender of payment; and this the Supreme Judicial Court agreed in. A vendor's lien may, of course, be waived by express contract, and any agreement which is inconsistent with its retention operates as a waiver of it. His lien is also waived by implication, as when the vendor receives some other security for the payment of the price. But a written receipt for cash and notes of the purchaser "in full payment" for property, the title to which has been retained by the seller until payment of the purchase money, does not operate to discharge the seller's lien as against the purchaser's assignee for creditors in the absence of evidence that the transaction was intended as a discharge. And where a note is taken as collateral for the price of goods they are, as between the parties, subject to a lien therefor. However, where one takes, as part of the purchase price, the note of another than the purchaser, it constitutes payment and is a discharge of the purchase money lien. And where one has assigned a note taken as part of the price, and is held only as an indorser on it and has not paid it, he is not in a position to claim a purchase money lien. The lien is also lost where goods have been sold in block for a lumping price, and proof sustains it on a part and fails to sustain it on the rest of the goods, on account of the impossibility to separate the price. It is also lost when goods have been unpacked and mixed with others, so that they can no longer be identified. The object of this lien being simply to secure payment of the price of goods; if the purchaser tenders that it will release them. Actual transfer of possession will also usually destroy the lien, as indicating an abandonment of it: but not always, as courts of equity will aid the seller in cases of insolvency and the like, where innocent third persons are not thereby injured, and in many of the States statutes to this effect have been passed. Where delivery would destroy the lien, merely marking the goods in the purchaser's name, or setting them aside, or boxing them up by the purchaser's orders, and putting his name on them, will not do it, so long as the seller holds them and has not agreed to give credit on them. Furthermore, the retention of open control by a seller's employee over machinery placed in the works of a company, which are being fitted up by the seller, is notice to said company of the existence of a vendor's lien.

THE TIN SHOP.

Patterns for Elbows in Elliptical Pipe.

From E. D., *Milwaukee, Wis.*—I would like to have meth ds published in *The Metal Worker* for describing the patterns of two-piece elbows in elliptical pipe. Patterns to be for elbows having their flat and narrow sides to the front.

Answer—The patterns for elbows in elliptical pipe are obtained in the same general manner as for those in round pipe. The profile is to be turned broad or narrow side to view, as may be required. In Fig. 1 the profile is turned with the narrow side to the view. Then, in Fig. 1, let A B C D represent the profile of pipe from which the elbow is to be made, E F G H J K the elevation of elbow, and F J the joint or miter line. The profile A B C D is drawn in line with one arm of the elbow, as shown. Divide the profile into any convenient number of equal parts, as shown by the small figures. With the blade of the T square placed parallel with K J of elevation, bring it against points in the profile and carry lines cutting the miter line F J. On E K extended, as L M, lay off a stretchout of the profile, through the points in which draw the usual measuring lines. With the blade of the T square placed parallel with the stretchout line L M, and brought successively against the points in F J, cut the corresponding measuring lines, as shown. Lines traced through the points thus obtained, as indicated by L P O N M, will give the desired pattern.

In Fig. 2 the same profile is used as in the previous instance, but is turned with the broad side to the view. In this fig ure A B C D represents the profile, Q R S T U V the elevation, and R U the miter line. To obtain the pattern, divide the profile into any convenient number of equal parts, and with the blade of the T-square placed parallel with V U of elevation bring it against the points in the profile and drop lines, cutting the miter line R U. At right angles to V U lay out a stretchout line of the profile, through the points in which draw the usual measuring lines, as shown. With the blade of the T square placed parallel with the stretchout line L M, and brought successively against the points in the miter line R U, cut corresponding measuring lines, as shown. Trace a line through the points thus obtained, as shown by P O N. Then L P O N M is the pattern desired.

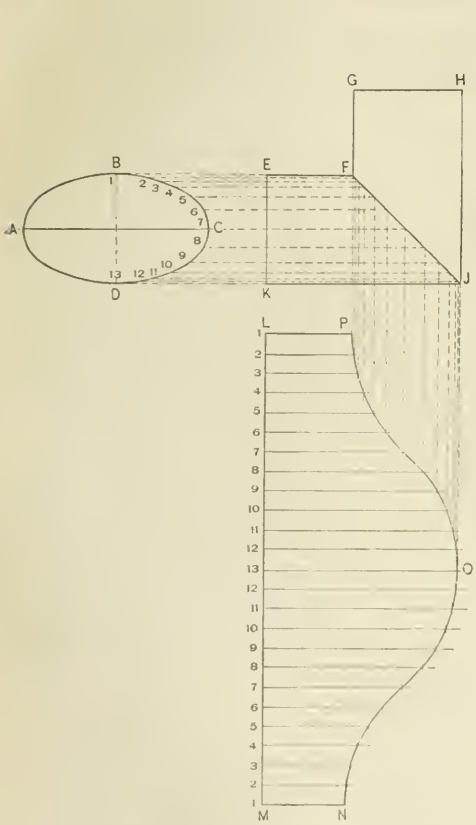


Fig. 1.—Profile Turned with Narrow Side to View.

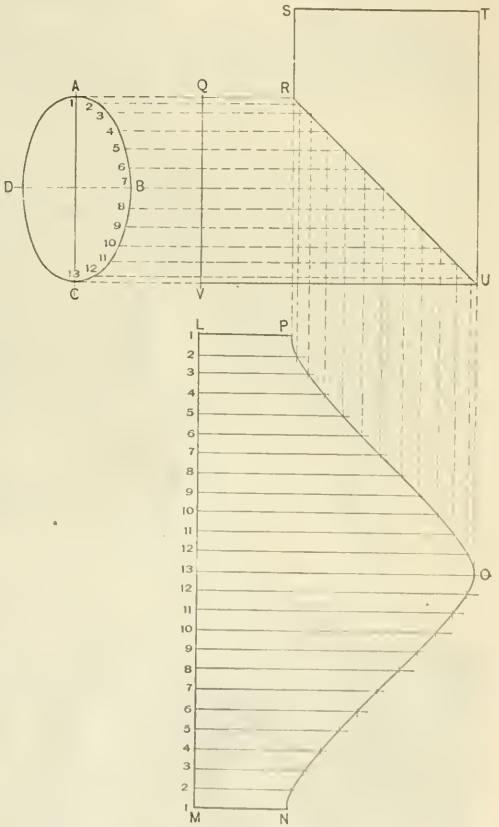


Fig. 2.—Profile Turned with Broad Side to View.

PATTERNS FOR ELBOWS IN ELLIPTICAL PIPE.

THE LETTER BOX.

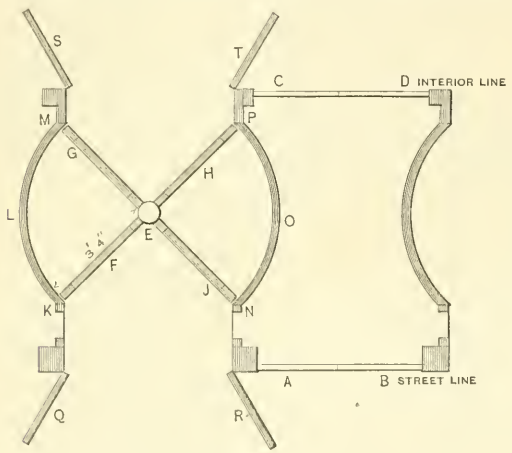
Soldering Flux.

From M. T., *Riverside, Cal.*—Could you inform me through *The Metal Worker* where I can obtain a soldering flux which is put up in the form resembling small cakes of beeswax?

Note—A soldering flux of the description our correspondent inquires for can be bought from The Norton Bros.' Can Manufacturing Company of Chicago, Ill.

Turnstile Storm Doors.

From E. R., *Chicago.*—The tallest of the tall buildings of Chicago is the Masonic Temple, 22 stories high, which is located at the corner of State and Randolph streets. The main entrance to this building was provided with two lines of swinging doors to prevent the air from entering in tremendous volume and rushing up the great elevator shafts. There are five sets of such doors, to accommodate the vast multitude of people who pass in and out of this huge building daily. These doors were at first arranged as shown in the accompanying plan, A B representing the outer doors and C D the inner. It was found that, as people were continually passing in and out during business hours, the doors were kept "on the swing," and consequently open most of the time, thus affording an opportunity for the air to enter after the manner of a cyclone. To remedy this condition of affairs, turnstiles were placed in alternate doorways, filling the entire space from top to bottom. In the engraving, E represents a wooden post which turns on iron pivots, the lower pivot entering the floor and the upper pivot the ceiling over double door way. F, G, H, and J are four glazed wooden doors secured to the post, thus forming the turnstile. These doors have rubber faces. The wood work on either side is represented by K L M and N O P. Glazed sash are placed at K and N. The doors Q, R, S, T can be secured in the position shown while the turnstile is in use. As the affair is arranged, people can enter the building through the turnstile by passing to the right and leave in the same manner, yet at no time is there presented a free passage for cold air to enter the building. During cold weather the doors similar to A, B, C and D are fastened, but can be used when the weather permits, thus allowing people to enter by these doors in place of the turnstile, if desired.



Turnstile Storm Doors —Entrance to Masonic Temple, Chicago.

Equalizing the Temperature of Rooms.

From A. P. W., *Somerville, Mass.*—In *The Metal Worker* of March 18, replying to "R. N. W." on the subject of withdrawing cold air from rooms to an extent that will render it possible to have the air at floor and ceiling at the same temperature, you offer suggestions toward the accomplishment of that end which do not seem to me as being competent, if fully carried out, to achieve that object. You state that the desired result—that is, the removal of cold air—can be attained by properly ventilating the rooms by registers, either near the floor level or located in the floor itself. I fail to see how this can be effected by having the register and the heated flue or duct so located. In the first place, it is difficult to perceive how the cold air is to be drawn out, even with the assistance of the hot air duct, from the opening at the floor, where the coldest stratum of air in the room is to be found. Suppose, for argument's sake, that the flue leading from that register or opening heats the column of air contained in the smoke pipe of the heater, and that such air ascends. Does any one imagine that the cold air from the floor will rush after it through the opening to be heated and ascend in the same manner? I do not think so. The motive force which causes the upward motion of the heated air is gravity, which acts by means of the greater weight of the cold air outside as compared to that which becomes heated in the duct. We know that air, being rarefied by the heat, becomes lighter than that which surrounds it, and that it ascends until it reaches that region of the atmosphere where the same degree of rarefaction exists. The air outside the duct, under a normal pressure of 15 pounds to the square inch, waits but the chance to obtain an entrance at the base of the column, and the velocity with which this is accomplished depends on the difference in weight between the ascending column of heated air and the descending column of cold air. If the cold air to be withdrawn through the floor opening be of the same temperature, or nearly so of the incoming air, there will be little or no displacement of the air in the room, whatever amount of circulation may be going on in the duct. The removal, therefore, of the cold air from the room through the heating of the air in the duct does not seem a thing that can be satisfactorily accomplished.

The establishment of a uniform degree of heat in all parts of the room presents a like difficulty. Air expands about $\frac{1}{490}$ of its volume for every degree of heat imparted to it, according to the best authorities. If, therefore, there is any artificial heat applied, be it ever so little, expansion will ensue and the ascent of the air so rarefied to the ceiling will at once commence, the colder air falling to the floor, to be made subject to the same law of expansion, by means of which a difference will always exist between the temperature at both extremes, viz., floor and ceiling, proportioned to the amount of heat applied, on which account your correspondent will find it difficult to extract the cold air from the room by what is known as "aspiration," or "the application of heat to move vertical columns of air in chimneys or heated up-cast shafts." Edward S. Philbrick, C. E., a well-known authority on the subject, in his *American Sanitary Engineering* says: "The extraction of the foul air near the floor can only be effected by special apparatus contrived for the purpose, with some aspiratory or mechanical force to move it," also that "the introduction of the fresh air near the floor is the simpler method." Again he says: "If the foul air be taken from the top of the room its higher temperature as compared with the outside air will provide for its (upward) motion." Summarizing my conclusion, therefore, I maintain: 1. That the cold air cannot be "drawn" out of a room by means of a heated duct opening in or near the floor, because of no expansion taking place at that point sufficient to act as a motive power of ascension. 2. That if any artificial heat is allowed to operate on the air in a room an equal temperature cannot be maintained at the floor and ceiling and intermediate space. 3. That if the cold air is to be removed it must be by mechanical means and not by gravitation. I may add also that it is conceded that no rooms can be "properly ventilated" merely by "outlets." There must also be "inlets" to do the work effectively, for the very essense of "proper ventilation" is changing the atmosphere—that is, displacing or expelling the vitiated portion, by the introduction of fresh or purer air.

As regards the ventilation of halls, churches, &c., the futility of attempting this plan will be better understood by reference again to Philbrick, who says that a hall heated in the first instance to 60° must be so ventilated as afterward to supply fresh air at the rate of 30 to 40 cubic feet per minute for every person in

the hall, and carry off the same amount of vitiated air without unnecessary drafts.

Note.—The argument that a room cannot be ventilated by heated flues drawing from the floor will hardly be borne out by experience. It seems to us that our correspondent has gone astray in his criticisms by assuming that the cold air in a room is the same temperature as the air out of doors. If this were so there would undoubtedly be a very sluggish current up the ventilating flues, for the air would only rise as it became heated to a higher temperature than the outside atmosphere. As a matter of fact, however, in speaking of the cold air of a room, the word "cold" is used in a relative sense only. It is cold as compared with the air in the upper part of the room, but on the other hand it is warm compared with the outside air, and this being so, it will be drawn up a heated ventilating flue.

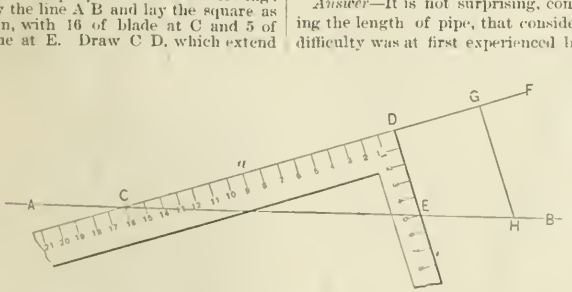
Air Chamber for Suction Pump.

From G. W. B., *Bradford, N. H.*—Is there any fixed rule to determine the size of an air chamber for a common suction pump.

Note.—There seems to be no uniform rule by which pump manufacturers proportion the size of air chamber to that of the cylinder of common suction and force pumps. Take any half a dozen common pumps of different makes and manufacture, but all having the same bore or cylinder capacity, and it will be found that the air chamber or barrel varies all the way from three quarters to twice the size of the cylinder. On information obtained from hydraulic experts, we believe that it is well to proportion the air chamber of a pump so that it will be of ample size, say about one and a half times the capacity or size of the cylinder.

Circumference From Diameter.

From J. D. A., *Remington, Ind.*—In *The Metal Worker* of January 21 I notice a communication from "C. E. L.," New Haven, Conn., asking for a short rule for finding the circumference of a circle when diameter is given. In answer to the above inquiry I submit the following: Draw the line A B and lay the square as shown, with 16 of blade at C and 5 of tongue at E. Draw C D, which extend

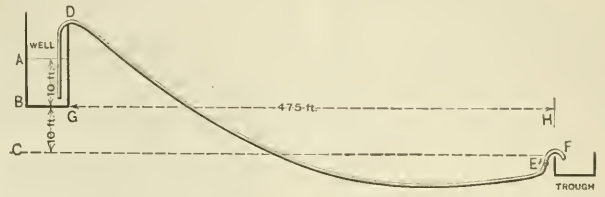


Circumference from Diameter.—Method Suggested by "J. D. A."

indefinitely, as shown by C F. To obtain the circumference of a circle, from C on C F space off three times the diameter, and at the point thus obtained erect a perpendicular to C F, cutting A B. The distance from this point where the perpendicular cuts A B to C will be the circumference. In the diagram the diameter C *a* was spaced off three times from C to G, and G H drawn; accordingly C H is the circumference of a circle having the diameter C *a*. The above method is convenient to use for finding the circumference of small circles, and I find nothing to equal it for tinners' use.

Difficulty with a Syphon.

From A. A. R., *Clifton Springs, N. Y.*—I had a job done last summer which is not satisfactory, and perhaps the editor of *The Metal Worker* can explain where the difficulty lies, if a proper description is given. I attempted to convey water through a 1-inch galvanized iron pipe from a well (fed by a spring) to a trough, the distance being 475 feet. The bottom of well is 10 feet above top of trough, and there is usually 10 feet of water in the well. Water did not run through the pipe for two weeks after the job was completed. One day, while pumping at the lower end of the pipe, there was a loud report like the "thumping" in steam pipes, and water poured through the pump rapidly, and continued to do so for several weeks. After that water would run freely through the pipe at times, at other times just a little, or not at all. Many people have looked the job over and failed to discover the difficulty. Some are of the opinion that it will never operate properly with iron pipe, but will if lead pipe is used. All the joints were well leaded and screwed together tight, so no air can enter the pipe, which is free from traps or short bends. It was expected the pipe would operate as a syphon, so there would be a continual flow of water from the lower end. Referring to the inclosed sketch, A B represents the water in the well, which is 10 feet deep. From bottom of well to top of trough, B C, is also 10 feet. From well to trough, G H, is 475 feet. A globe valve was placed at E for regulating the flow of water through pipe providing it would operate as a syphon. A full stream of water can be procured by means of the pump, which is placed at F.



Difficulty with a Syphon.

Answer—It is not surprising, considering the length of pipe, that considerable difficulty was at first experienced by our correspondent in exhausting the air contained in the pipe so water could be drawn by means of the pump placed at F. Regarding the action of the syphon, the weight of the atmosphere upon the surface of water at the sea level is about 14.75 pounds per square inch. If the syphon X D F, when arranged as shown, is filled with water, the end X being below the surface at A, the weight of water in D F will be greater than in D X. As the water runs out of D F, the pressure of the atmosphere upon the water at A will force the water up the pipe X D.

The pump being operated at F, exhausts the air contained in the pipe, and the pressure of the atmosphere upon the surface of the water at A forces the water up X D, thus filling the pipe. The pipe once filled with water, it can be drawn by means of the pump, or the pipe will operate as a syphon. Providing there is no air at D, there appears to be no reason why the flow of water through the pipe cannot be regulated by the globe valve at E. On the other hand, as air contained in the water collects at D, the flow of water will be retarded or interrupted, depending upon the amount of air at this point. As the pipe is arranged at present, it is intimated by our correspondent that air contained in the pipe can be exhausted by means of the pump at F, after which the pipe operates as a syphon, and this action continues until air again collects at D. It thus appears that, in order to have the pipe operate as a syphon, some means must be provided for exhausting the air that collects at D. If the present arrangement is not satisfactory, and if convenient to do so, the experiment could be tried of running the pipe in a direct line from D to F, and locating the pump at D and placing a stop cock between the pump and pipe. The end of pipe at F being under water, by opening the stop cock below pump, and operating the pump, the air contained in the pipe would soon be exhausted. The stop cock could then be closed to prevent any air from entering the pipe through the pump valves. This operation could be repeated as often as air collected in the pipe. Regarding the kind of pipe to be used, the water might encounter some resistance in coming in contact with the ends of the iron pipe at the joints, but providing there were no leaks or short bends, it is probable there would not be enough difference between iron and lead pipe to decide the operating of the job.

Now that the word "failure" has been finally written over one of the most gigantic frauds of the age—the Panama Canal—added interest is felt in the alternative interoceanic waterway of Nicaragua. The completion of the Maritime Canal of Nicaragua, to connect the waters of the Atlantic and Pacific oceans, is loudly called for in many quarters. This canal, which has been commenced by an American company, will take a course some hundreds of miles further north than its ill-fated rival, and therefore will be considerably more convenient for United States vessels.

WORLD'S FAIR NOTES.

Railroads Giving Bad Service.

With the opening day of the Fair less than a month distant every effort is being made by the officials to complete the work of preparation. The most serious delay now is caused by the unreasonable time taken by the railroads in delivering freight. The material for a large number of exhibits is kept by the railroads from ten days to two weeks when the distance hauled is only a few hundred miles. Even after the cars reach Chicago it generally takes four or five days to get them switched around. The Belt line, apparently, makes no effort to expedite the World's Fair cars. They lie on the side tracks for days, while exhibitors fume and fret at the chiefs of departments and the secretary of installation. Frequently exhibitors have brought a force of workmen from their home shops and the delay incurs a heavy loss to them, besides putting off the work that long. An aggravated instance of this kind last week came up in the installation office. The missing cars were traced finally to a side-track at Grand Crossing, less than two miles away, where they had lain a week without an effort having been made to get them to Jackson Park.

The material for the aquarium of the Pennsylvania Fish Commission has been over two weeks on the road. The officials are in Chicago waiting for the cars to arrive, but nothing can be heard from them. Cars over the Milwaukee & St. Paul have been two full weeks in reaching the park over the Belt line.

Although 200 cars a day are now being delivered at the fair the Transportation Department has had no trouble in handling the stuff as fast as it arrives, and the work is kept close up. The entire blame for the delays rests on the railroads, which handle exhibits the same as they would haul coal, and without the slightest apparent effort to get out of the rut. If the cars get side-tracked there they remain until the exhibitors fill the offices with complaints.

Exposition Roofs All Repaired.

Rain now has no terrors for the World's Fair chiefs or the exhibitors, for the roofs are at last water-tight. The great task, which was ordered by Chief of Construction Burnham before leaving for New York a week ago, was practically completed last Wednesday. A regiment of workmen had been employed. On the day previous there were 800 in the roof force, and 400 of them freckled the vast expanse of the Manufactures Building. There are still some repairs to be made, but they are more to preserve the roofs than to stop leaks.

The cost of repairing the roofs is estimated at about $100,000. This figure is given by a contractor's superintendent, who has much to do with the repairs. A portion of this sum was due to the snow slides on the Manufactures Building and Machinery Hall, but by far the larger part is chargeable to poor material and poor workmanship. The material for some of the roofs did not cost over 50 per cent. of what it ought. The contractors, however, were not altogether at fault. Canvas roofing was something new to most of them, and, as the roofs were only to last until the close of the fair, they naturally selected light material. The winter was against them, and a heavy loss has resulted. A considerable portion of the roofing was done with corrugated iron or steel, and even this was not as well laid as it should have been, but had to be repaired.

All the repair work has been charged against the contractors, but where they have been paid in full the exposition may have difficulty in collecting from their bondsmen. The contracts provided only that the roofs be water-tight, and did not specify the material. Some of the contractors say they will not stand the cost of repairs made by the direct order of the exposition and will fight the case in the courts.

Instead of waiting for rain the repaired roofs have been tested by water from a hose, and have not been left until they were shown to be water tight by resisting a downpour of rain.

Michigan's Exhibits.

In more ways than one the State of Michigan proposes to make itself known at the fair. Besides a building costing $50,000 it will have the only logging camp on the grounds, an exceptionally fine mineral exhibit, a grand horticultural show, and other conspicuous objects of interest. The State has been going along without saying much, but constantly making preparations for patronizing and supporting the exposition on a large scale. The Michigan board is the only State organization that has as yet opened an office on the grounds.

"In the Mineral Department, Mines Building," said Secretary Smith, "is where we expect to scoop the world. I have no hesitancy in predicting that when the doors are opened Michigan's exhibit there will attract as much attention and admiration as any other State or any other country on the globe."

The exhibit will be displayed in a pavilion made of stone, iron, ore, copper, crystallized salt, silver, gold, granite, marble, verde antique and other specimens of minerals taken from the quarries and mines of Michigan.

One of the unique attractions inside this pavilion will be a biblical representation of Lot's wife turned to a pillar of salt. There will also be a specimen of copper ore as it comes out of the mine, 98 per cent. pure and weighing 10,000 pounds. The cost of this pavilion is estimated at $20,000. It will stand in the center of the building opposite Germany and England, and is being constructed under the supervision of Peter White, member of the board for Marquette, and Jay A. Hubbell of Houghton.

The State has an outdoor space just south of Machinery Hall, where is being constructed a genuine logging camp 70 feet long and 20 feet wide. It will be an exact reproduction of the camps Michigan lumbermen live in, and the daily bill of fare, corn bread, pork and beans, strong black coffee, &c., will be the same as they have in the woods. Besides the camp there will be in this show the largest load of logs ever put on a sleigh and drawn by a single span of horses. These logs were cut and sent by Nester Bros. of Baraga, on the Sturgeon River. The load consisted of 50 pine logs, each 18 feet in length, piled in ten layers, varying in the number of logs from eight in the second layer to one capping the load. The biggest log contained 1225 feet, board measure, and the smallest 404 feet, and the whole weighed 300,000 pounds, or 150 tons. The logs were just cut, and were consequently heavy with sap and frost. They were loaded by means of chains and a pair of horses, with the assistance of three men. It took 1 ton of chain to bind the load together. The top of the last log was 33½ feet above the bottom of the runners of the sleigh. The horses weighed but 1700 pounds each and they pulled the load 80 rods on a level road to the rollway. The sleigh and team will be taken to the fair and the logs loaded again just as they were. It took ten standard size flat cars to transport the load to Chicago. The sleighs had 9 foot runners and 14-foot "bunks." That is, the width of the load was 14 feet. Near the camp will be a log train of five cars, and all about the place specimens of the tools used by lumbermen from the opening of the first camp in Michigan down to the present time.

Besides these State exhibits Michigan will be represented by about 1000 of its citizens with individual exhibits of manufactured goods and novelties, the products of their toil and genius.

From the Bay State.

Six carloads of the Massachusetts State exhibit are now in Chicago. There is included in this shipment the entire mineral section of that State's exhibit and much of the old fashioned furniture with which the Massachusetts headquarters will be furnished.

Commissioner Hovey, who is at the head of the Bay State Commission, says Massachusetts' exhibit in the agricultural department will be especially fine and will embrace many interesting features. Most prominent in this section will be the displays from the State agricultural training schools and experimental farms. Especially noticeable will be the educational section of the Massachusetts exhibit. Harvard University will make a magnificent display in this connection. The Massachusetts headquarters are now nearly completed. The building is a reproduction of the historic Hancock mansion and is among the finest of the State buildings.

Germany is Easily in the Lead.

Chicago papers say that it is at last possible to foretell where the honors of the exposition will go among the nations of the earth. Germany will be entitled to the first place among foreign exhibitors. The young Emperor's enthusiasm, spreading to his subjects, has produced the most magnificent exhibition of resources any nation has made outside of its own boundary lines. The beautiful structure, bearing the words "German Empire," has never been excelled as a national offering in a foreign land. It has been only since that structure neared completion that its beauty and imperial magnificence have come to be appreciated on the grounds. No one doubts that it is in Jackson Park to stay, for once the people of Chicago have seen it and roamed through its halls, public sentiment will not permit its destruction.

Mythology and metallurgy are a queer combination, but the pavilion now rapidly approaching completion in the Mines Building, which is to contain the exhibit of the great German iron works operated by the Barons Strumm, embraces in its details both of those sciences.

German mythology is illustrated by the devices with which the pavilion is decorated, and metallurgy is illustrated in every feature of the exhibit. The Strumm Brothers operate a plant that requires the employment of 5000 men. They are among the most advanced of the world's great iron manufacturers, and their display fully typifies the wonders that may be worked out of that base metal.

This structure will be 46 feet high and will occupy a floor space of 37 x 108 feet. The rear walls are of masonry, but the front elevation will be composed of heavy iron and steel manufactures of every conceivable device. Various German legends are being worked out in the design, merchant shapes forming the decorative material. A great portal in the center will give access to the pavilion. Over the entrance will be this inscription: "Vereinigte Eisenwerke Gebrueder Strumm, Nuenkirchen und Rudolph Boecking, Hallberger Huette." This will be worked out in mosaics with cinder and slag. Over this device will be the word "Strumm," also fashioned in the same manner. Iron and steel beams of different shapes will form the side columns of the portal, and surmounting the lettering will stand, upon a scroll of intricate design, a life-sized mythological figure of hammered copper

The scroll is made of manufactured iron pipes such as are turned out by the carload every day at the Strumm works.

At each of the four corners of the exhibit will be placed a large obelisk formed of T rails, round, angle and flat bars and various other products of the Strumm Mills grouped in artistic designs. These pyramids are 50 feet high. The two nearest the entrance are composed of transverse sections of beam iron. The trophies in the rear are of the same hight as those of the front elevation. The one on the right is composed of pipe iron, while that on the left is formed of band and strap iron, having the form of a gigantic flower stock, and fastened together at the base by hoops and coils of wire of various circumferences.

The rear of the pavilion is formed of solid masonry, and the front will be inclosed with a post and chain railing. The posts are samples of the results that may be obtained in iron and steel decorations. The head of each post consists of some familiar mythological god or goddess wrought in iron and steel, while the foundations are composed of manufactured articles of the same material.

The rear wall will be covered with photographs of the mammoth works of the Strumms, and there will be displayed the history of the concern since it was founded. The art of iron working has been brought to its highest development by this firm and their entire display is calculated to illustrate the schievements accomplished in that branch of industry in the past decade.

One of the most interesting parts of the exhibit is the immense iron rail which will form a portion of the frieze in the rear of the pavilion. This rail is 200 feet long and is bent in the form of a scroll, having been bent cold.

All along the front of the exhibit excellent paintings in oil are hung representing the various buildings and departments of the works. The visitor will also find there statistical references, such as the number of workmen employed in each division, the annual production, and the benevolent institutions for disabled and sick employees and their families, &c. Solid obelisks, 30 feet high, connected by scrolls of solid steel and cast iron, surround the interior of the mammoth exhibit.

Herr Maver, who superintends the construction of the pavilion, is a young man who has secured a position of responsibility in the great establishment. He is a graduate of the Saarbruecken Gymnasium. He served a year in the Garde-Fuesilier Regiment. He also completed a course in the Royal Technical School of Saarbruecken.

From New South Wales.

One of the most interesting displays that will be seen within the great structure devoted to mines and mining will be that now being prepared by the representatives of New South Wales. The work of installation is being superintended by J. E. Carne, F. G. S., of the Department of Mines, of Sydney. Speaking of the display yesterday, Mr. Carne said:

"It will undoubtedly surprise the American public to learn that in point of value gold does not rank first among the minerals of New South Wales. Coal will be made a feature of this exhibit, and it deserves the honor, because it is our most valuable mineral. The order of the output of the minerals of the colony is coal, gold, tin and copper.

"As a whole this exhibit may be said to be a heroic display of base metals. Along the front line will be massive trophies of silver ore, tin, copper and antimony. One particularly interesting feature will be the silver monument, which is to be erected at the northeast corner of the exibit space. It will represent one sixth of the entire output of the great Broken Hill Mine, which from May, 1886, to May, 1892, produced 36,500,000 ounces of silver and 156,000 tons of lead.

"In the rear there will be a triple arch, with two center pillars of coal and two outer pillars of petroleum oil coal, which is locally known as kerosene shale. These pillars will be 4 feet square and 11 feet high. Behind this feature will be shown full sections of principal coal scenes.

"That portion of the display which will be first seen by the visitors will be made up of bulk trophies of gold, siver, copper, tin, antimony, iron, manganese and chrome and building stone. These will be made as attractive as possible. Then there will be show cases containing collections of all metallic and non metallic minerals. In these collections will be some of the most valuable specimens ever discovered Quartz and placer gold and gems will be displayed as a distinct feature. And then there will be collections of fossils from the principal sedimentary formation. These will be accompanied by geological maps that will give one a comprehensive understanding of the physical formation of the colony."

The Great Waterbury Clock.

A few days ago the story was cabled to America that England would set up within the Manufactures Building a clock that would tell the time o' day in more ways than any other clock ever constructed But when the makers come to install that feature they will find, anomalous as it may seem, that they are way behind the times. In the center of the big building will be displayed a mammoth clock that will chime the time for all, built by the Waterbury Clock Company, that in the diversity of its accomplishments will be to the English clock as an hour is to a minute.

It was the original intention of the Waterbury Company to complete its clock so that it might be placed on exhibition at the Paris Exposition in 1889, but the scope of the undertaking assumed greater proportions as the work progressed, and it has been completed only a few weeks.

The timepiece stands 16 feet in hight, with a 6 foot base. It is made of black walnut, highly polished and handsomely carved with scenes representing American history from the landing of Columbus to the present time. At the lower part of the clock and on each side is an allegorical scene representing mechanical progress during the last century, every figure in each group being in motion.

The largest scene is in the center of the clock. It represents the "train room" of the Waterbury Clock Company, with all the shafting and machinery in operation and 25 operatives at work. The figures go through every motion of work in that department.

Four scenes are represented on the sides of the clock. The subjects are, first, a cotton gin in full operation in a cotton field, with the negroes carrying the cotton in from the fields and placing it on the cotton gin, while Eli Whitney, who stands by, is explaining the working of the machinery to a planter. A second scene shows the old method of manufacturing cloth. The operatives are at work beating the flax and preparing it for the looms and spinning wheels. A third scene represents a coal mine with the cage working and the miners digging into the banks of coal.

In a fourth scene is a representation of the improvement in sewing machines. Elias Howe is watching the work of one of his machines, while close by modern machines are plying, and in another adjacent group are a number of women laboriously sewing by hand. The fifth group indicates the advance in the electrical world. Electrician Daft is represented operating a dynamo. The sixth shows the interior of a telephone and telegraph office with operators at work and messenger boys running in and out.

Scene seven contrasts the old and new methods of manufacturing watches, showing the improved factories of the present day and a kitchen in Switzerland where watches were made by hand a century ago. The last is an old-fashioned saw mill with the saw running, logs moving, and children playing near by.

The figures are all operated by an electric motor and are constantly in motion. The center of the clock is occupied by a beautiful water color of the buildings of the clock company, while just above is the handrome dial of the clock. It is 3 feet in diameter and indicates the days of the week, month, and year, the hours, minutes, and seconds of the day, and the moon's phases and tides. Each figure represented is an exact likeness, and the whole is complete in every respect. At the top of the clock is a handsome carving of the "Declaration of Independence" with a reproduction of the famous old Liberty bell.

Will Light Chicago Harbor.

During the exposition season seven miles of the Lake Michigan front will be lighted by means of electric buoys. This is to be a feature of the fair, and will form a part of the Government exhibit.

Capt. W. S. Schley, U. S. N., who is now in charge of the Third Light House District, the headquarters of which is at Tompkinsville, Staten Island, arrived in Chicago last week. He will have charge of the work of arranging the line of buoys, and will superintend the greatest electrical experiment ever undertaken in any country.

If Captain Schley is successful harbor navigation will be revolutionized. The current for the lights will be furnished from one station. A power station will be erected at one end of the line and one cable laid the entire distance they propose to light. The wire will be of very small caliber at the dynamo, and taper up to about an inch at the return end. It will be made in this manner to save any loss of the current by friction. It is proposed to send 1500 volts over the entire line from one station, and a sufficient current will be taken off by means of a converter to supply each individual light. Fourteen miles of cable have been received, and will be used to complete the return circuit. The cost of the experiment will be about $25,000. To light the harbor by the old system would cost ten times that amount.

A Pavilion of Solid Mahogany.

One of the most magnificent and unique pavilions being constructed within the Manufactures Building is that which will house the exhibit of the Meriden Britannia Company. This pavilion is little more than 20 feet square, and yet will cost about $40,000. It is being constructed of solid mahogany and plate glass. It fronts on Columbian avenue, opposite the pavilon being erected by Germany. If the exhibit is worthy of the pavilion it will certainly be the finest of its line in the department.

A new method of securing cheap electric light from refuse has been exploited in England. A company has been formed in London, under the name of the Refuse Disposal Company, with the object of handling the dust refuse of cities and utilizing it, through the medium of destructors of their own design for electric lighting purposes. It is claimed that 20,000 tons of house dust, treated according to their system, may be made to produce as much as 5,600,000 indicated horse-power.

Hot-Air Heating.—II.*

(Concluded.)

LOCATING STACKS AND REGISTERS.

To insure the very best results from any job of heating, the location of furnace, stacks and registers should be planned out before the work of construction begins; and, while the owner cannot be expected to carry out the wishes of the furnace dealer to his own inconvenience, it will be found in planning a job that minor changes in the setting of partitions and swinging of doors and placing of studs and joists can be made without trouble, that will insure much better results from the heating than if the heating is ignored until after the studding is up. The general rules for locating stacks and registers are simple and easily borne in mind. The stacks should be placed as near to the furnace as possible and in a position to make the branches to the registers as short as possible, for the air in branches must travel in a horizontal direction, retarding the flow of air and losing in heat and volume. In many houses, as at present built, there is a main girder running lengthwise through the building on which the floor joists rest, and the stacks come down on this girder. The stack proper comes down to a point just below the floor line, and to complete the stack a boot is used with a collar to connect to the hot-air pipe. This boot is of different shapes and styles, as the position of each stack may be slightly different. When a stack comes down on the top of a girder and the joists are placed on top of the girder, an offset boot, as shown in Fig. 6, can be used.

Occasionally the joists are mortised into such a girder and the bottom of the stack comes down almost immediately on top of it, in which case the girder must be sawed off at an angle in order to allow the boot to be placed and a connection made with the stack.

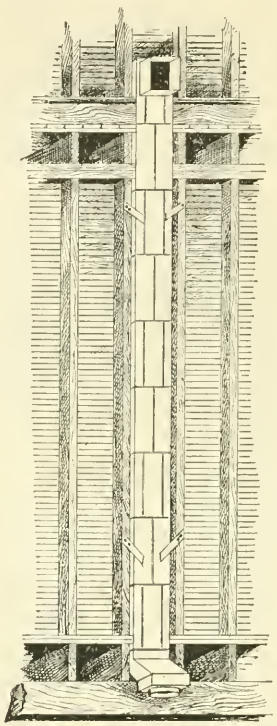
The cutting off of the girder, as indicated, weakens it to some extent, but is the best thing to be done under the circumstances. When a girder does not run through the house the stack generally comes down between the joists or along side of them, in either of which cases the attaching of the boot is a simple matter and the proper boot is easily selected. For stacks coming down between joists and near the center of space between, the boot shown in Fig. 7 can be used.

At times channels are cut in chimneys or walls to allow the stack to go up, in which case the stack is extended below the joist line and the boot attached as shown in Fig. 8.

A custom has prevailed in some parts of the country of running stacks down below the joist line, putting bottoms on them and cutting in collars on the sides of the stacks. This is a practice to be condemned in the strongest terms, for the reason that the sharp turn where the hot-air pipe joins the stack retards the flow of air and largely reduces the effectiveness of the stack and causes undue radiation in the basement. This class of work is done under the mistaken idea that it is more economical; but it is a mistake, for the boot costs actually no more than does the extra pipe needed to run down the stack below the joist line. In putting in the stacks they should be placed in the interior partitions, if such a thing is possible, and there are few cases, where space cannot be found for such stacks in the interior partitions. On all strictly first-class work it is supposed that double stacks are used. The outside size of the double stack is made 3⅝ inches in depth, so as to go within the 4-inch studs

* Reprinted from copyrighted catalogue of the Excelsior Steel Furnace Company, Chicago.

Formerly these stacks were made 3¾ inches in depth, but owing to the fact that the mill men have been dressing their studs down to less than 3⅝, it has been found necessary to change the size of the stacks. The inside stack is smaller to allow the circulation of air around it, and these stacks as made will be found to be absolutely safe and with their use no fire can result. The stacks are made in all sizes, so that the furnace dealer will select for each room a size of stack large enough to heat it. He will then place it in the partition that is the most accessible, having the carpenter on the job do the cutting necessary to get it in. If the job is planned carefully there will be no cutting of any importance, for in putting up his interior work the carpenter will have before him the plan showing the location of each stack and register, and will have the holes cut and the places for the registers framed out in case framing is necessary. If the register is at a distance from the stack a branch must be used to connect the stack with the register. This branch may be double square pipe, the same as the stack, or round pipe, double, of the same capacity as the stack. If a square pipe branch is used the connection will be made by means of a square stack collar, which is cut through the outside pipe and into the inside pipe and held in place by the notched edges of the collar, which are turned in and bent down to make a permanent connection. On the other end of the branch, which is of suitable length, the register box is placed and the ends of the branch are notched with the snips, the hole in side or end of box cut out and the branch connected in the manner described in case of the square stack collar. A better branch, and one more easily put in, is the branch consisting of two sizes of round pipe, one without the other and which is connected in the manner described, a round stack collar being used.



Hot-Air Heating.—Fig. 6.—Showing Manner of Using an Offset Boot in Connection with a Stack Over a Girder.

In some cases furnacemen prefer to make the connection with the register box by means of a collar, and in this case the collar is made a little larger in diameter than the regular collar, for in a connection of this kind the round or square pipe branch slips over the stack collar on the stack and inside of the collar attached to the box. As a rule, the former method is followed, although the connection is possibly not quite so neat or mechanical.

The registers should be placed as near to the stack as is possible, as explained in the above; also they should not be placed near the windows, nor where the doors will swing over them. It is a current idea of many people that a register should be placed under a window, but a little thought will convince any one that this is wrong, for air being a vapor and expanding as it is heated must force its way up into a room filled with colder air, and if the register is placed near a window, where the air is the coldest, the cold stratum of air will resist the entry of the warm air, and the heated air will have great difficulty in forcing its way into the apartment. If a register is placed where a door will swing over it the door will be warped. Furthermore, it is not advisable to place the register in the wall, for the reason that the circulation is not so good from a wall register, and the wall will be somewhat discolored by the dust that is occasionally blown up through the pipes, and which can be swept up from the floor without material damage.

With the double stacks excellent results will be obtained, but in a very particular job, where the maximum of heat is to be obtained with the minimum of radiation, these stacks can be wrapped with one or two thicknesses of asbestos paper and the little radiation in the partitions that results from the use of double stacks prevented in part.

The asbestos paper is not needed in general work, as the loss by radiation with double stacks is extremely small.

We are aware that in many parts of the country single stacks are wholly used and that exception will be taken to our allusion to the use of single stacks, but facts are facts, and we deprecate the use of single stacks no matter how well wrapped with asbestos paper. Asbestos paper is an article that is supposed to be absolutely fire proof, and genuine asbestos paper will not burn; but a certain class of papers have been sold for asbestos papers which contain a fibre that will burn, and if asbestos paper is used for wrapping stacks it should be the genuine article. We also find in many cases the asbestos paper is only wrapped around the stack and not pasted. In some cases it is only tied on with a cord or wire, which soon slips out of place. Even when it is put on properly there is more or less radiation and loss of heat, and in many cases the asbestos paper has been gnawed off by rats and mice and the single pipe entirely exposed. The only advantage in using a single stack is to get an increased space in the stack, which certainly is an advantage, but the disadvantage more than offsets it. It is a simple matter to move a stud an inch or two and thus get the extra space, or if it needs to be, furrow out that part of the wall where the stack is to go and get space sufficient for a deeper stack.

There are times and places were wall registers have to be used, and in such cases it is advisable to use convex registers, as they deliver more air than do the ordinary pattern registers. When wall registers are used the register should be placed as near the floor as possible.

We notice in plans sent to us that some dealers and house owners make provision for conducting the heat to the upper floors

by using one or more flues in a chimney. This is to be deprecated, for the loss of heat by radiation in the flue is very great and economical results cannot be obtained.

We have said above that stacks should be run in the interior partitions, but there are extreme cases where no suitable opening can be found on the inside, and the stacks must go in the exterior walls, and in such cases double stacks must be used, and in addition wrapped with three or four thicknesses of asbestos paper well pasted, and even then the stack should be of extra size if reasonably good results are to be obtained.

the outside branch pipe. In running branches where the distance is greater than one joint the branch should be supported either by wire attached to nails driven into the joists or else by short pieces of wood nailed between the joists.

The first floor outside box has an outside collar to give the job a finish. Some dealers omit the collar, leaving simply the hole for the inside box collar to slip through, but this leaves a raw edge on the outside box which does not look well. Single round pipe branches are in general use and are all right when wrapped with asbestos paper. Some of our cuts showing stacks and branches extween the furnace and joists by wire attached to nails or screw hooks. If the bonnet on the furnace is concave, the concavity can be filled with sand and the radiation much reduced.

What has been said above refers chiefly to residence work, and contemplates first-class work such as should always be done. Some little money can be saved by following other methods and being less particular; but the extra cost of good work over poor is so little that it does not pay either the dealer or house owner to have poor work done. Poor work has not infrequently killed a good furnace in a town and retarded the progress of im-

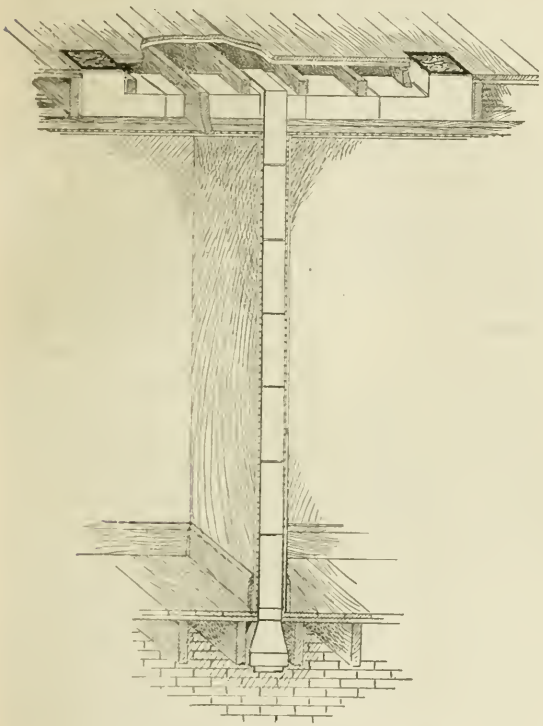


Fig. 7.—Style of Boot to be Used When Stack Runs Between Joists.

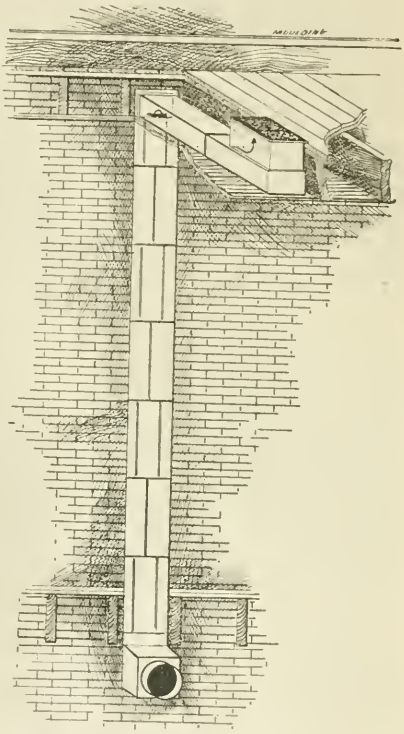


Fig. 8.—Stack Extended Below Joist Line.

HOT-AIR HEATING.

REGISTER BOXES.

In putting in register boxes a common custom is to put in single boxes, and, to prevent liability to fire, to line the surrounding joists with tin. This is all well and good, but there is no economy in so doing, as there is a better and no more expensive way, and one which produces a more finished job. We refer to the use of double register boxes, or the placing of one box within the other. When the work is started and the holes are being cut for the stack the locations for the registers can be determined and the holes cut for the outside boxes, whose flanges are turned over and nailed to the rough flooring. They can then be protected by boards nailed over them and left till the job is ready for a finish, when the boards are removed, the inside boxes put in and the job completed.

On the second floor the inside box is connected with the inside branch pipe and the outside box is connected with

hibit single pipe branches. Before leaving a job it is important to test the furnace flue, for if the draft is defective the heating of the furnace will be greatly diminished. A cold flue will not draw well at first, but if of proper size will work well after it is warmed up. The proper size for hard coal is 8 x 12 on the inside and plastered smooth. In many houses you will find flues of smaller size, and when they are straight good work is obtained from them, but often a flue smaller than 8 x 12 gives serious trouble. For soft coal the flue should be one-half larger.

By wrapping the smoke pipe with asbestos paper the radiation of heat is reduced. The smoke pipe should be of galvanized iron. Black iron will answer, but has to be frequently renewed. If the top of the furnace comes within a foot of the joists a roof should be placed over it. This may be of galvanized or black iron, with a thickness or two of asbestos paper pasted on both sides and suspended be-

proved heating of all kinds, simply because of the ignorance or willfulness of the parties who placed the original heaters, and which failed to realize the anticipations of the purchasers.

There are, of course, many variations from the line of procedure set down in the foregoing and which will produce equally good results, but the work if put in as set forth can hardly fail to produce satisfactory results with any standard furnace of the right capacity.

MEASURING FOR CONNECTIONS.

We have given one method of running connections from a furnace, presupposing that the furnace was set in the basement and material for the connections on the ground. Another and possibly better way, but which involves some extra work to the novice, is to go to the building before the furnace is set, locate the furnace, take the center of that location and draw a diagram of the basement, then taking the center of location of furnace and two

walls of basement at right angles with each other, the exact distance of each box or boot from the walls can be noted on the diagram, which should be drawn to a scale. This diagram can be taken to the shop, and the exact number of feet of pipe, number of angles and elbows, dampers, and other materials needed calculated, and in addition the bonnet can be taken and the casing collars cut in before being sent out from the shop.

HEATING STORES, CHURCHES, ETC.

In heating buildings of the class referred to judgment comes into play so largely that it is not possible, without having each particular case before us, to do more than give some general rules.

In heating a store the most satisfactory plan is to have the furnace placed in the basement at a point some few feet from the center in the direction of the front entrance. Then above the furnace place a large register equal in capacity to the furnace, and connect the furnace with a register equal in size for supplying the cold air and located near the main entrance. The philosophy of this method is that in a store the front door is opened frequently and the register at that point will get the cold air when the door is opened and also the colder air of the store when the door is closed and thus supply the furnace. An outside duct can also be used in connection with the inside duct.

This system can be modified in case of there being two entrances at different sides of the building and two cold-air registers used, one at each entrance. Also two or more hot-air registers can be used, the only difficulty being that in heating a large store large pipes must be used and if registers are placed some distance apart the pipes must have sufficient elevation or a loss of heat by radiation will result.

In heating churches and schoolhouses this same system in modification can be used, locating in halls and vestibules the cold-air return registers, and in both cases the interior air can be used before the assembling of the congregation or scholars and when the rooms are filled the outside cold air supply can be used altogether if desired.

On large and complicated work it is desirable to give each job particular study if the best results are to be obtained. In public work there is more risk than on private, for there are more people to satisfy and more difficulties to be overcome. In large work ventilation becomes almost an essential, and some system should be incorporated. We ask attention to the section following this, in which we describe a simple and effective system of ventilation.

VENTILATION.

Every one knows that air once breathed becomes vitiated, owing to the carbonic acid gas with which it is charged, and is therefore unfit for breathing, and the primary object of ventilation is to get rid of this impure air and introduce a supply of fresh air. A secondary object is to facilitate the heating of the apartment. It is obvious that no two bodies can occupy the same space at the same time, and as warm air from a furnace must be forced into the rooms above, the air in these rooms must find an exit somewhere. Exits are often found in the spaces around the doors and windows, but are rarely sufficient to carry away the impure air as fast as formed. Carbonic acid gas as thrown out by the system is a mild poison, and being heavier than air falls to the floor, where it is liable to be breathed by children. The gases liberated by coal also collect on the floor, and hence a system for conducting away this foul air is almost a necessity. A system of sanitary ventilation should be introduced into every home during the process of construction, and the additional expense of such a system is small in comparison with the advantages gained in heating and the benefits derived from the standpoint of health and comfort.

The system that we advocate is simple and very successful. It is not a theory and not an experiment, and can be carried out at a small cost while a building is under construction.

In the modern house several flues are usually built into one chimney for convenience and economy, and one of these flues should be used exclusively for a ventilating shaft and connected with each apartment by means of pipes running between the joists, floor or side wall registers being placed at some point opposite the hot air registers, to which the ventilating pipes run. In order to be effective, however, it is necessary that the ventilating flue should be alongside of a flue that is used by the furnace or kitchen range, in order that this ventilating flue be warmed and a suction or current created. A ventilating flue will fail to do its work if not located where it will be warmed, as the foul air cannot force its way up a shaft without assistance. This shaft should be of ample dimensions, so that no matter how crowded an apartment is at any time the foul air can be removed as quickly as formed. The furnace, if a good one, will supply an abundance of fresh and pure air at all times, and the capacity of the ventilating pipes can be reduced at pleasure by means of the registers.

Copper Plating Sheet Zinc.

According to the *Metallarbeiter* the copper plating of sheet zinc for building purposes has recently been tried with considerable success, and the process can be especially recommended where mechanical wear takes place. The zinc combines very well with copper. The electrolytic method of copper plating is advantageously used, but the zinc may be coated with copper by ordinary means. In the first place the sheet zinc is cleaned with soda from any adhering dirt and grease, and is also purified by a weak acid bath from the covering of zinc oxide. There are then dissolved in 24 parts of water 1 part of refined verdigris and 12 parts of cream of tartar; the mixture is heated to boiling point, after which 3 or 4 parts of Spanish white are added. The Spanish white is here decomposed and is precipitated as lime tartrate. The dark blue liquid is poured off and filtered, and can be used either as a bath for the sheet zinc or for the production of a copper plating paste. The first mode of application is better, as the fluid forces its way into the corners and angles of the zinc articles and is uniformly distributed all over. If it be desired to coat an immovable zinc object with copper, the article, after being cleaned, is painted with the copper solution and a chalk compound, and, after drying, it is brushed. This very simple operation would also prove of value for architectural purposes, namely, where it is desired to remedy the generally unpleasing effect of zinc ornamentations.

The manufacturers of very thin sheet iron and steel may, says the London *Ironmonger*, be glad to learn that in Germany one of the latest fads of fashion is to have visiting cards made of iron. These are said to be so thin that a pile of forty of them only reaches a thickness of one tenth of an inch. The names are engraved in letters of silver or gold upon a black surface. A correspondent thinks these cards must look like coffin furniture, but as I have not yet seen any of them I am unable to form any opinion on the subject. At the same time, one must welcome any new method of using up the enormous quantity of iron and steel which is now being produced in Europe and America.

Ancient and Modern Automata.

A little book, by Conrad Cooke, has just been published in London, England, which treats of "Automata, New and Old." In reviewing it, *Engineering* remarks: After reading it, we are divided between admiration of the skill of the ancient mechanics, and wonder at the mendacity of the historians who followed them. Marvelous as were the apparatus of which we have authentic information, they were but poor affairs compared with others whose performances have been handed down by rumor. Mr. Cook commenced by noting the automata attributed to Vulcan, but he did not get to firm ground until the time of Hero, who was not only a most able mechanic, but also managed to get his inventions well reviewed in the technical press of the day Hence it comes that we not only know what effects he produced, but how he arrived at them. He was the inventor of the piping bullfinch, of the first penny-in-the-slot machine, and of many other pieces of mechanism which have since been brought out as complete novelties. After the time of Hero there was an interval of nearly 1000 years, during which no record of automata is to be found. This carries the chronicle down to the time of Charlemagne, to whom a most elaborate water-clock was presented by the Khalif Haroun al Raschid. Speaking heads came into vogue about this time, and an automaton of clay, over which Albertus Magnus spent 30 years, is said not only to have spoken, but to have walked, answered questions and solved problems. This was destroyed by St. Thomas Aquinas as the work of the devil. The great period for the construction of automata began at the close of the fourteenth century. The list of the principal examples is too long to follow, and many of the accounts are evidently gross exaggerations. Among the more interesting are a number of clocks, such as those at Strasburg and Lyons. It was in the middle of the seventeenth century that magnetism began to be utilized in automata to form an invisible connection between the works and the moving figures. After this date we come to a period from which more reliable accounts have descended to us. Among the well authenticated automata are the musicians and the duck of Vaucanson, the writing man of Von Knaus and the figures of Le Drorz. The chess player of Baron Wolfgang von Kempelen would need to be included, had it not contained a man to direct its movements. Mr. Cook tells the real story of the fraud. There were several exhibitions of automata in London at the end of the last century, and they must have found fashionable audiences, seeing that the entrance fee, to one at least, was half a guinea. Robert Houdin was the next great constructor of automata, and after him there was none others until Mr. Maskelyn, who is still puzzling the world with his wonderful productions. For other examples of this kind of mechanism we have to look to the toy shops and to the street hawkers who sell "walking postmen" and the like.

As a result of observations taken in the center of Manchester, England, and about 1½ miles distant, it was demonstrated that the presence of smoke prevents radiation to such an extent as to make an appreciable difference in the temperature. At the town station on Saturday and Sunday evenings, when the amount of smoke produced is less, the temperature is perceptibly lower than during the rest of the week.

STEAM AND HOT WATER.

Heating and Ventilating School Houses by the Blower System—I.

By Walter B. Snow.

IMPORTANCE OF VENTILATION.

The importance of perfect school house ventilation, as regards the health of the growing child, cannot be overestimated. And yet how far, how very far indeed, from perfect is the ventilation of the majority of the school buildings of the country. Few well-to-do parents would be willing that there should be indiscriminately brought into their homes as companions for their children the very companions that their children must associate with in school; companions, perhaps, from the very "slums," uncleanly, unhealthy, diseased. And yet these children must sit side by side, must handle the same books, must breathe the same air, for perhaps five hours per day.

If we could but see filth in the atmosphere as we can view it on the stagnant pool, but few weeks would elapse in any ill-ventilated school house before a remedy was applied and the children supplied with clean, pure, healthful air.

But there is an "if" in the way; we can only rely on other senses than that of sight, and while we inhale the air, with its disagreeable "schoolroom odor," and perhaps feel dull and fatigued after breathing it for a few hours, yet as it does not really make us sick we pass it by as something inevitable. But do we comprehend that, like the constant dropping wearing away the stone, so this continued effort to sustain a healthy young life on a polluted atmosphere must eventually result to a greater or less degree in the impairment of the health of even the most robust.

Upon air in sufficient quantity one's life is dependent; upon the purity of that air does the health depend. If we would bring up a generation of children not crammed with book knowledge, although they may have attended school, but educated, alert and healthy because their lessons have been learned and their school life passed in an atmosphere approaching in purity that out of doors as nearly as science can provide public spirit must be awakened.

QUANTITY OF AIR REQUIRED FOR VENTILATION.

No definite idea of the actual requirements of schoolhouse ventilation can be formed without at least a rudimentary investigation of the amount of air actually inhaled and the amount contaminated by an average person. Although the adult naturally requires more air for respiration than is necessary for a child, yet the greater emanation of odor and the greater prevalence of sickness among the young fully offsets it, and it is well in estimating to allow as much for child as for adult.

The average adult when at rest makes about 16 respirations per minute, which, at the average of 30 cubic inches each, makes a total of 480 cubic inches passing through the lungs per minute. Of this amount about one-fifth will be oxygen and four-fifths nitrogen, in addition to which there will usually be present about $1\frac{7}{16}$ per cent. of aqueous vapor and $\frac{4}{100}$ of 1 per cent. of carbonic acid gas. All this before it enters the lungs. After passing them, however, it will be found to have lost about one-fifth of its oxygen by the formation of carbonic acid, which will in turn have increased to about 4 per cent. of the total volume, an increase of 100 per cent. The water vapor will have increased to 5 per cent. and the air will have a temperature of about 90°.

In addition to the carbonic acid thus formed about ½ more is given off by the skin. Assuming that an amount of air is supplied sufficient to dilute this to the same proportion as the breath, there obviously will be required, about 580 cubic inches or 0.33 cubic feet of fresh air, to supply the fixed requirements of the body. But, furthermore, $1\frac{1}{2}$ to $2\frac{1}{2}$ pounds of vapor are evaporated daily from the surface of the skin by a person in still life. If the air is supplied at 70° with a humidity of 70 per cent. and is assumed to be saturated when it leaves the body, then at least 4 cubic feet of air per minute will be required to carry away this vapor.

Taking into consideration these various factors it becomes evident that about $4\frac{1}{2}$ cubic feet of air will be required per minute to thoroughly remove from an individual all vitiated air and to furnish fresh air for respiration and the absorption of moisture from the skin. This, however, is only on the assumption that any given quantity of air, having fulfilled its office, is immediately removed without contaminating the surrounding atmosphere.

But the spent air is immediately diffused into the atmosphere. Outdoor air usually contains about 4 parts of carbonic acid in 10,000; that discharged from the lungs has, however, 400 parts in 10,000, and therefore to secure the commonly accepted standard of good ventilation, as 6 or 7 parts in 10.000, it would be necessary to dilute each 0.33 cubic foot with 19 to 22 cubic feet of outdoor air. Hence the individual would require 1140 to 1320 cubic feet of air per hour.

But even this must be admitted to be the theoretical quantity. Of all the air admitted to the room a certain amount is sure to escape without serious contamination—that is, without doing its part as a diluting medium. For practical satisfactory results it is necessary to supply per hour per person about 2000 to 3000 cubic feet of outdoor air with 4 parts of carbonic acid per 10,000 in order to maintain an atmosphere around the individual containing not over 6 or 7 parts in 10,000.

In an ordinary schoolroom containing teacher and 55 scholars a supply per head of 3000 cubic feet per hour is equivalent to supplying to the entire room 2800 cubic feet per minute, which, with an air space in room of 250 cubic feet per occupant, would be sufficient to change the entire air of the room every five minutes

COST OF VENTILATION.

As all of the air thus supplied must be properly warmed, and as the room must be maintained at 68° to 70°, it is evident that an enormous amount of heat in the form of warm air must be discharged every moment through the vent flue to the outer atmosphere.

This heat means coal; the coal bill is visible; the effect of the best ventilation upon the health of the scholars is by no means as readily seen, for its work is long extended; consequently it will be found almost without exception that the measure of the ventilation is to be found in the size of the coal bill the school board is willing to approve. Ventilation is expensive; were it not such articles as this need never be written. The public must be educated to the fact that ventilation is a necessity; then, and then only, can we hope for marked improvement. Too often a system of direct radiation with no air supply or a furnace system with a supply that is inadequate is compared on a basis of running expense with a hot-blast system supplying from 30 to 50 cubic feet per occupant per minute, with the most natural result that the latter is deemed far more expensive. But compared upon equal volume of air supplied the tables are completely turned.

THE HOT BLAST SYSTEM.

The hot-blast or blower system, consisting of blower, motor and heater, with a system of distributing ducts and a primary supply of steam, stands to day as the only system adequate to cope with all the requirements of school house heating and ventilation. While the furnace system may be perfectly satisfactory, under certain atmospheric conditions, there are days when a dependence upon natural methods of ventilation results in a totally inadequate air supply, but with the blower system the air being impelled by mechanical means is positive in its action, and may always be driven to its proper destination.

To quote the words of experience of Robert Briggs—an expert on the subject—in a paper pertaining to mechanical ventilation: "It will not be attempted at this time to argue fully the advantages of the method of supplying air for ventilation by impulse through mechanical means—the superiority of forced ventilation, as it is called. This mooted question will be found to have been discussed, argued and combated on all sides in numerous publications, but the conclusion of all is that if air is wanted in any particular place at any particular time it must be put there, not allowed to go. Other methods will give results at certain times and seasons or under certain conditions. One method will work perfectly with certain differences of internal and external temperatures, while another method succeeds only when other differences exist. One method reaches to relative success whenever a wind can render a cowl efficient. Another method remains perfect as a system if no malicious person opens a door or window. No other method than that of impelling air by direct means with a fan is equally independent of accidental natural conditions, equally efficient for a desired result or equally controllable to suit the demands of those who are ventilated."

(To be concluded.)

The Capitol Heater Company of Detroit having acquired, as previously announced, the Bolton heater, and contemplating putting forth a line of steam

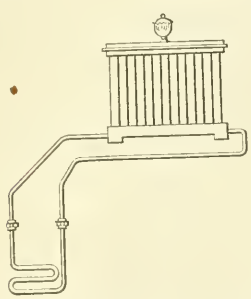
boilers, under the name Hecla, will change their name April 1, taking the more comprehensive title of United States Heater Company. The management of the company will remain unchanged, Messrs. Henderson and Smith who started the company a year ago, retaining the sole management. They have taken new offices in the Bagley Building, Congress and Randolph streets, Detroit, to provide the necessary accommodations for their largely increased business. The branch offices of the company will remain the same, that at Chicago under the management of John W. Mills, Ogden Building, and that at Boston under Gilchrist & Taylor, 106 High street.

English Practice in Hot-Water Heating—XXIII.*

EXAMPLE BUILDING WORKS.

In the following few examples it has to be mentioned, as was done when giving examples of horticultural works, that it may never fall to the reader's lot to erect an apparatus like any one of them; but by describing and also illustrating one or two methods of carrying out the works, great assistance can be rendered to the unskilled. The principles are thus made more clear, and once the principles are grasped nothing else can be gained except by actual experience. The examples are merely supposed requirements and the possibly best way of meeting them. It is impossible to do more than this as there are but very rarely two works anyway resembling one another.

Fig. 95 shows a convenient little arrangement (it can hardly be called an



English Practice in Hot-Water Heating.—Fig. 95.—Arrangement for Warming a Room Located Near that Containing the Fire.

apparatus) to give warmth into a room adjoining or near the place where the fire is. The coil is supposed to be at the back of an ordinary open grate fire, and furnishes heat to a few feet of pipe or a small radiator, which, however, should not be far away. This drawing shows a coil of three ¾ inch pipes, the top pipe being continued upward as the flow and the lower one forming the return. Two unions are shown just above the fire box to facilitate the removal of the coil if eventually it becomes fractured. There is no doubt it will fail one day if it has much usage, as dirt will find its way into the pipes and eventually fill up the lower one and cause it to split. If steam quality tube is used it will last very well for several years, only having use in the winter. A piece of copper tube for the coil would do well.

It is hard to suggest what actual work this little appliance is capable of doing—it depends upon several things. Firstly, the size of the fire. If it is a fire box holding a good thickness of fuel—that is, a mass of fuel deep from front to back, very effective results are obtained. If the fire box has wholly fire brick at back and sides (as with all good modern grates) it helps matters, and the attention to the fire will affect the heating of the pipes. In putting pipes containing water in the fire of an open grate we introduce a cooling influence that may completely spoil the utility of the grate, for it must be particularly noted that combustion effected in an open fire is very different to that in a close stove or boiler, with the important assistance

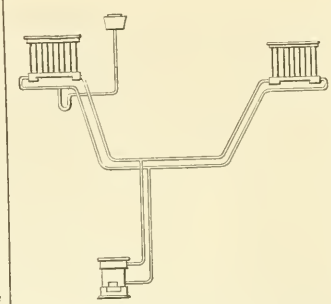


Fig. 96.—Two Radiators Connected with a Small Independent Boiler.

it has from the draft that is induced. With a close stove the draft passing through the fuel (and not over it as it does with a grate fire) causes combustion to proceed briskly irrespective of cooling influences, and this speed of combustion can be regulated just as may be required by the damper.

If the grate fire box is not a large one three pipes will have a deadening effect upon the fire, and one or two pipes only must be used for small requirements. The uses of this arrangement are that a radiator can be put into a neighboring room, which is perhaps of such a size as not to be heated by its own fire place; or it may be used to introduce a little warmth into a room that is not used regulary. If the coil was in a large fire it might be made to heat sufficient radiating pipe for the warmth a billiard room should always have when out of use.

The water supply may be provided for by a little cistern in any convenient place where it is not seen, or the radiator may be fitted with a little vase filling cup at top, as shown. This latter article then acts as an air vent. In any case an air-cock will be needed at the highest point in the radiator to allow for the escape of air as it is being filled. No stop-cock would be required with this apparatus; but a draw-off service (for emptying purposes only) might be found useful, if it can be conveniently placed.

The next example, Fig. 96, illustrates two radiators in connection with a small independent boiler, for heating an entrance hall or other similar purpose. Of course, coils or hot-water pipes could be used in place of the radiators, if so desired. There is scarcely a better purpose to which heating works can be put than this. The great gain that is effected by providing warmth in an entrance hall cannot be overestimated. This part of the house, with the staircases leading from it, has been likened to an artery, as it furnishes a constant current of air to the rooms and places that lead off from it. It must be known by every one that in nearly all cases the greater part of the air entering a house (and the volume is great) enters by the doors and openings it can find on the ground floor. This inflow is necessary, as the chimneys in a house require air, also the occupants, of course, and the house itself can well be likened to a great chimney, for an upward current of air, as a rule, always manifests itself inside. These conditions, perhaps, do not exist, or, at any rate, to such an extent when a good system of ventilation is provided; but this, unfortunately, is absent in too many cases.

Assuming that a considerable volume of air finds its way into the house by the best route it can, the larger proportion will pass through the entrance hall, and, as a rule, this part of the house is very cold. All doors in the vicinity have disagreeable drafts to them, and the staircases are in quite as bad a state. By introducing heat in the entrance hall a really important benefit is obtained. The heating medium should be placed as near the outer doors as possible, so as to contribute its warmth to the incoming air. By this means the hall is made agreeable, if not quite warm. The air entering the rooms is tempered, and that which passes up the staircases goes to make the upper parts of the house less cold. By keeping the boiler fire alight through the night the very disagreeable degree of cold experienced in the halls and staircases at early morning is prevented. Engineers are particularly cautioned against using the same quantity of radiating surface in an entrance hall as they would in a room, if they want to make a success of the job. These places are not usually expected to be of as high a temperature as a room, but notwithstanding this they require 50 per cent. more pipe. The necessity for this is due to the air of the hall being in tolerably rapid motion always, being taken by the rooms, and particularly the staircases, leading from it. If the gain effected was generally known no residence of any pretension would be without heat in the entrance hall.

In this example a small, independent boiler is shown, which would be situated in a cellar or basement room below. From the boiler is carried an inch flow and return service, by the best route (observing the principles already dwelt upon), and the pipes can be carried first to one radiator and then on to the other, or can be taken to a central point and branched each way, as shown. If the pipes be carried first to one radiator and then on to the other, the connection to the first would have to be as Fig. 94, or the second coil would be much longer than the first in heating.

In branching the services as illustrated a little better rise should be given to the pipes which extend furthest, so as to equalize results each way. There would be no need for stop-cocks in a little apparatus like this. The cold supply would be provided by a small cistern, as shown, either filled by hand or with a ball valve. If the latter, the cistern should only fill just an inch or two, so as to allow for the expansion of water when heating. An air cock would have to be fitted in each radiator and cleaning plugs and an emptying cock should be provided to the boiler.

The pipes from the boiler should be 1 inch, as just mentioned, but there would hardly be need for the branch to each radiator to be more than ¾ inch. It will be seen that the cold supply-pipe has the customary dip in it to prevent the heated water circulating into the cold-water tank. The way in which this acts has been fully explained and does not need repeating here.

* Reprinted from the London *Builder*.

HEATING NOTES.

THE HARRISBURG BOILER & MFG. COMPANY, Harrisburg, Pa., issue a catalogue attractively gotten up of boilers they manufacture. The publication, of oblong shape, is printed on heavy paper and begins with a description of the Star water-tube boiler, as adapted to power purposes. These are made in various sizes from 12 to 100 horse-power, and a table gives all the

dimensions and surfaces. Next is described the return tubular boilers, then locomotive and vertical boilers. Then comes the division relating to heating boilers. Accounts are given of the Star gas-burner boiler, Star water-tube boiler and the Star water-tube hot-water heater, besides the Star gas-burner hot-water heater. Numerous illustrations and complete descriptive text are presented. Miscellaneous goods such as flanging machines and pumps are noted at the close.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until the 12th of April, for furnishing and erecting complete steam disinfecting plants at the United States Quarantine Station, Camp Low, Sandy Hook, N. J., in accordance with drawings and specifications, copies of which can be had at the office of the Supervising Architect, or at the office of the Superintendent of Public Buildings, New York City.

THE *German Valley Quarterly* comes out in its last number resplendent in blue ink and other attractive features. This quarterly, which is published by the F. D. Stephens Company, contains a lot of local news, some interesting short articles, suggestions about heating and various prominent announcements of the F. D. Stephens Company, German Valley, N. J., who, among other things, handle the Florida steam and hot water heaters.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until April 26, for all the labor and materials and fixing in place complete of low pressure, return circulation steam heating and ventilating apparatus and power boiler, &c., in the U. S court house and post office building, Springfield, Mo.

THE SWAMSCOT MACHINE COMPANY, South Newmarket, N. H., with salesroom at 98 Milk street, Boston, Mass, issue a neat catalogue illustrating and describing their hot-water heater. The Swamscot heater consists of a series of horizontal cast iron sections connected together with a central water column. To speak more accurately the sections are dished so as to give an upward inclination toward the center column. They are connected together and with the fire pot by wrought iron nipples, the fire pot being surrounded by a circular water chamber. The apparatus is fully described and general and sectional views show very clearly all the features of its construction. The Swamscot heater is made in five sizes, with inside diameter of fire pot from 17 to 31 inches.

JAMES H. HUTCHINSON, New York City, has patented an improvement in radiators, the object of which is to secure large radiating surface, greater strength, free circulation and simplicity in construction. The invention consists in the combination of a radiator of inlet and outlet ports and a compound stop and check valve, consisting of a valve casing divided by a diaphragm into two chambers or passages, a stop valve in one chamber and a check valve in the other.

Gas jets, asserts an English gas trade paper, may be made important auxillaries to ventilation. Inserted in the bottom of air shafts, they establish active currents, which withdraw the vitiated air from living rooms. It has been proved by actual experiment that 1 cubic foot of illuminating gas can be so utilized as to cause the discharge of 1000 cubic feet of air; and as a common gas burner will consume from 3 feet to 6 feet of gas an hour, it will extract 1000 times that amount of air from a room each hour, if suitable contrivances are used, besides giving light.

Prize Competitions

$25.00.

Prize Competition No. 19.

SUBJECT:

Electrical Goods as a Part of a Hardware Stock.

The increasing demand for Electrical goods and their more general adoption in homes, hotels, stores, offices, public buildings, factories, and for street railroads, makes the subject a pertinent one to the Hardware merchant, especially as Gun and Locksmiths are endeavoring to absorb this line of trade in many places. The competition is designed to draw out expressions as to the advisability of including Electrical goods in Hardware stocks; to what extent these goods should be carried; assortment of goods which can be handled profitably; the best manner of arranging and displaying these goods; whether installing and Electrical repair work should be included, and to what extent electrical devices can be supplied to manufacturers and to street railroads.

This competition will remain open until April 29, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than April 29, 1893. They should be addressed as follows:

DAVID WILLIAMS,

96–102 Reade street,

New York.

Prize Competition No. 19.

The committee to whom the contributions in Prize Competition No. 5 were referred have awarded the prizes as follows:

First Prize to H. S. DRUMMOND, Newark, N. J.

Second Prize to CHESTER G. AMBLER, Danbury, Conn.

Third Prize to H. P. KING, Portland, Ore.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 16. Closing April 8.

Three or More Rules to be Observed in Buying.

No. 17. Closing April 15.

How Merchants Should Treat Traveling Salesmen.

No. 18. Closing April 22.

The Extent to Which Merchants Should Devote Their Attention to Outside Interests.

No. 19. Closing April 29.

Electrical Goods as a part of a Hardware Stock.

Another subject will be announced in our next issue.

We were favored with a card of invitation to be present at the closing exercises of the New York Trade School. Later we hope to present a report of the proceedings which attended the presentation of certificates, as well as of the addresses given on the occasion. Four hundred and fifty-three students received diplomas of proficiency.

Says an English scientific journal when considering the question of utilization of city waste: The waste of a great city might easily feed its desperate poverty. We waste our coal and our smoke, our gas and our water, our food and our refuse. What we want is more forethought in times of comparative prosperity. The chemist turns scrap iron into ink, old bones into lucifer matches, the shavings of the blacksmith's shop into Prussian blue, fusel oil into oil of apples and pears, and drainings of cowhouses into fashionable perfumery, beggars' rags into new pilot coats, and tar waste into aniline dyes and saccharine. In Paris they first utilize rats to clear the flesh from the bones of carcases, then kill the rats, use up the fur for trimmings, the skin for gloves, their thigh bones for toothpicks, and their tendons and bones for gelatine wrappers.

The Bulletin of the American Iron and Steel Association is responsible for the following story illustrative of the economic methods of the guardians of Uncle Sam's purse: It is interesting to note, says that journal, the absolute accuracy which the Government requires before it will receipt for light-weight coin. Only a short time ago a consignment of gold was received at the Treasury Department from San Francisco. The gold came in heavy canvas bags, and in an aggregate of a quarter of a million dollars of gold it was found that it was 9 cents light in weight. The cashier of the Treasury had to make good the deficiency of 9 cents, but the bags themselves were sent to the assay office at Philadelphia, and at an expense of probably a hundred times the amount of light weight the bags were burnt, the gold was recovered from the bags by a smelting process and returned to the cashier, who in the end lost nothing.

PLUMBING AND GAS FITTING.

Device for Destroying Sewer Gas.

At the store of S. A. Maxwell & Co., 134-136 Wabash avenue, Chicago, is to be seen a device, invented by engineer John Green, for disposing of sewer gas by burning. The device has been in use for some time. It was suggested to Engineer Green by necessity. Maxwell & Co.'s pipe system was faulty, and the defects eluded many attempts made to discover and correct them. In the meantime the rooms of the building, especially the basement, were impregnated with sewer gas and various "bad smells," to a dangerous extent. As from the building's sewerage system and from the main sewer. It is forced into the fire through longitudinal openings in the square boxes and is burned up.

In Fig. 1 is presented a view of boiler showing the arrangement of pipes and boxes. A and B are the two air boxes which are placed on either side of the fire box, the brick being cut away so they will be flush with face of brick wall. They are also placed as near the boiler front as convenient. The distance from top of grate to openings in boxes is 12 inches. C D is the 3-inch pipe leading to the sewer. C E and D F are $1\frac{1}{2}$-inch pipes connecting the main supply pipe C D with syphons and air boxes. G H J K is the $\frac{3}{4}$ steam supply

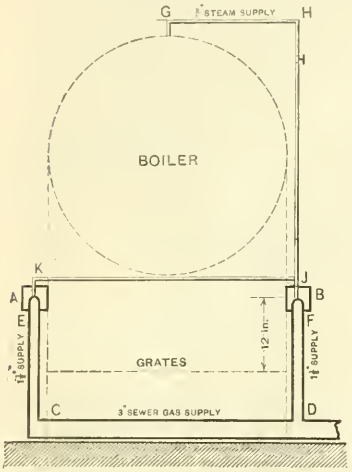


Fig. 1.—Front View of Boiler, Showing Arrangement of Pipes.

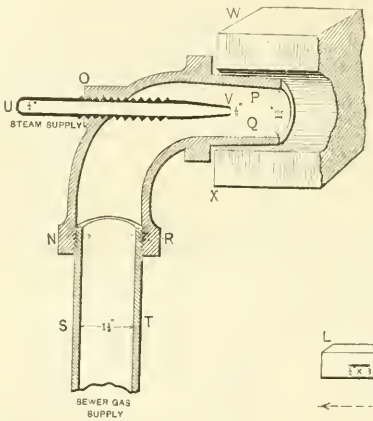


Fig. 4.—Section of Syphon.

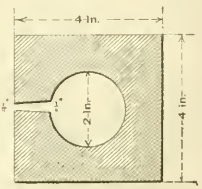


Fig. 3.—Section of Air Box.

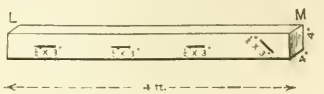


Fig. 2.—Air Box.

DEVICE FOR DESTROYING SEWER GAS.

is the case with many of the old style Chicago buildings, or those put up soon after the great fire, the exhaust from the engine is connected in the basement by means of a Y with the ventilating pipe which leads from the sewer up through the roof. Engineer Green is of the opinion that the result of this arrangement is either to force steam into the sewer, or at least prevent the escape of sewer gas up the pipe as intended. Hence he set about correcting this trouble, and invented the device referred to.

"There is no patent upon the device," said engineer Green. "All it cost was the expense of rigging up the boiler and running the connecting pipes to the sewer." The device comprises two iron pipes or boxes at the top and either side of the firebox of the boiler. A steam jet with an aperture of $\frac{1}{8}$-inch is screwed into the boxes. The latter are connected by 3-inch pipes with the sewerage system in the building, and the connection is also carried out to the street side of a trap opening into the large sewer under Wabash avenue. Steam is forced at a high pressure into the square boxes, the effect of which is to create a vacuum and a draft so strong as to draw in gas for syphons, and is connected with the boiler. One of the cast-iron air boxes is shown in Fig. 2. It is 4 feet long, and 4 x 4 inches at the ends. Four longitudinal openings, $\frac{1}{8}$ x 3 inches, are placed in the box, as shown. A 2-inch opening extends through the box, which is closed with an iron plug at M. The end L slips over the syphon. A section of air box is shown in Fig. 3. The longitudinal openings are $\frac{1}{8}$ x 3 inches outside, and $\frac{1}{4}$ x 3 inches inside. The top of opening is on an angle, the object being to cause the air to strike down on the fire. In Fig. 4 is presented a section of steam syphon and part of air box. N O P Q R is of cast-iron and made to receive the air supply pipe S T, which is indicated in Fig. 1 by E C or F D. U V is a piece of $\frac{1}{4}$-inch pipe drawn out so the opening at V is $\frac{1}{8}$-inch in diameter. U V is connected with the $\frac{3}{8}$-inch steam supply pipe as indicated at K or J in Fig. 1. The sewer gas supply pipes and syphons are placed inside of the boiler front, thus the only holes necessary in the front are those for the steam supply pipes, which can be placed outside.

The device having been tested by means of an anemometer, it was estimated that 3,840,000 cubic feet of sewer air passed through the pipes in one month. Engineer Green says the action of this device assists in the consumption of smoke, and he believes that in this respect it is as effective as many smoke burners of special make. The working of the device was explained by him to the Municipal Order League at a late meeting. He said that if the device was generally adopted manhole explosions would become a thing of the past. Engineer Green states that during January, 1892, before the device was in operation, 124,000 pounds of good coal were used, the plant being run during the day only. During January 1893, with the device in operation, 121,000 pounds of poor coal were used, the plant being run day and night.

The North Shore Plumbers' Association.

We have received from W. E. Goodwin, secretary, 714 Evanston avenue, Evanston, Ill., the following report of the organization of the new Master Plumbers' Association of the North Shore, which was effected at Evanston on March 23.

The initiatory degree was conferred by W. T. Geary, assisted by D. J. Rock, J. B. Breen, Alexander W. Murray, and Robert Thoroughgood of the National and Chicago Master Plumbers' Associations.

The members of the new association are Robert Thoroughgood of the Thoroughgood Plumbing Company, Rogers Park; J. J. Pickett, Evanston; John Eiden, South Evanston; Thomas Howe, Lake Forest; W. E. Goodman, South Evanston; George Wallace of George Wallace & Co., Evanston; Charles Wallace of the McDougle Plumbing Company, Evanston; A. Balfour, Evanston; Charles Beck, Evanston; Louis Beck, Rogers Park, and G. Specht, Wilmette. The officers of the

association are as follows: Robert Thoroughgood, president; J. J. Pickett, vice-president; Thomas Howe, treasurer; W. E. Goodman, secretary, and John Eiden, sergeant-at-arms. The towns included in this association are Rogers Park, Evanston, South Evanston, Wilmette, Winnetka, Highland Park, Lake Forest and Waukegan, lying north of Chicago in a rapidly growing district.

The leaders in this movement have assurances from all the plumbing firms in these towns that as soon as possible they will join, expressing themselves in hearty sympathy. Regular meetings are held on the fourth Monday in each month at Liberty Hall, Evanston.

Range Boiler Emptied Through Relief Pipe.

From E. P., *Stockton, Cal.*—In regard to the inquiry of "C. Q. A.," of Ohio, in *The Metal Worker* of March 18, respecting a range boiler emptied through a relief pipe, I would suggest that if he carried the vent pipe from the top of the boiler direct to the top of the supply tank he would not be troubled with the boiler emptying. The trouble is after the water becomes hot enough in the boiler it expands sufficiently to overcome the gravity of the water in the tank. If the tank was at a higher elevation there would be pressure enough to overcome the expansion of hot water in the boiler and the emptying would not occur.

From E. R. P., *Baltimore, Md.*—In *The Metal Worker* of March 18 and March 25 there appeared articles headed "Range Boiler Emptied Through Relief Pipe." In the issue of the 18th "C. Q. A." tells that such a thing is done, and in the issue of the 25th "W. T." explains why it is done, or rather the cause of the effect. Then "W. T." suggests three methods of overcoming the difficulty, the last of which would dispense with the relief or expansion pipe in the case of street pressure. I am of the opinion, as is "W. T.," that doing away with this portion would not bring about any dangerous results, and I would here raise the question why such a pipe is used in country houses, or wherever tanks supply the boiler. Last winter, which was a severe one, I have, in two cases, found the expansion pipe frozen at the tanks, which were under the roof and in the coldest part of the house. They were consequently rendered useless for expansion, while in the case of the supply pipe the occupant took the precaution of wrapping them to prevent freezing. This precaution would probably never have been taken had not their supply been cut off at all the outlets, and as the freezing of the expansion caused no inconvenience they never took the trouble to prevent the freezing. I therefore ask the question, What practical use are they, unless, perhaps, to prevent collapsing of the boiler (when not frozen), and if this is the only use what safeguard has a boiler against collapsing that is supplied by street pressure? I know that there are such devices as vacuum valves, but they are seldom used.

New York Plumbing Regulations.

From T. Y., *New Jersey.*—I wish to obtain a reliable book, giving illustrations, with the sanitary laws and regulations of the Health Department of New York City.

Answer.—The rules and regulations governing sanitary plumbing in New York City are published by the Building Department, corner Eighteenth street and Fourth avenue, and give only the necessary instructions, but no illustrations. Copies are supplied to plumbers doing work in the city who ask for them, and if our correspondent cannot apply in person he will have to get some friend to procure a copy.

TRAPS AND VENTS.

FROM A LOCAL PAPER published at Atlantic Highlands, N. J., we learn that Percy Falkinburg of that town has received a patent on an automatic flush tank for closets, which consists of an air-tight tank with a mechanical movement inside which causes the tank to fill with water when the closet is in use until the air pressure equals the water pressure.

THE KEYSTONE POTTERY COMPANY of Trenton, N. J., have just published a 14-page catalogue, covering their line of sanitary ware. It is printed on paper of extra quality, and the illustrations are tinted. Neatly bound in cloth, it will, no doubt, be very acceptable to the trade.

A DETROIT LOCAL PAPER gives an account of "Shipping a factory across the Atlantic," telling how the entire plant and equipment for the Steel Clad Bath Company's English factory was sent from New York. Presses and rolling machines of different descriptions will be erected immediately on their arrival under the supervision of James Hutcheson, formerly of the Detroit Company. The Steel Bath Mfg. Company have been doing a very excellent business, and their increase in trade has decided them to erect a new three-story building.

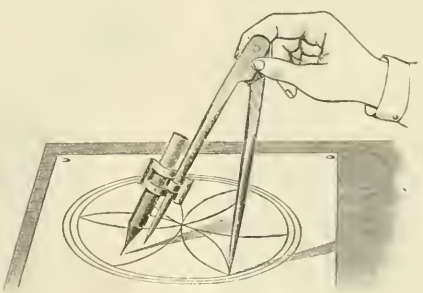
THE BEEKMAN SALUTARY SYSTEM COMPANY make announcement to the trade that they are closing out their retail branch at 56 Beekman street, New York. They mention that it has well served its end, in bringing the Whirlpool Closet and Beekman Duplex Tank prominently before the best architects, sanitary engineers and builders in the country. They now feel that they are in a position to confine themselves entirely to manufacturing this closet and tank and other sanitary specialties which they control, as was the intention of the company when incorporated. The Beekman System will hereafter be sold direct to the trade at close manufacturers' figures.

THE APPLICATION of cement to the construction of pipes was recently described in a French engineering journal. The method followed is what is called the Bordenave system of sidero-cement. The general principle consists in imbedding a frame work of iron bars in cement mortar. These bars are made in long lengths and wound in helical form. The working stress is calculated at 9.8 tons per square inch, so that for a pipe 2 feet 7½ inches, inside diameter, a bar 0.5 x 0.2 inches would have a pitch of 3.8 inches for a head of water of 33 feet. An experimental pipe line of four miles has been constructed on this principle and found to be entirely successful. The metal is said to be completely preserved from deterioration by the cement which adheres closely to it. Other advantages claimed for the invention are that no vegetation or deposit of any kind will attach to the cement; that the danger of leakage is less than in iron piping with lead joints, and finally, that there is a saving in cost over iron pipes of from 15 to 45 per cent., while the durability of cement piping is stated to be exceedingly good.

THE PECK, STOW & WILCOX COMPANY have commenced the manufacture of a line of Gas and Burner Pliers. These goods are referred to by the company as drop forged, solid steel, well tempered and polished, and fully warranted. The Burner Plier is made in 5, 6 and 7 inch sizes, the first two having one opening and the latter two sizes of grip. The Gas Pliers are made in seven sizes, 7 to 14 inches inclusive, with two sizes of openings and screw driver attachment on one arm. Both classes of Pliers have the usual grip for small work on the end.

Double-Grip Pencil Clasp.

Wm. H. Jacobus, 90 Chambers street, New York, is offering the above device, as illustrated herewith. The wedging action of the compass causes the clasp to grip the pencil rigidly, and a fine adjustment for the size of the circle is obtained by turning the clasp on the compass leg



Double-Grip Pencil Clasp.

The pencil may be easily adjusted in the clasp by loosening the clasp on the compass leg. The point is made that the clasp when attached to a pencil prevents it from rolling off the desk, and also serves as an eyelet for attaching a string. The clasp is made of rolled brass, nickel plated, and is designed for use on compasses or trammels, and for machinists, carpenters and draftsmen; also for use in schools.

The Effect of Melting Pig Iron.—The Valentine Iron Company of Bellefonte, Pa., have just issued the first number of a small publication called the *Nittany Bulletin*, which deals with their Nittany brand of foundry iron. From it we glean the following chemical data bearing on a recent experiment made by them to show the chemical change which takes place in the cupola. The following table shows the change in the chemical composition of iron as the result of remelting, the analysis given being that of the pig iron and of the resulting castings, one a heavy piece of machinery and the other a thin plate ¼ inch in diameter:

	Pig iron.	Large casting.	Small casting.
Silicon	2.080	2.400	2.380
Graphitic carbon	3.140	3.420	2.180
Combined carbon	0.740	0.100	0.430
Manganese	0.654	0.397	0.490
Phosphorus	0.508	0.530	0.502
Sulphur	0.041	0.089	0.097
Iron	92.230	92.850	93.130

The melt was made with a 48-hour coke having 1.46 per cent. of sulphur, which explains the increase in the sulphur contents in the casting.

The Pennsylvania Legislature has appropriated $625,000 for a fire proof State Library building.

ROOFING AND CORNICE.

The Country Cornice Shop.

VI.

By Cornice Worker.

MOLDED GUTTERS ON BRICK WALLS.

Fig. 47 shows the method of fastening a sheet metal molding to a brick wall, on which the gutter is formed of wood, and then lined with sheet metal. A is a section of the brick wall, the upper portion L being built up to but half the thickness of the wall, as shown, thus leaving a space on which to build the gutter, as shown at K. C represents the wooden wall plate, fastened to the wall by means of the bolt B, which has an angle at the bottom. The bolt is placed upon the wall when up as high as shown by the dotted line X. The wall is then built up around the bolt, after which a hole is made in the wall plate C and set over the bolt and fastened with a washer and nut, as shown. D represents the rafter on which the roof is planked, and to this the flange of the gutter lining is nailed. As all this has no bearing on the cornice work, it is only briefly explained so the reader may better understand the sectional views of this kind of work. In making the details for the molding and brace, shown in Fig. 47, care should be taken that the inside brace, shown from 1 to 5, is so drawn that a portion will meet the top member of molding at 1, at part of the ogee, as shown at 2, at the flat portion, shown at 3, and on the flange of the drip, shown at 4. Bolts are then inserted through the molding and brace, as shown at 1, 2, 3 and 4. The thickness of the wall A is taken and the brace made to extend through it, allowing for a flange to bend down behind the wall, as shown at 5. The length of the flange should be less than the hight of a brick. Care should be taken in drawing the top flange and lock of the molding that the lock J, Fig. 47, comes directly over the center of the gutter plank H, so that when the sheet-metal lock of the gutter lining is locked into J of the molding and pounded down with the mallet the blow will come directly over the center of the wooden plank H. If the lock J should come in further than the thickness of the gutter plank H, a bad seam would be the result, because the locks could not be driven together, there being no foundation to pound on. It will be noticed that that portion of brace in Fig. 47 which meets the ogee at 2 at once gives the shape of the gutter on the inside, against which the plank H is laid, as shown.

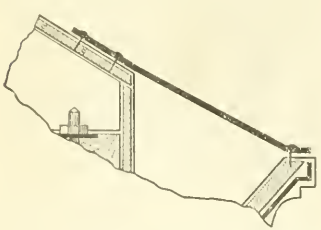


Fig. 49.—Part Section of Gutter, Showing Top Brace.

CONSTRUCTING AND SETTING UP THE WORK.

After the molding is formed on the brake, and set together to the required length, the braces are inserted about 30 to 36 inches from centers, care being taken that the length of the brace from R to S, in Fig. 47, is correct so as to slip over the wall.

The mason, when building up the wall, usually has a scaffold on the front, which is often used by the cornice maker to put up his work. One way to set moldings of this kind is to have the mason stop with his wall when he gets up as far as shown by the dotted line V, Fig. 47. The braces are put in the molding in the shop, with the flange S5 already bent. A hole is punched through the brace as shown at 5, in which to fasten the wire.

Now set the molding and braces upon the wall, and have the drip R of the molding fit well against the face of the wall, as shown. As the molding will

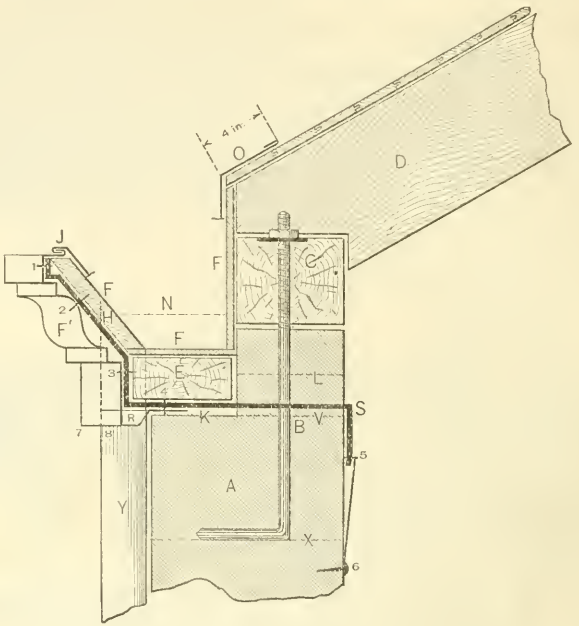


Fig. 47.—Fastening a Sheet-Metal Molding to Brick Wall.

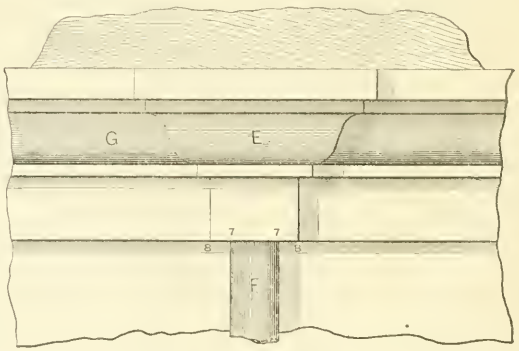


Fig. 48.—Front Elevation of Molding, Leader and Head.

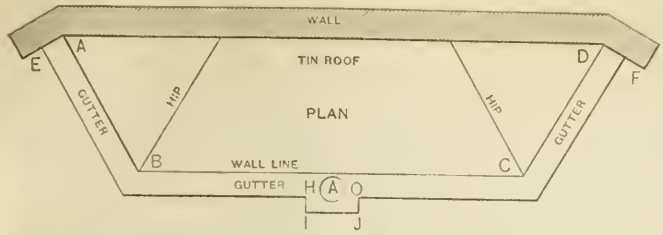


Fig. 50.—Roof Plan of a Bay Window.

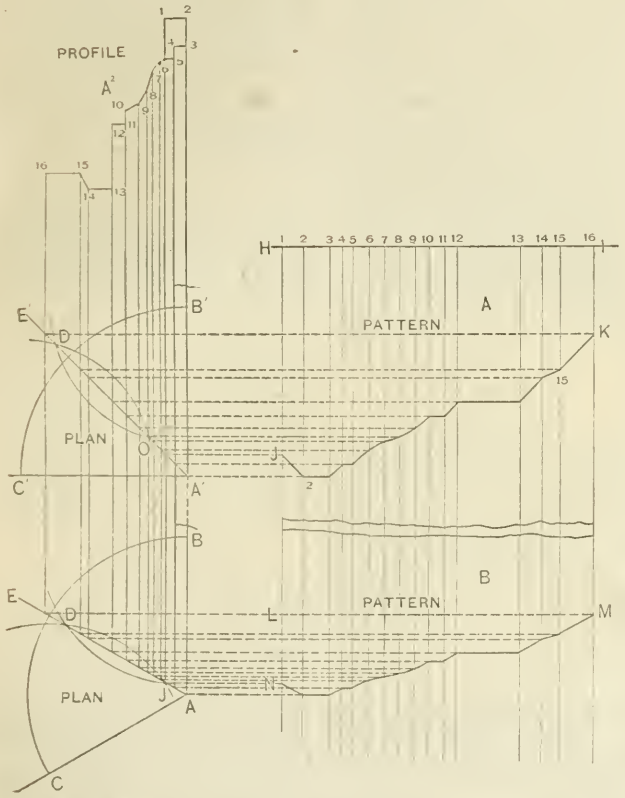


Fig. 51.—Method of Obtaining Two Miter Patterns, Using One Profile.

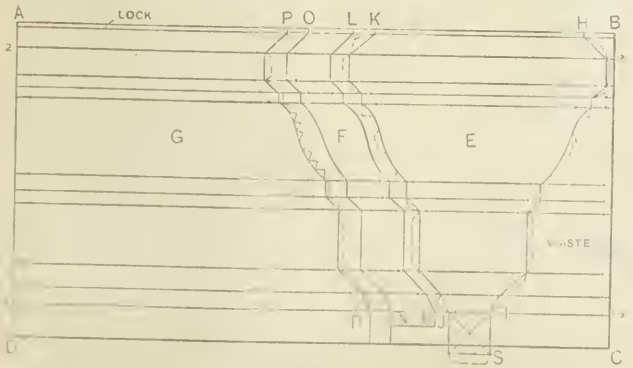


Fig. 52.—Method of Cutting Full Size Patterns.

THE COUNTRY CORNICE SHOP.

have a tendency to tip forward when set, fasten a piece of wire in the hole 5 of brace, press down the brace at S firmly on to the wall, and fasten the wire with an anchor nail into the joint of brick work shown at 6. The wall L is now built on top of the braces, which holds the molding in its proper position. As the full depth of the gutter down to the wall K is not required, blockings of wood are placed upon the braces, as shown at E, Fig. 47. In gutters of this kind the carpenters should prepare the pitch of the gutter. F represents the lowest point of gutter, and N the highest; and after obtaining the required length of the gutter, the lowest point would be blocked up with wood to the hight of F, and the highest point blocked with wood as high as N. A chalk line is then stretched from N to F, and intermediate blockings placed. The gutter is planked out as shown by F F F and connected with the roof boards, after which it can be lined with either tin, copper or galvanized iron, locking the lining into the front lock on molding as before explained, and leaving a flange on roof of about 4 inches, as shown at O, which would be sufficient lap, whether the roof were covered with tin, slate or shingles.

It is the writer's preference in putting up moldings of this kind to let the mason and framer first finish their work complete. When the work is put up before, by the time the mason has finished his wall, and the framer has his wall plate and rafters set, the molding is usually pressed out of shape and flattened.

When putting up the molding after the wall is finished, set it temporarily against the wall and mark where the braces will come, so as to cut the holes shown from L to Y, Fig. 47. As before explained, the angle of brace S 5 should be less than the hight of a brick, so that the holes cut with the use of a chisel and heavy hammer through the brick wall need be the hight of one brick only. The braces having been slipped through are then drawn down with wire as before explained, and the mason closes up the holes with brick, thus holding the braces firmly in position. Y in Fig. 47 represents the leader to carry the water from the gutter. The back of the leader, laying against the wall, is carried up through the blockings, as shown by the dotted line, and intersects the gutter on the bottom line F. The front of the leader is run up through the molding and intersects the plank H at F. Now, if the leader was left in this position it would deface the entire front of the molding, so to overcome this a projection the width of the leader is placed over it, as shown at F', Fig. 47. This at once forms a leader or conductor head, the face of which is shown at E, Fig. 48. The projection 7 8 and 7 8, on either side of the leader F, Fig. 48, is the same as the projection 7 8 over the leader Y, Fig. 47.

Fig. 48 also shows a portion of front elevation of the molding G, which miters to the leader head E, as shown.

Fig. 49 is a part of Fig. 47 reversed, showing top brace fastened at top and bottom, to prevent the gutter from breaking down when filled with snow and ice. After the gutter is lined and the top lock is soldered water tight a galvanized-iron brace is screwed to the roof boards and into the plank of the front of the gutter, as shown. These braces are placed about 30 to 36 inches apart, and are made of $\frac{1}{8}$ x 1 inch band iron, the same material being used for the inside braces, shown in Fig. 47. The method of bending these braces was fully explained in a previous chapter.

Having now explained how the work is to be constructed and put up, we are in a better position to take the measurements and obtain the patterns.

OBTAINING MEASUREMENTS.

Fig. 50 is a rough sketch of the roof plan of a bay window showing the leader, projection of the leader head and angles of walls. The measurement for the moldings would be taken upon the wall line from A to B, B to C and C to D, the angles A B C and B C D being the same. The angle is taken with a bevel, as explained in a previous chapter. The angles at A E and D F are square. Two miter patterns would be required, one for the angle A B C or B C D and the other for the leader head shown in Figs. 47 and 48.

OBTAINING THE PATTERNS.

To obtain the two patterns for the miters, proceed as follows: Let A^2, Fig. 51, represent the section or profile of the gutter, shown at F', Fig. 47. Place the profile in its correct position, as indicated, having the line 12 13 of the profile A^2 perpendicular, and divide the profile into a number of parts, as shown. In line with 2 3 of the profile A^2 place the angle of the leader head, as shown by H I J or I J O in Fig. 50, which is a right angle, as shown by B A' C' in Fig. 51. Then again in line with 2 3 of the profile A^2, Fig. 51, place the angle of the wall A B C or B C D of Fig. 50, as shown by B A C in Fig. 51.

The next step is to obtain the miter lines of these two angles, for which proceed as follows: Place one leg of the compass at the point A', Fig. 51, and strike an arc, as shown from C' to B'. Now, with C' and B' as centers, strike the two arcs as shown intersecting each other at D' and O. A line drawn through these two intersections will be the required miter line, as shown from E' to A'.

The same method is employed for obtaining the miter line for the other angle. With A as center, strike the arc from C to B; then, with C and B as centers, strike the two arcs shown intersecting each other at D and J. A line drawn through D and J will be the required miter line, as shown from E to A, Fig. 51. When miters for different angles are required, and the profile is the same, it is well to use this method of placing the miter lines under one another, thereby saving considerable time in spacing the profile for each miter line.

From the divisions on the profile A^2 drop perpendicular lines, as shown, cutting the miter lines E' A' and E A. At right angles to the perpendicular lines draw the line H I indefinitely, upon which place the stretchout of the profile A^2, as shown by the small figures 1, 2, 3, 4, &c. At right angles to the stretchout line H I draw lines indefinitely from the small figures, which intersect with lines of corresponding numbers drawn from the intersections on the miter lines E' A' and E A parallel to the line H I. Draw lines through these intersections; then H I K J will be the miter pattern for the angle required for the leader head shown at E, Fig. 48; and L M N the miter pattern for the angle taken on the wall line A B C or B C D, Fig. 50. It will be noticed that the angle B' A' C', Fig. 61, is a right angle, and that the pattern obtained is for a square return miter. The method here shown is the long rule for obtaining square miter patterns, the short method having been explained in a previous chapter. It is the writer's preference always to use the short method; but when cases arise where miter patterns are required at other than right angles, and a plan must be drawn as B A C in Fig. 51, then we can just as well draw the plan of the right angle B' A' C', as but one operation is required to intersect any number of miter lines.

FULL SIZE PATTERNS.

Fig. 52 shows the method of cutting the full size patterns from a sheet of iron with as little waste as possible. Let A B C D represent a sheet of iron, upon which the patterns for the leader head are to be laid out.

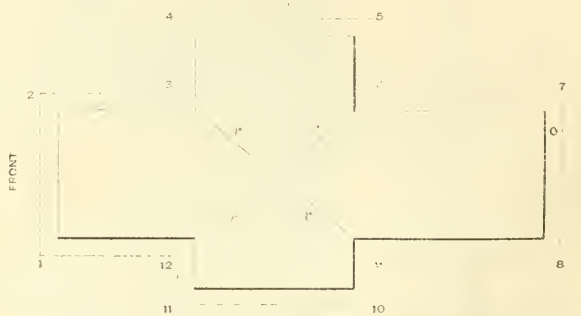
In practice, the front edge of the sheet A B would be cut straight, so that the lock would show an even edge when bent on the brake, and to which the lock of the gutter lining would be attached, as at J, Fig. 47. A stretchout of the profile A^2, Fig. 51, is now taken upon a strip of zinc about $\frac{5}{8}$ inch wide, upon which the bends of the moldings are dotted off. These dots are now transferred upon the sheet by placing the zinc stretchout even on the line A D, Fig. 52, and dotting off the sheet by means of a scribe awl and hammer. Horizontal lines are then drawn through these dots, which represent the bends of the molding. Next turn the pattern A of Fig. 51, and place the line 2 2 of pattern to correspond with the line 2 2 upon the sheet of iron in Fig. 52, and mark the miter, as shown, from H to I, with a scribe awl. Take the width of the leader Y, Fig. 47, and place it as shown from I to J on the line 15 15, Fig. 52; then, reversing the pattern A of Fig. 51, lay the point 15 of the miter upon the point J on the line 15 15, Fig. 52, and having the line 2 2 of the pattern upon the line 2 2 of the sheet of iron, mark the miter, as shown, from K to J. Then will K H I J or E of Fig. 52 represent the pattern of the face of the leader head shown at E, Fig. 48. As the bottom of the leader head is to be placed on the face E, Fig. 52, and the sheet of iron not being wide enough, a small piece of iron would be soldered on. At right angles to I J draw I S, equal in length to I J, and make a square, as shown. Draw the dotted diagonal lines, the intersection giving the center point from which to strike the circle corresponding to the diameter of the leader Y, Fig. 47, and which would be cut out with a circular shears or snips. This completes the pattern for the entire face and bottom of the leader head, laps being allowed as shown by the dotted lines.

Where the leader head intersects the moldings, as at H and O, Fig. 50, it is called an inside miter. Therefore the pattern A of Fig. 51 would be placed in such a position on the sheet of iron shown in Fig. 52 that L M would represent a reverse cut, or inside miter. As M N of Fig. 52 would be joined to I S, take the width of I S and place it as shown by M N and L O, and mark the miter cut. Then will L M N O or F of Fig. 52 represent the projection of the leader head, shown at F', Fig. 47, and the miter cut O N of Fig. 52 be connected to the face E on the cuts J K or H I. Now take the pattern A of Fig. 51, and place 2 2 of the pattern upon the line 2 2 of the sheet of iron and mark a reverse or inside miter, as shown by P R, Fig. 52. Allow laps, as shown by the dotted lines from P to R; then will A P R D or G represent a portion of the molding G, Fig. 48, on which the leader head would be joined, the cut L M on Fig. 52 being joined to P R of the same illustration. The measurement on the molding would be made upon the line R 15 of Fig. 52, that being the bend which sets upon the brick wall. Whatever more molding would be required to obtain the desired length would be joined to the piece G, Fig. 52, having the miter cut the same as B, Fig. 51, for the angles A B C or B C D, Fig. 50.

The face and the return of the leader head E and F, Fig. 52, could be formed upon the hatchet and mandrel stakes, using the ridge and gutter former to make the ogee. In forming the molding G, Fig. 48, it would be best to commence at the lock J, Fig. 47, bending it square with the mallet by using the brake previously illustrated, and then turning over the lock to its proper position with the use of the hatchet stake and mallet. The ogee and the square bends would be made as explained in a former chapter.

Roof with Single Leader Pipe.

From D. G., *New Hampton, Iowa*.—I would be pleased to have the opinion of *The Metal Worker* with regard to a matter which I will try to explain. Inclosed find outline plan of roof of a two story



Roof with Single Leader Pipe.

dwelling house 60 feet deep, the roof being about one-fourth pitch. The solid lines represent the eaves, the broken lines hanging gutter or eave trough. The figures 1 to 12 are 12 miters in the trough, eight outside and four inside. The size of the trough is 4½ inches. The entire run is 170 feet. The distance between 5 and 6 is 5 feet and between 9 and 10 3 feet. Please bear this fact in mind, as it may help to the solution of a difficulty made apparent further on; *v v v v* are four valleys terminating in four inside miters. O, at the southwest corner, is the only outlet and down pipe in the system. This job was put up last summer, and is not satistactory, as the water flows over at 5, 6, 9 and 10. The owner was particular that there should be but one outlet. I gave it as my opinion at the time that there would be serious trouble, considering the great number of right-angled miters in the trough, and experience proved that I was correct. I claim that the rush of water in the valleys, terminating in the short runs between miters 5, 6, 9 and 10, retard the uniform flow or dam it up, causing the water to flow over at those points. I apprehend also that no reasonable amount of fall would overcome this tendency to fill to overflowing. About the only thing, aside from more outlets, that suggests itself to me is a much larger trough and increased fall, the present fall being 6 inches. The proprietor avers that more than the present outlet is impracticable,

owing to no sewerage, nature of soil and close proximity to other property. Reconstruction is the word passed to headquarters, and I would like to have your opinion expressed through *The Metal Worker*.

Answer.—We think the last suggestion made by our correspondent is by all means the best, namely, to reconstruct the whole thing and put in more leader pipes. Of course the difficulty could be overcome by increasing the size of the gutters, as there must necessarily be a flow toward the outlet, and the only thing is to have the gutters of sufficient size to hold it, even though it be dammed up at the corners. The suggestion that the water flowing down the valleys forms an obstruction to what flows through the gutters from the other part of the roof is plausible, and we think explains the trouble. The water coming down with considerable velocity may flow against the opposite corner of the gutter and divide part of the stream backing up away from the outlet and necessarily damming the flow. A possible remedy that suggests itself would be to put in a deflector at the bottom of each valley which would throw the water into the run of the gutter so that it would not flow directly across and give rise to back water. The introduction of this deflector, however, would probably make it necessary to widen the gutter where it passes the bottom of the valleys. This might give a queer architectural effect, but would possibly prove a remedy and permit the owner to dispense with more leader pipes against which he has such an objection. We would like to hear from members of the trade in this matter.

FLASHINGS.

THE CANTON STEEL ROOFING COMPANY, Canton, Ohio, announce that their exhibit at the World's Fair will be located at Section H, Block 3, Space 14 in Manufacturers and Liberal Arts Building, near the northwest corner. They invite every one to call upon them, notwithstanding that their exhibit will not be as elaborate as intended, because of the very small space assigned.

THE CANTON STEEL ROOFING COMPANY, Canton, Ohio, issue a handsome illustrated catalogue, reference book and price-list of their manufactures. The volume, bound in dark green paper, with embossed gilt lettering, is of convenient size, and contains many hundred pages of text. On a separate sheet are printed directions for measuring the H. W. Smith patent folded lock seam steel roofing, also for iron doors and shutters. This style of roofing is thoroughly described in the early pages of the publication, together with illustrations. Next, attention is given to ventilators, the Monarch ventilator being illustrated in two styles. Paints of various kinds are noted; then corrugated iron in several varieties, also corrugated curved moldings and curved iron for ceilings and arches. Crimped iron, weather boarding, siding, beaded iron, sheet steel pressed brick, cluster shingles, &c., window caps, sills and jambs, hip coverings, chimney flashings and other articles are noted; and several pages are given to fire proof doors and shutters. The next section of the catalogue takes up eave troughs and conductor pipes, a very large variety being illustrated and briefly described, the material being stated and tables of dimensions given. Cut-offs and strainers are included in this section. Sheet metals are dealt in by this firm, and price-lists are given. Ornamental ridgings, crestings and finials, window caps, vanes, &c., complete the list of articles, while at the end is an index of the contents.

BERGER BROTHERS, 237 Arch street, Philadelphia, have issued their annual catalogue of Tinners' Hardware and Roofers' Supplies for 1893. The present issue is enlarged to 90 pages and contains a number of new goods, including a full line of registers, tinners' machines and Tools, and other fresh articles which have been added to Messrs. Bergers' extensive line of supplies. The catalogue is profusely illustrated, containing over 400 cuts of articles kept in stock. Special attention is called to Berger's patent eave trough hangers, which are stated to have become very popular with architects and builders; also to Berger's ornamental pipe straps, soil pipe, gas pipe and plumbers' hooks, and to the pail ears, saucepan handles and tinware trimmings, of which the firm handle a very comprehensive line. Berger Bros. announce that they have increased their plant, giving better office facilities and more storage room. The firm's Trade Discount Sheet for 1893 is forwarded with the catalogue.

AMONG newly licensed corporations in Illinois is the Sykes Steel Roofing Company, at Chicago, for the manufacture of roofing; capital stock, $50,000; incorporators, R. G. Sykes, C. O. Hart and H. G. Murphy.

Talks About Trade.

"I never miss an opportunity to have a social chat with a customer," said a Minneapolis merchant who asks not to be quoted personally. "Now please note, I say an 'opportunity' for a 'social chat.' First of all, every time is not opportune. Sometimes my customers are in a hurry, or I am in a hurry; or they are repellent in manner (though I do not let that disturb me very much); or some other cause arises to prevent my chat. Now, I also say a 'social chat,' but without meaning precisely a chat on social topics. My chat is always based, directly or indirectly, on the goods I handle. In other words, while taking an interest, and a very lively interest, too, in what my customer's wants are, I let him or her—say, principally, her—know that we can both be interested in and by other goods which she may not want at that moment. Of course such goods are in my line and in my stock—always. I take infinite pains to make her purchase the starting point of the conversation which (sometimes, I confess, by very indirect methods) will lead us up to the point where I can name new goods, point out novelties, tell of improved housekeeping helps and conveniences. In other words my 'social chat' is 'shop talk.'

"Do you know I won't permit a clerk to say in that stereotyped hand-me down fashion, with which as customers we are all wearisomely familiar, 'Anything else this morning, madam?' I believe in shop talk, but I know also that the ordinary 'shop talk' is a nuisance and a bore to all save a few silly women and soft-pated clerks who have mastered a certain jargon which they think will appeal to the women whose trade they wish to win. I carry a general line—all kinds, I might say, of housekeeping supplies. There is not a week in the year but what I have something new in stock.

"Now I don't want a clerk to make himself interesting to my customers; I want him to make my goods interesting, and if he can't do that I have no place for him. There are scores of clerks in this town in demand because it is believed they carry trade with them. In many cases there is too much of the aroma of the 'masher' in the atmosphere around these young men. If I ever get one of them on my pay roll he either reforms (and reformation in such cases is as rare as a thunder storm in midwinter) or he goes—quick. The best clerks I have ever had are men whose chief interest lies not in themselves, but in the goods they sell; men who inform themselves about the stock and can give the customer not merely the points of value in the goods but the reasons why they are points of value; men who talk the goods as if they believed in them and loved them, and men who can, therefore, interest a customer because they themselves have the unction and the influence that come from enthusiasm in their business."—*The Hardware Trade.*

SCRAP.

THE MANAGERS of the New Castle Tin Mill of New Castle, Pa., have just ordered an improved automatic pickling machine. This machine is manufactured in England. The engines and other machinery for the new plant are arriving every day, and the mechanics are placing them in position. The managers of the mill confidently assert that tin will be made in New Castle by June 1.

WORK OF REMODELING the old Malleable Iron Works, at Youngstown, Ohio, will be commenced shortly, preparatory to the starting of a tin plant by a company known as the Youngstown Tin-Plate Company. The machinery for the plant has all been bought and is now ready for shipment. The proprietors expect to put the plant in operation in about a month. Two Morewood machines will be placed in position and worked night and day; they will have a capacity of 35 boxes of bright tin and 8 boxes of terne plate every 24 hours. The men who have interested themselves in this enterprise have worked in tin mills on both sides of the Atlantic. The officers are: Samuel Thomas, president; David T. Edwards, secretary and treasurer; Joseph Chapman, superintendent.

THE NEW SHEET AND TIN MILL of the Falcon Company at Niles, Ohio, is being hurried to completion. The machinery of one of the sheet mills is being run to "limber" it up, and the intention is to commence rolling iron full turn Monday. A large force of men is at work, but it is not expected to have the tin mill ready for operation in less than two months. The plant is said to represent an outlay of $500,000, and will give employment to 350 persons. It is so planned that if the tariff on tin plate is disturbed so that American manufacture is made unprofitable, most of the plant can be operated as a sheet mill. It is equipped to roll the widest sheet of any mill in the country—55 to 60 inches across.

IN *The Metal Worker* of March 25 we printed a description and illustration of a galvanized iron vase made from scrap metal by William A. Wittbecker, Lansing, Iowa. In a recent letter from Mr Wittbecker he states that he has received so many letters of inquiry for patterns for making the vase, that he has decided to get up a carefully prepared set, with printed instructions, and will sell them, post paid, for 50 cents.

W. E. LOVEGROVE distributes cards, calling attention to his business at 939 Westminster street, Providence, R. I. Mr. Lovegrove works in tin plate, sheet iron, copper and zinc. He also does plumbing and gas fitting, furnace setting, roofing, &c.

House Warming.—VIII.

CHEMISTRY OF COMBUSTION.

The next branch of our subject which it will be necessary to consider is that of the chemistry of combustion, together with such physical laws as relate to it directly, and also incidentally, in connection with its effect on ventilation and sanitation.

Combustion, of whatever form, is a purely chemical phenomenon, and it is, therefore, governed by laws which are absolutely exact and unchangeable, irrespective of existing conditions, though, of course the latter will affect the rapidity or intensity of the combustion, as well as its degree of perfection.

Broadly stated, the terms combustion and oxidation are synonomous: combustion is oxidation and all oxidation is combustion, whether it be the rusting of iron, the purification of our blood by respiration, or the production of the most intense heat in a steel furnace. The burning of Chicago was the rapid oxidation of the combustible portion of the materials of which the buildings were composed; and the function of breathing effects the slow combustion of the impurities contained in the venous blood in its passage through the lungs, after having been the rounds of the entire circulatory system.

Were we considering the subject of heating alone we would need to investigate only the rapid oxidation or the combustion of fuels in the production of fire; but, as before mentioned, the sanitary phase of the matter demands that we examine into the requirements and effects of the less rapid rate referred to.

ELEMENTARY LAWS.

All chemical combinations occur in certain fixed and unvarying proportions of the different elements; and these quantities, although designated by volumes, or equivalent in the chemical formulæ and symbols, are really based on the weight (in vacuum) of a single volume, as compared with that of an equal volume of some other element. As hydrogen is the lightest of all known bodies, it is usually taken as the unit or basis of comparative weight, and from this unit the respective weights of light volumes of all other elementary bodies are calculated. These—called "atomic weights"—will be necessary in our calculations, and are given in Table XXI, as are also the symbols by which the elements and their several combinations, necessary to our purpose, are designated.

The first five items in the table, it will be noticed, are represented by symbols of a single initial letter, which indicates that they are simple elements. All of the items following employ different groupings of these letters or symbols, some of which are accompanied by numbers. These latter are all combinations or compounds of two or more of the elements, and their compositions are expressed by the groupings of symbols and figures which constitute the chemical formulæ by which they are invariably represented. Carbonic oxide, or carbon monoxide, for instance, is written CO, and means that one equivalent or volume of carbon and one of oxygen have combined to form this gas.

Referring to the table, we find the atomic weight of carbon to be 11.97, and that of oxygen 15.96; therefore, the formula would express that 11.97 pounds of carbon had combined with 15.96 pounds of oxygen to form 27.93 pounds of carbonic oxide.

But we see that carbonic acid is represented by CO_2, and we must know the meaning of the figure to understand the formula. All such figures placed to the right of the elementary symbol, below the line, are called indexes or indices, and indicate the number of volumes of the element entering into the combination.

Our formula, then, should be read: One equivalent or volume of carbon, weighing 11.97 pounds; and two volumes of oxygen weighing $(15.96 \times 2 =)$ 31.92 pounds, combine to form 43.89 pounds of carbonic acid.

In the case of olefiant gas, we find both carbon and oxygen have the index number, and C_2H_4 expresses $(11.94 \times 2 =$ 23.88 pounds carbon$) + (1 \times 4 =$ 4 pounds hydrogen$) =$ 27.94 pounds olefiant gas. In the case of sulphurous acid, we see the formula $H_2.SO_3$ is a combination of three elements—hydrogen, sulphur and oxygen. It will be noted that the H_2 is separated by a period from SO_3, which means that two volumes of hydrogen have united with a combination of one volume of sulphur and three volumes of oxygen, resulting in 81.86 pounds sulphurous acid gas.

Again, in the case of sulphuric acid, H_2SO_4, we see that the only difference will be one volume of oxygen, but our quantity of the acid will be $81.86 + 15.96 =$ 97.82 pounds.

We find atmospheric air represented by $N_4 + O$, and not N_4O, as in the previous cases. The reason for this distinction is that air is not in any sense a chemical combination, but is a purely mechanical mixture, in which the two elements, nitrogen and oxygen, in the proportion of 4 to 1, although very thoroughly mingled, are readily separable without involving any chemical reaction such as would be necessary to separate the oxygen and hydrogen, of which water is composed, and when they are in chemical combination.

It will be observed that the table shows the atomic weights of all the compounds named to be the sum of the weights of their constituents—that is, their atomic weights multiplied by the number of volumes. Thus H_2O gives $(1 \times 2) + 15.96 = 17.96$ as the atomic weight of water; and $H_2.SO_3$ gives $(1 \times 2) + 31.98 + (15.96 \times 3.) = 81.86$, atomic weight of sulphurous acid.

It is important to note, however, that, although the weight of a compound is the sum of those of the constituent elements, the volume after combination will always be governed by the number of elements, regardless of the number of equivalents of each. Thus, to find the number of cubic feet in one pound of a simple element, we divide the volume of 1 pound of hydrogen (at 62° F.) by the atomic weight of said element—as, for example, the atomic weight of oxygen is 15.96, and $\frac{189.7}{15.96} =$ 11.88 cubic feet per pound, as per column, 5 of table. For a compound—say olefiant gas—we see C_2H_4 gives a total of 6 volumes, and the atomic weight, 27.94; yet the number of cubic feet per pound will be 189.7×2 (the number of elements only) and divided by 27.94 or $\frac{189.7 \times 2}{27.94} =$ 13.587, as per table.

In the case of sulphurous acid, having three elements and six volumes $(H_2.SO_3)$ we have $\frac{189.7 \times 3}{81.86} = 6.4364$ cubic feet per pound. To find the weight in pounds per cubic foot, we divide 1 by the number of cubic feet in 1 pound, as $\frac{1}{6.4364} =$ 0.15536 pound = the weight of 1 cubic foot of sulphurous acid gas; or $\frac{1}{189.7} =$ 0.00527 = that of hydrogen, as per column 4 of table.

Table XXI.—Atomic Weights, &c.

Element or compound.	Symbol.	Atomic weight.	Weight per cubic foot at 62°.	Cubic feet per pound at 62°.	Specific gravity at 62°.	Relative density.
Hydrogen	H	1.00	0.00527	189.70	0.0000846	0.06926
Carbon (vapor)	C	11.97	0.63131	15.84	0.001013	0.82323
Oxygen	O	15.96	0.0814	11.88	0.001350	4.10563
Nitrogen	N	14.01	0.07383	13.54	0.001185	0.97137
Sulphur (vapor)	S	31.98	0.16861	5.932	0.002705	2.2150
Water (vapor)	H_2O	17.96	0.04745	21.07	0.0007613	0.6235
Carbonic oxide or carbon monoside	CO	27.93	0.07364	13.60	0.00118	0.9674
Carbonic acid or carbon dioxide	CO_2	43.89	0.11636	8.64	0.00187	1.52901
Marsh gas	CH_4	15.97	0.04209	23.757	0.000675	0.55306
Olefiant gas	C_2H_4	27.91	0.07360	13.587	0.001181	0.967104
Ammonia	NH_3	17.01	0.04484	22.30	0.000719	0.58920
Sulphurous acid	$H_2.SO_3$	81.86	0.15536	6.4364	0.002493	1.54143
Sulphuric acid	H_2SO_4	97.82	0.18148	5.5111	0.002911	2.38465
Air	$N_4 + O$	72.00	0.07610	13.14	0.001221	1.0000

According to an English journal, a true copper age has been established. At a recent meeting of the Académie des Sciences, Paris, M. Berthellot read an interesting paper on the archæological question whether there was an age of copper prior to the age of bronze. Pieces of copper have been unearthed by M. de Sarzec in Mesopotamia which are apparently older than any found in Babylon and more ancient than the celebrated vulture steel of Chaldea. Copper is easily reduced from its ores by carbon, but bronze requires the addition of tin, a comparatively rare metal, as it is chiefly found in Malacca and Cornwall. Its use, therefore, implied the power of making long voyages and a considerable advance in civilization. M. Berthellot has analyzed the Mesopotamian specimens and finds them to contain no tin or zinc and only traces of lead or arsenic. Air and water have oxidized the specimens to a mixture of protoxide and metallic copper. M. Berthellot is also analyzing a portion of a scepter of one of the Pharaohs of Egypt who reigned about 3500 years before Christ, and so far he has discovered no tin. Of course, a large number of specimens will require to be analyzed before the question of a pure copper age is really settled, but his researches are in favor of the supposition. We may add that Prof. Flinders Petrie has adduced much evidence from Egypt in favor of a copper age.

An investigation of the affairs of the bankrupt Lombard Investment Company of Boston is said to show how a concern enjoying high repute may at the same time be entitled to no higher commendation than that of rare skill in deceiving the stockholders.

THE RETAIL STORE.

Local Advertising.

There is a great difference of opinion among retail Hardware merchants as to the most effective method of advertising their business. It is a recognized fact that bright, judicious newspaper advertising produces good results, while dodgers or gutter snipes are considered by many to be worthless as an advertising medium. Regular customers need to be frequently reminded that they can purchase goods to better advantage where they are in the habit of trading than at some other store where they may happen to drop in. Live merchants stimulate trade at dull seasons of the year by offering special inducements in certain lines. The stereotyped form of notice attracts little if any attention in these stirring times, and something striking, which will instantly rivet attention, must take its place. The manner in which this was done in one case may be suggestive to some of our readers. A firm in a Western city prepared themselves for a large business in tools by providing sufficient stock in this line to meet all demands, and then sent the following postal card by mail to mechanics whose names were selected from the city directory :

WE HAVE BEEN ACCUSED

Of maintaining the Best and Cheapest place in the City whereat to buy

HARDWARE.

We are now making a Special Sale of PLANES, SAWS, CHISELS, AUGER BITS, BRACES, SQUARES, HAMMERS, HATCHETS and Everything in the TOOL line at Reduced Prices, for Thirty Days. Call and see us.

CASE & UEHREN.

TERMS CASH. 29 River Street.

We are advised that the results were entirely satisfactory, a good many inquiries having been stimulated and a demand created for those goods.

Famous Parer and Slicer.

The paring and slicing knife which the accompanying cut illustrates is being introduced by Charles F. Spery, Herman, Mo. The knife is made of one piece of refined steel, providing two blades, one for cutting and the other for paring and slicing. The point of the knife is designed to remove the eyes of potatoes and the side of the blade to remove the decayed parts of fruits or vegetables. The point is made that the construction of the blade enables following the curves or uneven surfaces of the fruits or vegetables upon which it is used, as well as straight surfaces. The maker claims that by the use of the knife 5 to 10 per cent. of the peel is saved, and equally as much time ; that the forefinger is not made callous or the thumb cut; that an even peel is taken off and that the blade is easily cleaned. It is designed for use on potatoes, carrots, parsnips, turnips, squash, apples, pears, quinces and firm peaches.

Famous Parer and Slicer.

MEMORANDA.

CHARLES E. BOND died at his home in Pavilion, N. Y., March 21, after a brief illness. He was the youngest son of the late Elias Bond, one of the earliest settlers of Genesee County, and was 42 years of age. He conducted a hardware business in Pavilion for a number of years, and had served as postmaster and town clerk. He leaves a widow and four children.

CHARLES H. BOWNE of Gouverneur, N. Y., has sold his hardware store to Charles Loveland of Potsdam, N. Y., and will give possession at once.

WILLIAM MERRITT is about to open a tinsmith shop on Canal street, Hinsdale, N. H. He was at one time associated with Edward Stebbins, but for the past few years has been in business in Northfield, Mass.

THE HARDWARE STORE of F. B. Karl, located at 158 North Main street, Delaware, Ohio, was visited by fire on the morning of Saturday, April 1, resulting in slight damage, which was fully covered by insurance.

A. L. BURTIS, who for ten years has been in partnership with John Lambert at Lockport, N. Y., has started in business by himself at 41 Pine street, that city, and is prepared to do all kinds of work in sheet metal, as well as put in warm air furnaces. Mr. Burtis has been for over 30 years almost daily in the tin shop and is therefore most excellently equipped for his new venture, in which all his friends will wish him success.

WHITCOMB, KIRKHAM & HAZEN is the style under which will be conducted the business heretofore carried on by C. S. Whitcomb and Kirkham & Hazen at Springfield, Mass. The firm will begin business on May 1, occupying the old stand of W. L. Wilcox & Co., who just 30 years ago succeeded A. M. Galpin at the same location. C. S. Whitcomb of the new firm began the stove business 33 years ago, when he entered the employ of Mr. Galpin, then a leading stove dealer. Mr. Whitcomb followed the business through numerous changes, and finally in 1876 accepted a place with Leonard Clark. Two years later, however, he began business for himself, and has since been located at 150 State street. Mr. Kirkham of the new firm began in the stove business as a clerk for W. L. Wilcox & Co. in 1880, and six years later formed a partnership with George L. Esterbrook, which continued for three years. He then took E. C. Hazen as a partner, and the business was carried on under the name of Kirkham & Hazen. Mr. Hazen had previously been engaged in the business, and was several years a member of the firm of Simpson, Clark, Clark & Co. We understand that all three members of the firm are favorably known to the trade and have a thorough knowledge of the heating business.

Housewives' Delight Can Opener.

The accompanying cuts illustrate a can opener being put on the market by F. E. Kohler & Co., Canton, Ohio. It is described as being made from the best malleable iron, with steel knives adjustable to any size of can, and as cutting smoothly and without exertion. It combines openers suitable for round and square cans with a skewer puller, as shown in Figs. 1, 2 and 3.

Fig. 1.—Housewives' Delight Can Opener.

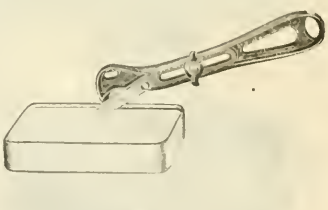


Fig. 2.—Adapted to Square Cans

Fig. 3.—As Skewer Puller.

Gem Cake Pan.

North Brothers Mfg. Company, Lehigh avenue and American street, Philadelphia, Pa., are offering the set of pans and cup as herewith illustrated. The pan, Figs. 1

Fig. 1.—Gem Cake Pan.

and 2, is in two pieces only, the side being removable from the bottom, and is made of extra quality heavy bright plate. As seen in Fig. 2, the rim on the bottom of the pan is so made that when the sides are pushed on the bottom it is tight, and the

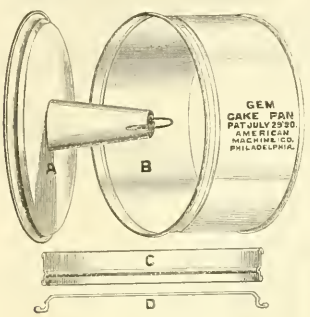


Fig. 2.—Gem Pan Apart.

makers claim that no batter can leak through or get in the joint. It will be noticed from letter D that the bottom of the pan where the cake rests is above the

Fig. 3.—Layer Pan and Measuring Cup

rim which supports the pan in the oven, so that the cake is elevated from the oven, to prevent its burning. The layer pans, Fig. 3, of which there are three in the set, come apart in the same manner as in the pan shown in Fig. 1, and are constructed upon the same principle. The cup is for measuring flour, sugar, &c., in receipts furnished with the set of pans. The pans are for baking delicate and other cakes without greasing the pans, and for removing the cake from the pans without tearing or breaking. It is explained that the pans permit of inverting the cake to cool when taken from the oven; prevent the cake from falling, and make cake larger and lighter than the ordinary style pan.

Retailers' Trade-Marks.

It is often found desirable by merchants to associate their names in the minds of the public with a peculiar typographical arrangement, as an effective form of advertising. This is done by

Fig. 1.—Stationery Size.

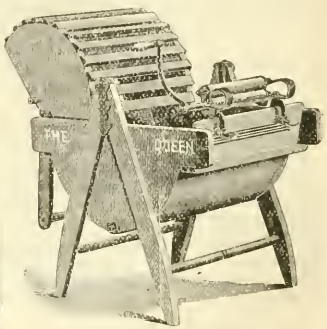
Samuel H. Blackwell, Fairfield, Maine, by using a trade-mark of white letters on a black background in various sizes, combining in an ingenious manner the words Blackwell and Hardware. Reproductions of the trade-mark in two sizes are given in the accompanying cuts, showing the happy way in which this is accomplished. It appears singularly fortunate that the name is Blackwell, and that the business engaged in is Hardware, which combine so happily in the typographical arrangement shown. The smaller sized trade-mark is printed upon letter heads, business cards, checks, receipts, memorandum

Fig. 2.—For Circulars, &c.

blanks, &c. It is also printed upon gummed paper for pasting on everything that goes out of his stock, and for sticking on circulars of manufacturers and jobbers, which he distributes to his customers. The larger size, Fig. 2, is used at the bottom of circulars of goods upon which special efforts are being made, printed for home use. Circulars of this kind, one devoted to each article, with the article illustrated on it, relate to Pocket Cutlery, Bucket Pump, Mixed Paints, Washing Machines, &c., with plenty of space below the description to print the large trade-mark. This is also used in newspaper advertising. The trade-mark is used for road-side signs also; for this purpose the words cover 8 x 17 inches of paper. It is glued upon smooth boards and afterward varnished to render it water proof. These boards are then nailed upon trees and buildings where they can be seen by people passing. These are much cheaper than painted boards and give satisfactory results. The goods carried in stock include Hardware, Iron and Steel, Cutlery, Cordage, Glazed Windows, Doors, Sash and Blinds, Farmers' and Mechanics' Tools, Kitchen Furnishings, Artists' Materials, Paints, Oils, Varnishes, &c., but are all grouped under the one word, Hardware, and by the method described are associated in the minds of the people in and about Fairfield with the name of Blackwell.

The Queen Washing Machine.

The accompanying illustration is of a washer being put on the market by the Buckeye Churn Company, Sidney, Ohio. It is explained that the slats for rubbing are semi-circular quadrilateral in shape, with their inclines running from the extreme points of the rubber toward the center, with sheet-metal lining covering over half the slats; and that in the tub the slats are of similar form, with their incline running from the center of tub below toward the top. Thus, when the rubber is in its place, resting on the goods, the inclines are in opposite directions. It is claimed that by every motion of the lever



The Queen Washing Machine.

the goods are moved in opposite directions; and reversing and dipping, as in filling and pressing a sponge, the sheet-metal lining over the rubber slats giving force to the water. These are some of the features claimed as being of especial advantage; also, that there is less friction on account of taking hold of the goods and not slipping over them. The manufacturers state that they are substantially made, rapid in operation and will not tear the clothes.

The New York Tack Puller.

The accompanying illustration is of a tack puller, put on the market by Maltby, Henley & Co., 20 Warren street, New York. It consists of a high-grade steel plate riveted on to a japanned iron handle, 6 inches in length. In operation the steel point at the top of the puller is forced under the tack, and by a downward pressure of the handle the tack is drawn. The point is made that the tempered steel point, by its peculiar construction, is stronger and more durable than forged steel, and that it is better adapted for the purpose of pulling tacks than ordinary tack claws.

The New York Tack Puller.

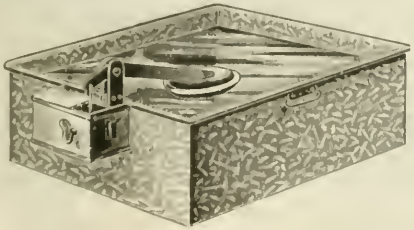
The Wayne American Washer

The Anthony Wayne Mfg. Company, Fort Wayne, Ind., are putting an improved form of washer on the market, as illustrated herewith. The difference between this and their Anthony Wayne washer consists in the American being wide on the bottom instead of on the top, as in the former. In this machine, it is stated, no nails are used inside the machine where they would be apt to come in contact with the clothing, and all nuts, washers, bolts, &c., that are used inside the machine are galvanized. The machines have solid corrugated staves and bottoms, which obviates the necessity of nailed cleats. The cover is hinged, and when thrown back lifts the gearing and inside working parts out of the washer.

The Wayne American Washer.

The Gurney Alarm Catch Basin.

An illustration is herewith given of an alarm catch basin for refrigerators and ice boxes, manufactured and sold exclusively by the Gurney Refrigerator Company of Fond du Lac, Wis. It is made of heavily galvanized iron, with an alarm attachment to be kept wound up. Connected with the alarm is a float, which rests on the surface of the water in the basin. As the water reaches a certain hight it automatically raises the float and starts the alarm, which calls attention to the threatened overflow, and thus prevents the ruin of carpets, or the injury of ceilings below.



Gurney Alarm Catch Basin.

The device is especially useful in connection with refrigerators having the waste pipe in the back, where the catch basin cannot easily be seen. It is made in two sizes, with a capacity of 12 and 16 quarts, respectively.

Columbia Hose Mender.

J. W. Lander & Co., East Greenwich, R. I., are introducing through Alford & Berkele, agents, 77 Chambers street, New York, the hose mender herewith illustrated. By means of the right and left hand screw of the mender the ends of the hose are brought firmly together, and thus made ready for the clamp. The clamp is referred to as a feature peculiar to this mender and as a great improvement over wires used for completing the joint. The clamp is in two parts and requires only a screw driver in adjusting it. Insuring, it is claimed, a perfect joint and preventing the hose from splitting at the ends where it has been mended. The menders are made in ½, ¾ and 1 inch sizes.

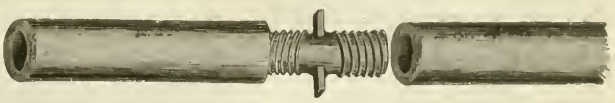


Fig. 1.—Columbia Hose Mender.

Aluminum Cooking Utensils.

A statement regarding aluminum cooking utensils, made by Joseph W. Richards of the Metallurgical Laboratory, Lehigh University, Bethlehem, Pa., in a letter to the Illinois Aluminum Company, Lemont, Ill., is given herewith. This statement is of interest to the trade, as it is the result of two years experience, and is as follows:

Speaking from an actual experience of two years with aluminum cooking utensils, I can state unreservedly that in point of lightness, cleanliness, durability and all-round adaptability to their purpose they leave nothing to be desired. They are the perfection of cooking utensils. As to durability, let me cite an instance:

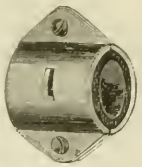


Fig. 2.—Hose Clamp.

Two aluminum boilers have been used in our kitchen for cooking all sorts of food in all sorts of ways, preserving, stewing fruit, etc., for two years. They have been used, washed, rubbed once, twice or three times a day for that time. They look as good as they did a week after we received them. Weighed on March 14, 1892, they weighed 1 pound 12½ ounces and 1 pound 11 ounces, respectively. Weighed to-night on the same scale they turn it to exactly the same weight, not a fraction of an ounce less. They both look good for many years' service.

The Monroe Refrigerator.

The Monroe Refrigerator Company, Lockland, Ohio, claim to have made some radical changes in the method of securing a low temperature in their large sizes of refrigerators without the use of crushed ice or melting the ice by salt or other artificial means, but with the greatest possible economy in the consumption of ice.

By their new system of refrigeration they claim to carry the cold dry air directly from the ice to the lowest parts of the refrigerator before it enters the provision compartments, thus securing a very low temperature at a great distance from the ice. It is explained that with their new system of refrigeration there is no passing of air, as the entire movement of the air in the provision compartment is upward, and there is never any mixture of flavors or tastes, and that if cream, milk and other delicate foods are placed at the bottom of the refrigerator, they received the pure, dry cold air directly from the ice before it touches other food. This system of refrigeration and dry air circulation is used in connection with their patent glazed earthenware lining, which it is claimed is free from absorption and metallic poisons therefore as cleanly as a dinner plate.

The Mexican correspondent of a contemporary reports that, as a result of the recent excursion of American manufacturers into Mexico, a number of prominent firms have established agencies in the City of Mexico. Others have purchased considerable tracts of coffee and agricultural lands, which they intend developing.

Effective Wall-Case Displays.

The Springfield Hardware Company, of Springfield, Ohio, advise us that they endeavor to arrange goods, especially those which bear a good profit, in so effective a manner as to claim the attention of customers entering their store. The accompanying illustrations give an idea of their manner of doing this, and indicate that they believe the time and labor required is well expended. A wall case near the entrance is devoted to Cutlery and fancy goods, as shown in Fig. 1. First are Knives and Forks, sampled on the original boxes, standing on shelves and so arranged as to present a uniform appearance. In the next apartment are Razor Strops, Razors, Shaving Brushes, Key Chains, Ticket Punches, Police Nippers, &c. In the next space are arranged Scissors and Shears, the larger ones in the center diminishing in size toward the edges. Razors occupy the corners at the top. The next opening contains Razor Strops, Brushes, Razors and Traveling Toilet Sets. To the right of these, though not shown in the cut, are shelves containing Table Cutlery, arranged to correspond with the shelves at the other end of the case. This arrangement of the case results in Table Cutlery on shelves at each end, and three apartments with glass sash in the center, making a pleasing and uniform appearance. The part of the center showcase nearest the door contains Scissors and Shears arranged in piles, one Shear on the top of the other. These are held in place by upright wire pins passing through the openings in the handles. The other part of the showcase contains Pocket Knives, sampled on their original boxes. Fancy Tea Kettles, Stands, &c., are shown on the top of the showcase, and also above the wall case. Another wall case, as shown in Fig. 2, is devoted to Bicycle Locks, Guns, Revolvers, Fishing Tackle, Dog Collars, Whistles, Calls, Wrenches, Jointed Rods, Nets, &c. Above these are Fishing Poles suspended by cord from the platform above, Fig. 3. Electrical goods are displayed in a section of shelving, Fig. 4, with a battery bell and push button in working order. Planes are shown, in Fig. 5, on inclined shelving with rods in front to prevent them from sliding off. These are adjoining the shelving containing the Electrical goods. Shelf Hardware is sampled on wooden shelf boxes, while under the ledge are drawers for Chisels, Braces, Squares, &c. The business was established in 1840 and incorporated in 1890.

Fig. 1.—Display of Cutlery and Fancy Goods.

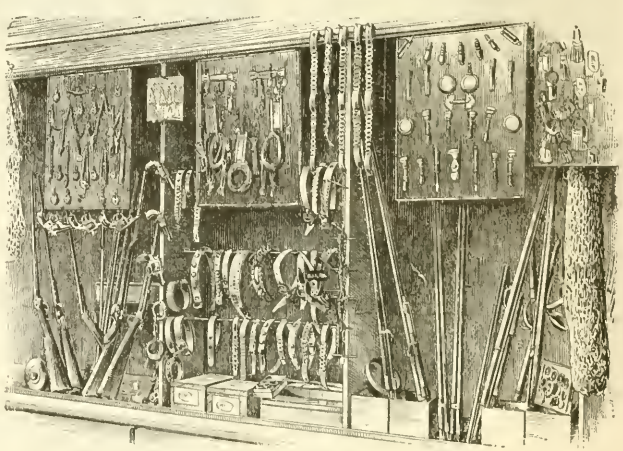


Fig. 2.—Sporting Goods, Fishing Tackle, &c.

How to Keep the Store Neat and Clean.

FIRST ARTICLE.

By M. W. Carleton.

That Hardwaremen in general are noted for their enterprise and intelligence is a fact generally recognized, and for this reason it seems strange that so large a number of them are negligent of the arrangement and cleanliness of their storerooms. A great many of them who have scrupulously clean, neat and tidy houses, and who would quickly find fault at any breach of the laws of order therein, will permit their offices and storerooms, in which they probably spend more of their time, to become so untidy and unclean as to cast reflection on the entire craft.

The fact is, the old proverbs, "Cleanliness is next to Godliness" and "Order is Heaven's first law" are as applicable to the Hardwareman as to his fellow merchant in any other line of business. That it is possible to have a Hardware store almost if not quite as attractive as that of the clothier, dry goods man, or even the jeweler, may be demonstrated by a visit to a store of the modern class, such as are happily becoming quite common in most localities.

When the actual advantage, attractiveness and economy of such a store is seen, it is a cause for wonder that these facts are not more generally recognized by the Hardwaremen, who, of all others, have the reputation of being the most progressive and ready to adopt any advanced business methods. So, laying aside all moral and social considerations, it seems strange that there are so many stores of the "good (?) old kind" in existence at the present time.

OLD FOGY.

Comparing one of these with one of the modern, progressive class, the contrast is startling and the advancement of late

years, especially of the last decade, very noticeable. In locating a storeroom of the former class the size is one of the principal considerations and such matters as light, ventilation and general arrangement are of minor importance. The shelves and counters are inconvenient, rough and unattractive features: the show windows entirely too small; the floor of wide pine boards, often warped out of shape, while Nail kegs, case goods, Agricultural Implements, &c., are disposed around the room with little regard for anything but convenience. Such a store as this can scarcely be made presentable even at the expense of prodigious labor. In contrasting the modern store the difference is such as ought to make even an "old fogy" a convert to the new *regime*.

Fig. 3.—Samples of Fishing Poles.

PLENTY OF LIGHT.

In place of the plain, open shelves with untidy rows of goods, and the old, unsightly counters with the rows of Nail kegs alongside, there are the attractive, cleanly rows of drawers with the samples advantageously displayed on the background of green or black, and the broad, oak counters with the convenient bins for Nails, &c., beneath.

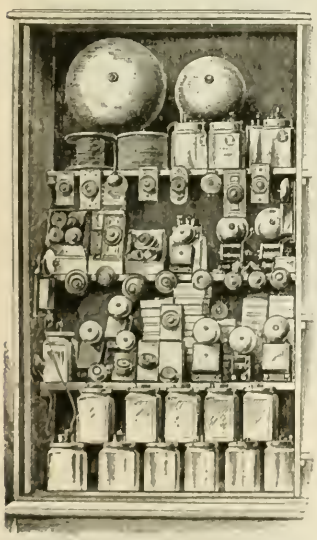


Fig. 4.—Electrical Goods.

By these arrangements two of the principal causes of untidiness, viz.: the open, dusty shelves and the unsightly Nail kegs, are obviated. Another great improvement is the racks or brackets for Steel Goods, Shovels, &c., by means of which these articles may be suspended from the ceiling or wall, leaving the floor entirely accessible to the broom. The Stoves carried in stock are placed on trucks and may readily be moved for sweeping or display. Then the little untidy show case with its seldom-changed assortment of Knives, Scissors, Revolvers, &c., is superseded by a larger and more attractive one, with effective display arrangements, while still another improvement of much importance is the windows of large, clear glass, admitting plenty of light and dispelling the gloom usually found in so many stores of the older class.

ATTENTION TO CLEANLINESS.

So much for arrangement, for in that lies half the solution of the problem, but it is not the other and usually neglected half by any means, since no convenience of arrangement or elegance of fixtures can compensate for lack of attention to cleanliness. Of course it will be admitted that it is not as easy to keep a Hardware store presentable as some other lines, but it is not an impossibility by any means. A store may be scrupulously clean so far as freedom from dirt is concerned, yet be far from attractive and inviting, because of the untidiness and confusion. To prevent this is fully as important as sweeping and dusting. To this end waste baskets should be placed behind the counter at convenient intervals, in which all discarded wrappings, &c., should be deposited. Another cause of untidiness is the habit of leaving articles on the counter and ledges after a sale is made, and to avoid this salesmen should be instructed to replace everything as soon as possible. However, it is sometimes impossible to do this during the busy time, but it should be attended to at the first opportunity, since it not only improves the appearance of the room, but loss by theft, &c., is avoided.

ORDER.

Where purchases are left to be called for they should be carefully wrapped and plainly marked and put in a certain part of the store. It is important that there should be a certain place for this purpose, and one clerk should be made responsible for these packages as far as possible, as much confusion and annoyance will be avoided by such a plan. While replacing the stock the tools in use around the store should be returned to their proper receptacles and the loose Nails, &c., gathered up.

COVERING COUNTERS.

At the close of business the counters, cases, racks, &c., should be covered over with gingham covers to protect them from the dust caused by sweeping and dusting. These covers will be found very convenient, as they not only lessen the labor of dusting, but preserve the goods from damage and soon pay for themselves for this reason alone.

SWEEPING.

All stores should be swept daily, and if possible the sweeping should be done in the evening in order that the dust may settle during the night.

While sweeping seems simple enough, it is a fact that it is seldom properly done. To tell the average man that he does not know how to sweep will probably arouse his indignation, but it is true, nevertheless. To some it may sound ridiculous to talk about the "science" of sweeping; nevertheless, there is a knack about it which can only be acquired by experience. It is amusing to hear a man speak about the dust in his store when you know that he does not even dampen the floor before sweeping. This scarcely sounds reasonable, but there are many who do not do this. Dampened sawdust, scattered on the floor, is better than sprinkling, since it absorbs the dust, and the floor may be swept cleaner and more satisfactorily. The old broom in the hands of the average "junior" or porter is responsible for a great deal of the dust on the shelves. The sweeping brush is so much better in every respect that its use will be continued after one trial. While the first cost is greater, they are really more economical than the brooms, as one brush will outlast several brooms.

Fig. 5.—Plane Display.

GET IT OUT OF SIGHT.

The old method of disposing of the sweeping or rubbish was to sweep it under the stove or in the corner, the easiest way to get it out of sight; but the proper way is to burn it wherever possible. If this cannot conveniently be done, it should be deposited in an iron can until it may be otherwise disposed of. It is important

that an iron can be used, since there is danger of fire from cigar stumps, &c., where wooden receptacles are used.

DUSTING.

Next comes dusting, and it is very essential that this be thoroughly done. Good feather dusters should be used, the windows raised and doors opened, and every particle of dust removed. All shelf goods should be thoroughly dusted at least twice a week, and the upper tiers taken down and thoroughly cleaned. When doing this, the older or shopworn goods should be placed on the top, where they will be the first sold. Attention to these minor details will do much to improve the appearance of the stock.

After the dusting is completed, the showcases and windows should next receive attention, as a dirty, grimy case is worse than none, because it advertises carelessness and slothfulness instead of the goods, as intended. It will usually be found necessary to clean the showcases at least once a week, and the samples should be rearranged frequently. The best method of cleaning glass is to use a cloth dampened with alcohol and dipped in whiting, ending with a polish by means of a dry chamois skin. In this way a brilliancy is imparted which is not attainable otherwise. It is a common mistake in cleaning show cases to overlook the metal corners, and the effect is as bad as unfinished work in general. These should be brightened whenever necessary, but all traces of polishing material must be removed from the glass.

In summer much annoyance will be experienced from flies, and at that season windows and cases will require careful attention to keep them clean. An effectual and inexpensive protection against these pests is common colored mosquito netting.

A SEPARATE ROOM.

Unless it be possible to have a separate room or a certain part of the storeroom for the purpose of receiving and unpacking goods, much dirt and confusion is unavoidable. Wherever possible this work should be assigned to a responsible and trustworthy person, and all goods received by him should be entered in a book especially for the purpose and the invoices checked from it. This plan does away with many errors and the unpleasantness of claims for shortages is avoided, and it is not necessary to keep the goods out of stock pending the arrival of the invoices. Under no circumstances should the cases be trucked to the various parts of the store and there opened, as such a plan not only causes a great deal of untidiness, but the goods are frequently lost or stolen.

Attention should be paid to the samples in the showcases and on the drawers, and they should not be allowed to become soiled and rusty. Whenever they show tendencies of this kind they should be replaced by new ones at once.

ENTIRELY OUT OF PLACE.

Another point worthy of mention is the gaudy and senseless placards, &c., often displayed promiscuously around the room. They seldom improve the appearance of the store and in many instances are entirely out of place. Of course there are many which are really attractive and may be displayed to advantage, provided they are not too numerous, but nine-tenths should be thrown in the fire. There are many other points worthy of consideration which cannot be treated here from lack of space, but they will readily suggest themselves to any one giving the subject the study essential to its successful application, and it is to be hoped that the interest will continue unabated and the advancement in the next few years be as satisfactory as in the past decade.

Star Hose Band.

Syracuse Specialty Mfg. Company, Syracuse, N. Y., are putting the hose band herewith illustrated upon the market.

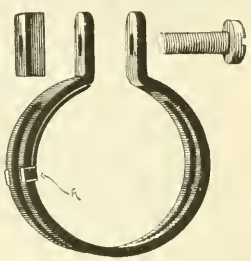


Fig. 1.—Star Hose Band.

The bands are made of rolled-strip steel, plain or coppered; well adapted, it is remarked, to this use on account of its tensile strength. The piece A, Fig. 1, is adjustable, and slides out of position when the band is being placed on the hose, obviating the necessity of spreading the band enough to destroy its form. After the band is in place on the hose the adjustable piece is slid into position, Fig. 2. This arrangement, it is stated, allows the end of the band to draw over it uniformly from both sides. The manufacturers claim that there are no sharp ends to destroy the covering of the hose or to imbed themselves, thus preventing the tightening of the screw; that there is no strain whatever on the adjustable piece; that the bands are carefully formed, uniform in shape and size; that there is no surplus metal in

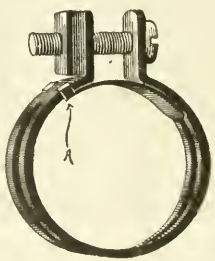


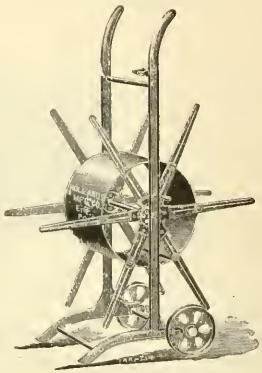
Fig. 2.—As Adjusted on Hose.

them, and that the screw would break before the band would give. The screw is adjusted with a screw driver. These bands are made for hydrant, also for steam and brewer's hose, from ⅛ inch to 2½ inches.

A colony of 2000 Waldensians, refugees from Italy, will soon remove to 12,000 acres of land purchased in North Carolina, where there is promise that they will become valuable citizens. Lumber for their dwellings is being prepared.

Metal Hose Reel.

The accompanying cut represents a ree manufactured by The Hollands Mfg. Company, Erie, Pa. The cylinder is made of heavy galvanized sheet iron, and is provided with an automatic attachment which allows it to revolve or to remain fixed, as desired. The other metal parts, with the exception of the wheels, are of malleable

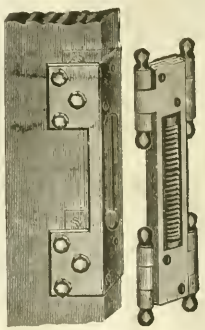


Metal Hose Reel.

iron, designed for rough usage. There is a nozzle holder attached to one of the handles, in connection with which is a spring for holding the hose firmly in place. The wheels are made larger than shown in the cut, to allow them to run freely and easily over lawns and walks. We are advised that the reels are painted and varnished in an attractive manner. Accommodation is provided by the reel for 150 feet of garden hose.

Marble Water-Closet Door Hinge Attachment.

Chicago Spring Butt Company, Union Park Place and Carroll avenue, Chicago, Ill., are offering the above attachment, as



Marble Water-Closet Door Hinge Attachment.

illustrated herewith. The attachment is made for the hinges and blanks of the Chicago spring butts, so that a door may be hung with a pair of hinges; or with a hinge and blank, when one hinge is strong enough to open the door. As the doors are of wood it requires the attachment only for the marble partitions, the hinge being attached to the wood door, as in ordinary cases. The attachments are made in sizes corresponding to their various sized spring butts, and are supplied in brass or bronze metal, and in finish to match other manufacturers' goods. The point is made that though the attachments are more suited to the Chicago spring butts, they can be used with other makes, by drilling the screw holes in them to match those in the attachment.

STOVE TRADE NOTES.

An Early Three-Flue Furnace.

More or less attention has recently been given in these columns to early cooking and heating stoves, and we are led to believe that our readers will not be less interested in some illustrations of an early three-flue furnace. We therefore present in this connection engravings of what was known as the Blanchard Furnace, the patterns for which were made in 1871 by the Boston & Maine Foundry Company of Wakefield, Mass., and passed into the possession of the Smith & Anthony Stove Company of Boston, Mass., when they bought the plant of that concern. The engravings which are here given were made direct from photographs of the old furnace and were sent us by the Smith & Anthony Stove Company as an interesting contribution to the literature of down-draft furnaces. Fig. 1 shows a partial front and side view of the furnace with the casing removed, while Fig. 2 represents a rear view.

The Smith & Anthony Stove Company have recently made a new furnace patterned after this original construction, the work being done from one of the old furnaces in the company's establishment as well as from the old patterns. The makers call special attention to the original furnace as being the first one constructed with brick-lined fire pot and having three outside vertical flues, one on either side for the descending draft and one at the back for the ascending draft. At the base the furnace has what is known as a horseshoe flue, all of these features being peculiar to several other well-known heaters now on the market. The Smith & Anthony Stove Company, referring to this old construction call attention to its priority in the field. As originally made the furnace is said to strangely resemble its modern successors. The old furnace here illustrated is said to have been a remarkable heater and there has been a steady revenue for its maker in the way of repairs.

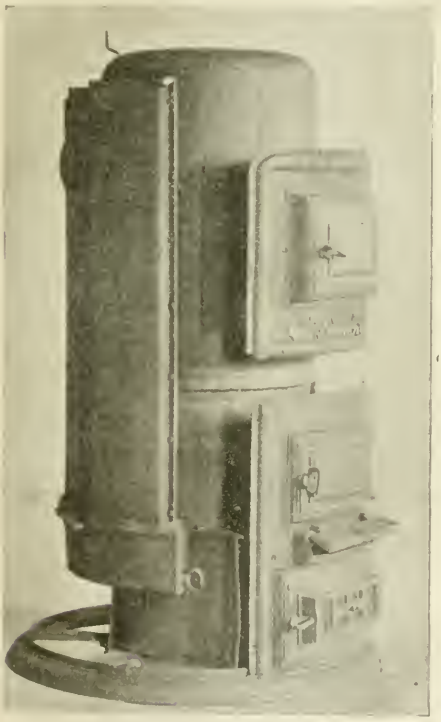


Fig. 1.—View of Side and Front.

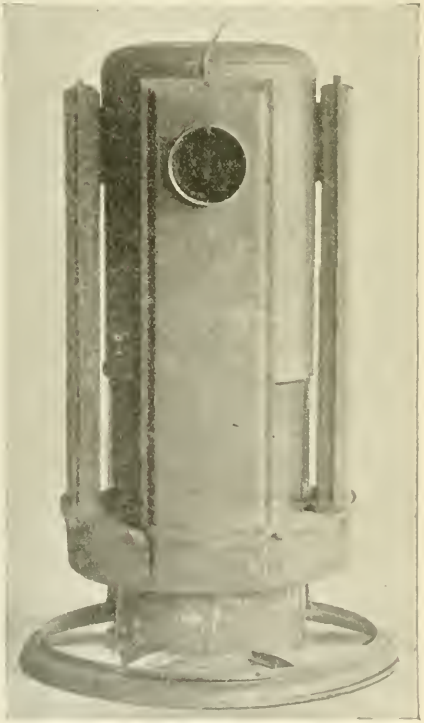


Fig. 2.—Rear View.

AN EARLY THREE-FLUE FURNACE.

AN ATTRACTIVE CATALOGUE of 32 pages has just been issued from the press of Gies & Co. by the Carton Furnace Company, Utica, N. Y. The pages are devoted to the Carton furnaces and combination hot-water and hot-air heaters, which the company manufacture in great variety. The construction and superior points of these goods are considered in a manner likely to interest the trade, while the illustrations are of such a character as to clearly show the arrangement of parts and general opperation. In connection with the illustrated matter are tables giving various dimensions of the different sizes in which the goods are made, the prices and heating capacity in cubic feet. The floor plans of an average house occupy one page of the catalogue and are presented as a guide to inexperienced furnace dealers, the company calling attention to the location of pipes, registers, sizes of the same and location and size of the cold air box. A feature of the publication is found in a number of rules for setting and piping. This is the company's forty-sixth annual catalogue and price-list, and in offering it to the trade they state that as the patterns for the Carton tubular and Carton warm-air furnaces are not yet completed the illustrated descriptions of them therefore have to be omitted from the pages. As soon as the different sizes

are ready for shipment the company will furnish price-lists and discounts on application.

The "Jewel" List of State Days for the World's Fair.

We take the following interesting article from *The Jewel Record*, issued by the Detroit Stove Works. In the names given as chairmen of the several entertainment committees, the stove trade will recognize salesmen and officials of this company.

Undoubtedly a large proportion of the leading stove merchants in every State will desire to attend the World's greatest Fair some time between May 1 and October 31. The Entertainment Committtee of the Detroit Stove Works, believing that merchants from the same State would desire to time their visit so as to meet as many State friends as possible, has arranged the list of States and the days set apart for each in the order of their admission to the Union. The following list, therefore, will be found both interesting and instructive reading for stove merchants throughout the country. The original 13 States are given in the order of their ratification of the Constitution.

In the arrangement of this list it is assumed that the fair will be open, or at least partly open, on Sundays as well as on week days, although the final action of Congress on this much-mooted question may change the programme in this particular.

Following is the list of States in the order of their admission to Statehood, the entertainment days assigned to each, and the name of the chairman of the Entertainment Committee :

Delaware day, May 1. Chairman of committee, G. M. Soverhill. Admitted, December 7, 1787.

Pennsylvania days, May 2 and 3. Chairman, James G. Insole. Admitted, December 12, 1787.

New Jersey day, May 4. Chairman, Soverhill. Admitted, December 18, 1787.

Georgia day, May 5. Chairman, H. D. Schall. Admitted, January 2, 1788.

Connecticut day, May 6. Chairman, Schall. Admitted, January 9, 1788.

Massachusetts day, May 8. Chairman, Soverhill. Admitted, February 3, 1788.

Maryland day, May 9. Chairman, Schall. Admitted, April 28, 1788.

South Carolina day, May 10. Chairman, Schall. Admitted, May 23, 1788.

New Hampshire day, May 11. Chairman, Soverhill. Admitted, June 21, 1788.

Virginia day, May 12. Chairman, Schall. Admitted, June 25, 1788.

New York days, May 13, 15. Chairman, Soverhill. Admitted, July 26, 1788.

North Carolina day, May 16. Chairman, Schall. Admitted, November 21, 1789.

Rhode Island day, May 17. Chairman, Soverhill. Admitted, May 29, 1790.

Vermont day, May 18. Chairman, Soverhill. Admitted, March 4, 1791.

Kentucky day, May 19. Chairman, Schall. Admitted, June 1, 1792.

Tennessee day, May 20. Chairman, Schall. Admitted, June 1, 1796.

Ohio days, May 22 to 27, inclusive. Committee, G. W. Patterson and J. G. Insole. Admitted, November 29, 1802.

Louisiana day, May 29. Chairman, Schall. Admitted, April 30, 1812.

Indiana days, May 30 to June 3, inclusive. Committee, George G. Garey and George Fifield. Admitted, December 11, 1816.

Mississippi day, June 4. Chairman, Schall. Admitted, December 10, 1817.

Illinois days, June 5 to 15, inclusive. Committee, J. F. Cady, Leo Goldsmith, W. J. Anderson and William Randall. Admitted, December 3, 1818.

Alabama day, June 16. Chairman, Schall. Admitted, December 14, 1819.

Maine day, June 17. Chairman, Soverhill. Admitted, March 15, 1820.

Missouri days, June 18 to 28, inclusive. Chairman, Theo. Gale. Admitted August 10, 1821.

Arkansas day, June 29. Chairman, Schall. Admitted, June 15, 1836.

Michigan days, June 30 to July 6, inclusive. Committee, J. W. Thorn, George Fifield and H. A. Furber. Admitted, January 26, 1837.

Florida day, July 7. Chairman, Schall. Admitted, March 3, 1845.

Texas days, July 8 to 12, inclusive. Chairman, H. W. Peak. Admitted, December 29, 1845.

Iowa days, July 13 to 23, inclusive. Committee, A. B. T. Moore and P. C. Jones. Admitted, December 20, 1846.

Wisconsin days, July 24 to July 31, inclusive. Committee, H. D. Bell and R. J. Millar. Admitted, May 29, 1848.

California day, August 1. Committee, J. K. Armstrong. Admitted, September 9, 1850.

Minnesota days, August 2 to 6, inclusive. Committee, C. H. Conner and R. J. Millar. Admitted, May 11, 1858.

Oregon days, July 7 to 11, inclusive. Chairman, J. K. Armstrong. Admitted, February 14, 1859.

Kansas days, July 12 to 16, inclusive. Chairman, C. F. Dietrich. Admitted, January 29, 1863.

West Virginia day, August 16. Chairman, Schall. Admitted, June 19, 1863.

Nevada day, August 18. Chairman, J. K. Armstrong. Admitted, October 21, 1864.

Nebraska days, August 19 to 23, inclusive. Chairman, Capt. M. C. Bennett. Admitted, March 1, 1867.

Colorado days, August 24 to 26, inclusive. Chairman, J. K. Armstrong. Admitted, August 1, 1876.

North Dakota days, August 28 to 31, inclusive. Chairman, R. J. Millar. Admitted, November 2, 1889.

South Dakota days, September 1 to 4, inclusive. Chairman, C. H. Conner. Admitted, November 2, 1889.

Montana days, September 5 to 8, inclusive. Chairman, R. J. Millar. Admitted, November 8, 1889.

Washington days, September 9 to 14, inclusive. Chairman, J. K. Armstrong. Admitted, November 11, 1889.

Idaho day, September 15. Chairman, J. K. Armstong. Admitted, July 3, 1890.

Wyoming day, September 16. Chairman, Armstrong. Admitted, July 11, 1890.

All States' days, September 18 to 30, inclusive. Chairman, W. M. Shaddinger, secretary Detroit Stove Works, Detroit, Mich.

All Nations' days, the entire month of October. Chairman, F. H. Tefft Barbour, vice-president Detroit Stove Works, Detroit, Mich.

JOHN GROSSIUS' SONS, 389 Main street, Cincinnati, Ohio, are distributing to the trade an oblong catalogue relating to the heating and ventilation of schoolhouses. In this publication, which is bound in colored paper covers, the company describe and illustrate Grossius' patent schoolroom ventilating heaters in such a way as to enable those contemplating the purchase of heating and ventilating apparatus to compare them with heaters of other makes adapted to meet similar requirements. The company claim that for 25 years their patent schoolroom ventilating heaters and improved warm-air furnaces have had a large sale and from the beginning have proved a practical success. The Grossius heaters are illustrated by means of numerous engravings, while elevations and floor plans of buildings show the arrangement of hot air and ventilating flues. The pamphlet is neatly gotten up, and containing information as it does with regard to putting up and using the company's heaters, will be found of interest and value to the trade in general.

WE ARE indebted to the Favorite Stove & Range Company of Piqua, Ohio, for a copy of the order of exercises of the fourth annual ball given by the I. M. U. No. 94 on April 3. The programme is of such a character that we present it herewith:

PROGRAMME.

1. Grand March..... I. M. U. No. 94
2. Waltz ..... Bill Fritz's Boots
3. Quadrille .....I'll Wrestle the Dog for $10
4. Schottische ..... A. K.—I Like Owl
5. Quadrille, Tucker, G. M.—Whoa! Stop My Horse
6. Polk.....C. B.—Does My Head Shine?
7. Waltz Quadrille .....Here Comes Papa
8. Galop, Boys, I'll Take Care of the Third Ward
9. Quadrille ...L. M.—I'm on the Fence to Dry
10. Waltz, German.....Go in, Anton
11. Quadrille.....I'll Tell You, Ain't I Right?
12. Quadrille, Doce Balenette, Stop the Horse, I'm Fell Out

30 minutes intermission.

13. Waltz.....Lou and His Little Can
14. Schottische.....Santa Claus is with Us
15. Quadrille ...Say, Boys, I'm After the Wheel
16. Polka, Success to the Favorite Stove and Range Co.
17. Waltz Quadrille, I'll Settle Down on Kitt Street
18. Quadrille, Everybody Takes His Hat Off to Me
19. Waltz, Mother, I'll Tell You Water Makes Me Sick
20. Quadrille .. .. Dan, Trim Your Lilacs
21. Waltz.....J. H.—I Feel Like a Fox
22. Quadrille, Tucker, Choice of the Third Regiment Band
23. Polka.....Joe and His Little Goat
24. Quadrille, Ma, You Wake Me Up, for Pa Is Mad at Me
25. Virginia Reel .....Home, Sweet Home

Remember 94 in their next.

On the page facing the above are blank lines for the names of the dancers, while on the fourth page or back cover is a *facsimile* of the trade-mark of the Favorite Stove & Range Company and the statement that Favorite stoves and ranges "bake better, last longer, use less fuel and are more convenient than all others."

THE FULLER & WARREN COMPANY of Troy, N. Y., have recently discovered who has been systematically robbing them for several months past. The chief conspirator is said to be the foreman of the molding shops, and, according to our Albany correspondent, he has made a confession, implicating nine men employed under him. It appears that the plan pursued by the foreman and his accomplices was to credit the men each day with more work than they really performed and on pay day after cashing their slips the men would meet and divide the amount received in excess of that to which they were justly entitled, the foremen, of course, receiving the lion's share. It is said that the foreman had one of the most lucrative positions in the foundry, making legitimately as much as $50 a week. By his scheme, however, he more than doubled the amount. His mode of living is said to have aroused the suspicion of his employers and an investigation followed. The foreman was arrested and at last advices had been admitted to bail in the sum of $1500.

THE WESTERN STOVE MFG. COMPANY, 506 North Main street, St. Louis, Mo., favor us with a four-page circular relative to some of their leading specialties. Among these may be mentioned the Model Bakewell, a four-hole cook, intended for using coal as a fuel and made in a great variety of styles and sizes ; the Bonny Bake-well, a six-hole range, intended for using wood only ; the Midland, a neat four-hole cook for coal or wood, and the Cherry and Eureka, four-hole wood cooks. The circular presents more or less letterpress, while the illustrations are of a character to clearly show the external features.

An Old Heating Stove.

The engraving of the ancient looking heating stove presented herewith is made from a photograph sent us by Stone, Brewster & Co. of Windsor, Vt. They state that the stove was recently brought to them as old iron, and as they are interested in knowing something of the probable age of the construction, they send the picture to *The Metal Worker* in order that it may be presented to our readers. The only name on the casting appears on the panel just above the front doors and reads as follows : "John Morrison, Troy, N. Y., No. 4." According to our knowledge on the subject, Mr. Morrison was in business somewhere about 1840, which would indicate very closely the age of the stove here shown. The picture represents a type very common about 50 years ago, and was turned out by the leading stove makers of Albany and Troy. It is of especial interest at this time as an illustration of the tendency to revert to old principles in artistic casting. The decoration is rich and effective, and it will be observed that nearly the whole of the exposed surface is covered with ornamentation. The columns at the side and the drum or radiator at the top afford a considerable amount of radiating surface, while at the same time adding to the artistic appearance of the stove. The wood is placed in the fire box through the door at the end of the stove, and the products of combustion pass upward, radiating their heat, and then escaping to the chimney through the radiator or chamber supported by the circular columns. If any of our readers can furnish additional information regarding this type of heating stove we shall be glad to have them do so.

Old Heating Stove Made by John Morrison, Troy, N. Y.

ODD PLATES.

The Howard Furnace Company, 254 Water street, New York, and Syracuse, refer to many generous testimonials from the trade in relation to their line of goods. They have a new catalogue in course of preparation which they hope to issue the coming May or June. This will contain a new line of single radiator furnaces, of which four sizes—Nos. 32, 36, 40 and 44—are now ready, and two more—Nos. 48 and 56—they expect to have ready by June 1. They have also ready six sizes of combination furnaces for hot water and hot air.

We are indebted to Fletcher, Russell & Co., Limited, Warrington, England, for a copy of their catalogue of gas-burning appliances bearing date of March, 1893. It is a volume of 125 pages, and its make-up is similar to the publication reviewed in these columns a short time since. Numerous illustrations are given of heating and cooking stoves adapted to meet the requirements of the English trade, while ample descriptive matter calls attention to the leading features. A selection of testimonials also finds place in the catalogue, showing the favor with which the goods are received by those who have practically demonstrated their merits.

Treasurer Roberts of the Auburn Stove Foundry Company, Auburn, Me., states that the sales of the company's goods are increasing from month to month and are much larger thus far the present year than for the corresponding period a year ago. The iron that is being melted produces fine, smooth castings, and the stoves and ranges are meeting with great favor.

The Syracuse Stove Works, Syracuse, N. Y., are directing attention to their Model Welcome six-hole range as a "new departure in stove construction." It is fitted with sheet flue, large top surface measuring 30 x 48 inches; ash pit 6 inches deep and 17 inches wide; fire box intended for burning coal, 9 x 18 inches in size, and 10 x 24 inches for using wood as a fuel. The ornamentation is of a pleasing character, and the company are confident that the Model Welcome is destined to be a great seller.

James Boyle & Co , Salem, Ohio, favor us with a calendar for the month of April. In the general make-up it corresponds to those of the earlier months of the year sent out by this firm, being illustrated with an engraving of the Family Keystone four-hole cook stove and printed in colors. Around the panel inclosing the calendar proper for the month is the statement that "next month will show cut of Perfect Oak, latest and finest in the market. Don't buy your Oaks until you see it." The card bears the imprint of Frank H. Peterson & Co., Minneapolis, Minn., as agents for the Northwest.

President Nathan B. Perry, of the Perry Stove Company, Albany, N. Y., who has been away on a ten-days' vacation, has returned to the management of this progressive concern.

Stumpf & Thiele of Indianapolis, Ind., are meeting with such a demand for their furnaces that they operate their works day and night in order to fill orders. Their output is larger than ever before in their history, and the prospects are for a continuance of the present satisfactory conditions.

The Co operative Stove Company of Buffalo, N. Y., deny the statement that they are discriminating against union men. The manager of the company says the concern employ union labor, and applicants for work are never asked whether they are non-union men or not.

Troy Nickel Works, Troy, N. Y., have appointed Francis Frost & Co., Toronto, Ont., as Canadian agents for the sale of their Alaska Stove Trimmings.

Eugene Munsell & Co , 218 Water street, New York, are distributing circulars, printed in colors, relating to their Manhattan gas stoves, made in a great variety of styles and sizes, and also to Graves' permanent gas-burner attachment. The latter device, our readers will remember, was illustrated in these columns not many weeks ago. The circulars are liberally illustrated and carry sufficient descriptive letterpress to enable the dealer to readily comprehend the merits of the device referred to.

The Ringen Stove Company, St. Louis, Mo., are adding another story to their manufactory, which will, when complete, make it a four story building 75 x 200 feet. The entire structure will be devoted to the manufacture of the Quick Meal gasoline and gas stoves. Last year

their increased business compelled them to build an additional story to their foundry, which is 60 x 100 feet, so that the improvements they are at present making indicate that their business is steadily growing. They have two large warehouses, which they use for the storage of goods, and it is more than probable that these will shortly be supplemented by an additional warehouse.

H. SANDMEYER & Co., 215 South Adams street, Peoria, Ill., have just issued from the press a very neat catalogue of 64 pages, bound in colored paper covers. The first portion of the work is devoted to the subject of house heating and ventilating and to illustrations and descriptions of the line of furnaces made by the company. These include the Imperial, the Victor, the New Style Pleasant Home, the Prince Royal and the Royal, the latter being a furnace intended for burning wood only. Tables giving dimensions of the various sizes of the different furnaces made, together with price-lists and capacities, are features of the work. The latter portion of the catalogue is devoted to illustrations of sheet-metal store fronts, crestings, finials, skylights, window caps, gutters, &c., manufactured by the company. One page is devoted to Dickson's Dry Closet System for schoolhouses.

THE MARCH number of the *Gasoline Stove Bulletin*, issued in the interests of George M. Clark & Co. of Chicago, Ill., is full of matter pertaining to vapor stoves which is likely to interest dealers everywhere. On the editorial page the company state that March found them doing the largest business in their experience, and in explanation of this they state the reason is simply because they have a good line of gasoline stoves of all kinds to suit all people. The Jewel Process range is given a conspicuous place in this number of the *Bulletin*, the shipments for one week reaching a total of 2600 stoves. The last page is devoted to a letter in *fac simile* from the company's largest agent. It is short, but tells of two classes—the dealer and the wholesaler.

THE EXCELSIOR MFG. COMPANY, St. Louis, Mo., who recently placed on the market a line of wrought-steel ranges, known as the Monarch, report a heavy demand for these goods, and advise us they are in receipt of some gratifying orders for them. They are substantially made, and are sold at a reasonably low price.

W. H. PECKHAM, manager of the Chicago branch of the Sill Stove Works, is having his sample room overhauled and redecorated to present an inviting appearance to the crowd of visitors expected this summer.

THE MICHIGAN STOVE COMPANY of Detroit, Chicago, Buffalo and New York announce that they are bringing out an entirely new line of cast cooking goods in both ranges and stoves, to cover requirements for wood or any kind of coal. All styles and sizes will be found in this line. It is almost unnecessary to add that the Michigan Stove Company's reputation insures the appearance of something very fine this World's Fair year. Their steel ranges are having an excellent sale, winning their way largely through their own merits.

WE HAVE RECEIVED a very dainty invitation from the Peninsular Stove Company to the opening of their new salesrooms, 79 and 81 Wabash avenue, Chicago, on the 7th inst. The rooms were open from 7 to 10 o'clock in the evening, cards having been issued to the fortunate ones who were favored with invitations.

Grave questions relating to the efficiency of quarantine regulations are raised by the landing at Halifax of emigrants bound to the United States.

Municipal Laws as to Rain-Water Conductors.

The following digest of municipal building laws in regard to rain-water conductors, compiled by Henry A Phillips, is printed in the *American Architect:*

Boston.—1. Buildings over 45 feet high shall have suitable water tight metallic leaders, and all buildings shall have leaders sufficient to carry all water to street, gutter, or sewer, and in such manner as not to flow upon sidewalk, or to cause dampness in any wall, yard or area.

2. Rain-water leaders, when connected with soil or drain pipe, shall be properly trapped.

Baltimore.—1. Inspector is directed to compel owner or his agent to put proper metallic spouting and gutters on buildings, and keep same in repair, so that gutters shall not leak nor overflow to pavement, and carry water from roof to ground, sewer or gutter, protecting walls and foundations.

2. Awnings not extending over curb-stone shall be provided with gutters and down spouts to carry water to street gutters.

Brooklyn.—1. Wooden gutters of stone or brick buildings shall be lined or covered on upper surface with copper or other fire proof material to be approved by commissioner.

Chicago.—1. Buildings shall be kept provided with proper metallic leaders for conducting water from roof to ground, sewer or street gutter in such manner as shall protect walls and foundations from damage.

2. In no case shall water be allowed to flow upon sidewalk.

3. But shall be conducted by drain pipe to street gutter or sewer.

4. Rain-water leaders must never be used as soil, waste or vent pipes, nor shall any soil, waste or vent pipe be used as a leader.

5. Water leader within house must be of cast iron with leaded joints, or of copper with soldered joints When outside house and connected with house drain, it must, if of sheet metal with slip joints, be trapped beneath ground or just inside wall, the trap being arranged to prevent freezing. When leader opens near window or light shaft, it must be properly trapped at its base. The joint between a cast-iron leader and roof must be gas and water tight by means of brass ferrule and lead or proper pipe properly connected.

Cincinnati —1. Buildings shall be provided with proper fall pipes connected with sewer, or to catch basin connected with sewer when building abuts on street or alley containing public sewer; otherwise water shall be carried to street gutter in manner approved by inspector.

2. Rain-water leaders, when connected with soil or drain pipe, shall be properly trapped.

Cleveland.—Same as above (1) for Cincinnati.

Denver.—1. Rain water shall be so conveyed from roof as not to flow upon adjoining property, nor against any wall so as to endanger it or cause dampness therefrom, and all water conducted from building to street gutter or sewer.

2 In no case shall water be allowed to flow upon the sidewalk.

Detroit.—All gutters shall be of metal.

District of Columbia.—1. Buildings shall be kept provided with metallic down spouts and eave and cornice gutters for conducting water without damage to walls or foundations, so as not to drain upon or damage adjoining property, and by drain pipe to sewer, or to gutter under sidewalk where no sewer exists.

2. In no case shall water be allowed to flow upon sidewalk.

Kansas City.—1. Same as above (5) for Chicago, and brick buildings shall be kept provided with suitable water-tight metallic leaders, and all other buildings with water-tight metallic or wooden leaders conducting water from roof to ground, and thence to street gutter or sewer.

2. In no case shall water be allowed to flow upon the sidewalk.

3 Buildings shall be provided with proper fall pipes connected with sewer, or to catch basin connecting with sewer, when building abuts on street or alley containing public sewer; otherwise water shall be carried to street gutter in manner approved by inspector; not drip on ground or cause dampness in wall, yard or area.

Minneapolis.—1. Buildings fronting on street shall be kept provided with proper leaders for conducting water from roof to ground, sewer, street gutter or dry well in such manner as shall protect walls and foundations from damage. No leader shall be constructed except in accordance to law.

2. Rain-water leaders running down outside of building shall have trap or back-pressure valve before entering sewer, drain or soil pipe.

3. Rain-water leader within building shall be extra heavy cast-iron soil pipe, or standard wrought iron pipe tarred inside and outside.

4. Connection of rain-water pipe with soil and drain pipes shall be on lower side of highest fixture.

5. A soil or vent pipe above highest fixture shall not be used as rain water pipe.

6 Rain-water pipe running from low roof or low eaves shall have trap or back-pressure valve before entering drain or sewer pipe.

Nashville —Water spouts emptying contents on public sidewalk shall be connected with gutter by drain laid beneath surface of sidewalk.

New Orleans —1. Gutters on buildings where fire-proof roofs are required shall be made of non-combustible material, and firmly secured to building by irons.

2. Balcony projecting over any part of banquette shall be provided with metal gutter attached to outer edge and leading into metallic down pipe, leading across banquette into street gutter. But if balcony is entirely roofed, then such gutter shall be attached to roof.

3. Gutters shall be kept in such repair that they do not leak or drip on sidewalk.

4. Gutters across banquette shall be covered and approved by City Engineer.

New York.—1. Buildings shall be kept provided with proper metallic leaders for conducting water from roof to ground, sewer or street gutter in such a manner as shall protect walls and foundations from damage.

2. In no case shall water be allowed to flow upon sidewalk if there is sewer in street. Pipe shall be below surface of sidewalk.

Omaha.—1. Same as Chicago (5).

2. Same as above for New York (1 and 2).

Providence.—1. Buildings fronting on street shall be provided with proper leaders conducting water from the roof to ground, sewer, street gutter or dry well in such manner as to protect walls and foundations from damage. (*g.*)

2. *Tenement and Lodging houses,* water shall not drip from roof so as to cause dampness in walls, yard or area.

St. Louis —1. All buildings shall be provided with proper metallic leaders conducting water from roof to ground, river or street gutter in such manner as to protect walls and foundations from damage.

3 In no case shall water be allowed to flow upon the sidewalk, but shall be conducted by drain pipe to street gutter or sewer.

San Francisco.—Gutters on brick buildings reconstructed shall be made of fireproof material.

Gray's Telautograph.

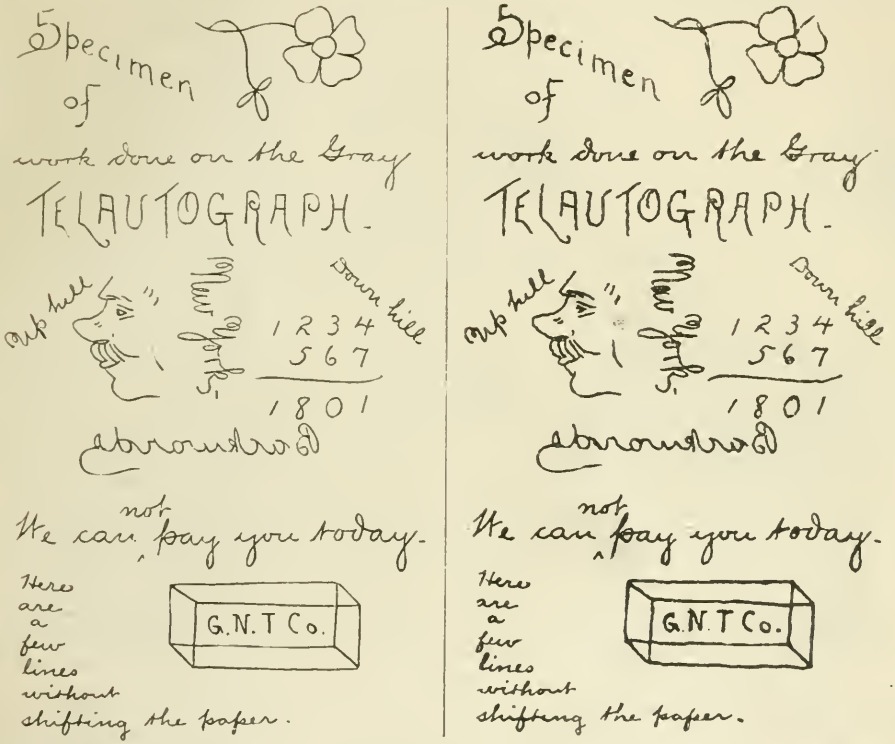
If expert electricians are not wofully mistaken, another very important aid to the facilitation of business has been perfected. Professor Elisha Gray, of Highland Park, Ill., after six years of constant experiments, last week exhibited his apparatus for transmitting by wire a *fac-simile* of anything written or drawn, the apparatus being of such a simple character that a skilled operator is not necessary. It is claimed that every obstacle which has hitherto defeated the attainment of this long-sought process has been surmounted, and that the apparatus is ready for introduction into practical every-day use. It is styled the telautograph. A transmitter and a receiver are used, each somewhat smaller than a of letters, words, figures, signs or sketches. Apparently, the only limit in reproduction is that of stenographic characters, as the machine makes but little distinction between heavy and light lines.

The cut which accompanies this sketch, reproduced from the *Electrical World*, represents a telautographic message as written and received through an artificial distance representing one mile. This shows clearly the fidelity of the reproduction. Printing, script, and sketches transcribed horizontally, uphill, downhill and backwards are all with equal faithfulness copied by the receiving pen. The illustration shows the exact size of the transcribing plate.

Assuming that the telautograph is now in as good condition for practical use as which will be appreciated by those who occupy their offices irregularly.

The *fac-simile* of the original writing of a message which is provided by the telautograph will avoid many disputes and mistakes arising in the transmission of communications by our present system. Even the identity of the writer or sender is thus preserved and can be traced by those familiar with his penmanship. Contracts in much more satisfactory form can be made in this way than by telegraphic message or telephone, and it may not be necessary to add, as now "Please confirm by mail."

The size of Australis, justly says an exchange, is not generally appreciated. The seven colonies between them occupy a territory greater than that of the United



As Written. *As Received.*

SPECIMEN OF WORK DONE ON THE GRAY TELAUTOGRAPH.

type-writing machine. The transmitter and receiver stand side by side. In sending a message an ordinary lead pencil is used, near the point of which two silk cords are fastened at right angles to each other. These cords connect with the instrument, and, following the motion of the pencil, regulate the current impulses which control the receiving pen at a distant station. Ordinary paper five inches wide, arranged on a roll attached to the machine, is used by the writer. The receiving pen is a capillary glass tube placed at the junction of two aluminum arms. This glass pen is supplied with ink, which flows from a reservoir through a small rubber tube placed in one of the arms. The electrical impulses coming over the wire move the pen of the receiver simultaneously with the movements of the pencil in the hand of the sender. As the pen passes over the paper, an ink tracing is left, which is always a *fac-simile* of the sender's motion, whether in the formation was the telephone when first brought out, a magnificent range of possibilities is presented. Private wires for the transmission of messages can be furnished business offices as easily as telephonic communication is now established. A business man can receive and transmit his own messages without the intervention of a messenger boy and also without having them pass under the scrutiny of two or more telegraph operators. Further, not only does he secure secrecy, but he also obtains a record in black and white of his telegraphic correspondence, including exact reproductions of the communications sent by the party at the other end of the wire. The telegraph and telephone may not be superseded, as they have their uses; but the telautograph steps in to occupy a field which neither of them can cover. As the receiver works without any attention, persons having telautograph connections can be furnished with dispatches or messages at any time, day or night, States, excluding Alaska. New South Wales alone is as large as the 13 original States. Tasmania, the Rhode Island of Australia, is as large as that State, with New Jersey, New Hampshire and Massachusetts added; Victoria, the smallest colony of the continent, is equal in size to Great Britain. Queensland surpasses the united areas of Austria, France and Germany. South Australia, one-third greater than Queensland, is nearly as large as Western Australia, which of itself has nearly four times the extent of Texas, while the two colonies together are larger than the whole of Europe without Russia. The total population is about 4,000,000.

Honduras is engaged in slaughtering her own citizens as a means of promoting the general welfare. In Southern Brazil the same tactics are adopted. The greater the victories achieved the greater the disaster.

Estimate Blank for Furnace Work.

The Excelsior Furnace Company, Chicago, Ill., have got up for their customers and the trade in general a very complete form of estimate blank, consisting of four pages 14 x 8½ inches in size. The front page is reproduced below. The inner pages contain a very complete list of registers and furnace fittings, smoke pipes, air pipes, &c. The names are given, also the sizes, as well as the list price, while two blank columns are left for inserting the cost, so that a complete and accurate estimate can be made. On the back of the blank or fourth sheet are lines for indorsing the name of the owner, architect, and the date the contract was submitted, besides half of blank page for memorandum of runs of pipe and special instructions. We print above first page of blank.

ESTIMATE BLANK.

FOR FIGURING COST OF FURNACE WORK.

Copyrighted 1893, by the Excelsior Steel Furnace Company, 117-121 South Jefferson Street, Chicago.

No. of estimate.....Date.....Date submitted.....Option of acceptance till.....
Name of owner.....Address.....
Architect.....Address.....
Contractor or builder.....Address.....
Location of building.....
Purpose to be used for.....
Guaranty required of contractor.....(Also see last page).
Memo.....
Estimated cost $.....Bid $.....Terms.....

	Size.	Description.	Net.	Cost.	Totals.
....	....	Excelsior steel furnace.....Pattern.....	....	....	....
....	....	Excelsior steel furnace.....Pattern.....	....	....	....
....	....	Excelsior steel furnace.....Pattern.....	....	....	....
....	....	Casing kind.....with....Style bonnet.....inches high	....	....	....
....	....	Casing kind.....with....Style bonnet.....inches high	....	....	....
....	....	Casing kind.....with....Style bonnet.....inches high	....	....	....
....	....	M. brick for foundation at.....per M	....	....	....
....	....	Bbls. cement for foundation at.....per bbl	....	....	....
....	....	B. J. registers as per memo. on following pages	....	....	....
....	....	N. P. registers as per memo. on following pages	....	....	....
....	....	C. P. registers as per memo. on following pages	....	....	....
....	....	Miscellaneous registers as per memo. on following pages	....	....	....
....	....		....	....	....
....	....	Cost of fittings as per memo. on following pages	....	....	....
....	....	Estimate of cost of special fittings in addition	....	....	....
....	....		....	....	....
....	....	Estimate of carting and crating, freight and handling	....	....	....
....	....		....	....	....
....	....	Total estimate of labor on complete job	....	....	....
....	....	Memo:	....	....	....
....	....	Measuring up job $.....Foundation $	....	....	....
....	....	Stacking job $.....Setting up Furnace $	....	....	....
....	....	Piping off and finishing job $	....	....	....
....	....	Carfare and incidental expenses, including cost of making settlement and giving instructions	....	....	....
....	....		....	....	....
....	....		....	....	....
....	....		....	....	....
....	....		....	....	....
....	....		....	Total.	....
....	....	Total net cost of job as per above	....	....	....

Eaves Droppings.

The spring poet is sure to come with the season, and even *The Metal Worker* can't escape him. The following harmless ode in praise of the tin roof is sent to us by one who should know better.

If you want to get a roof
That is surely waterproof,
Tin's the thing you ought to buy;
It will keep you nice and dry.

It doesn't freeze and lose a slate,
To make you cuss when too late;
Or on the house to put a strain
To hold its weight—that is plain.

You can't see the stars in bed
With a tin roof overhead;
But on shingles far less plain
Sounds the music of the rain.

Stand all the roofs in a line,
Nary one will tin outshine;
Tin's the roof that does the trade,
And throws the others in the shade.

Burning Gas in Stoves.

Following a discussion of a paper on a special form of gas heater, read at the ninth annual meeting of the Ohio Gaslight Association, some interesting statements were made respecting the use of gas for heating purposes. Our readers will recall some discussion in recent issues of *The Metal Worker* on dampness arising from burning gas in a room with no flue connection. In the discussion referred to it was stated that the burning of one pound of natural gas makes two pounds of water. One of the speakers, referring to the effect of the combustion on the air of the room, said:

My own experience in heating rooms with gas where there is no flue connection is that the presence of carbonic acid is not perceptible, or not disagreeable, but the presence of steam is a worse difficulty; and next to that, and more serious, is the fact that the oxygen is burned out of the air, leaving the nitrogen. The point I don't understand is how a room can be heated for 24 hours at a time with a stove burning 10 or 15 feet of gas per hour, destroying the oxygen in the air all the time and leaving the nitrogen; and yet I know by actual experience in my own house and the houses of a great many of my friends that a room can be heated in that way and kept perfectly pleasant. It seems to me that unless there is some means by which the nitrogen gets out doors and the oxygen comes in, that the atmosphere inside will become so charged with nitrogen that it will not support life.

The Carpenter Calorimeters.

Schaffer & Budenberg of Brooklyn, N. Y., have arranged with Professor Carpenter of Cornell University for the sole manufacture and sale of calorimeters invented and patented by him. The throttling calorimeter proper is made of brass, nickel-plated, and consists of a small vessel to which steam is supplied through a tapering or converging orifice, and which contains in its center a very deep cup, into which a thermometer can be inserted for obtaining the temperature of the steam in the calorimeter; the calorimeter is furnished with a cock, to which a manometer can be attached for measuring the pressure in the interior. The exhaust steam is discharged from the lower part of the calorimeter, and need not be condensed; it may be conducted away in a hose or pipe, or permitted to escape into the air, as convenient.

The principle on which the calorimeter operates is as follows: Some of the heat contained in high-pressure steam is liberated when the pressure is lowered, and that heat is utilized in evaporating any water the steam may contain and in raising the temperature of the steam above that due to its pressure. Thus the total heat in 1 pound of steam at 80 pounds absolute pressure is 1177 B. T. U., and that in 1 pound at 20 pounds absolute pressure is 1151 B. T. U. If, now, steam were allowed to expand, without doing work on any body except itself, from 80 to 20 pounds pressure, 26 B. T. U. would be liberated for each pound of steam. Since at 20 pounds pressure 954 B. T. U. are required to evaporate 1 pound of water, we should have additional heat sufficient to evaporate 26 ÷ 954, or 0.027 pounds. Now, if the original steam contained less than 2.7 per cent. of moisture, a thermometer placed in the steam would show a temperature higher than that due to a pressure of 20 pounds, which is 228° F. In such a case it would be possible to compute the percentage of moisture in the steam; but if the steam contained more than the above moisture, the heat would not be sufficient to evaporate it, the reading of the thermometer would be equal to that of the boiling point for the given temperature, and no computation of the moisture in the steam would be possible. That is, a throttling calorimeter cannot be used if the steam contains much over 2.5 per cent. of moisture, but it is very convenient and accurate when it can be operated.

The separating calorimeter consists of a vessel about 12 x 3 inches, constructed so that steam in passing will be completely and perfectly separated from any moisture that it contains. The moisture is precipitated in an interior chamber, which is connected to a water gauge glass and scale, so that the amount of water can be seen and its volume of weight read off on a scale. The dry steam passes into an external chamber, which surrounds the inner chamber and forms a steam jacket, which prevents the loss of heat by radiation from the inner chamber. The dry steam and such water as may be formed in it by condensation after leaving the calorimeter is discharged at the bottom of the outer chamber through a small orifice. This steam is caught in a condensing vessel and its weight determined from the increase in volume of the original water in the condensing vessel. The scale on the calorimeter gives the weight of moisture, that on the condensing vessel the weight of dry steam.

The per cent. of moisture in the whole weight is then evidently the quotient obtained by dividing the weight of steam, as shown by the calorimeter scale, by the sum of that shown by the scales on the calorimeter and the condensing vessel. The quality of the steam is 1 minus this number.

TRADE REPORT.

The Iron Market.

In Eastern markets the commencement of the fourth month in the year does not bring with it any new or encouraging features. The volume of business is large, and prices are steady, but they are so low that manufacturers insist that they are working on so small a margin that it precludes the idea of doing more than getting out whole. Further weakness, therefore, is something they dread to meet, and yet it is not entirely certain that this can be avoided. As already stated, there is no reason to complain of business being dull; the point is, that it is unprofitable, and it is not clear how it can be made otherwise, unless there is some very decided change in the conditions, of which there is no immediate probability. Supply and demand are very evenly balanced; the weak point is, that the facilities for production are growing all the time, so that, heavy as the demand is, and heavy as it may be, the impression prevails that it can be easily met, hence there is no inducement for speculative buying. Many large producers are also of opinion that there is no good reason for refusing any business that can be had at about the figures now ruling, which appears to be confirmed by the ease with which orders are placed for material of almost any description. Apart from the matter of prices there is no room for complaint, and it may be that even in that respect the situation is not as bad as it is made out to be. This article simply aims to voice what the trade have to say, which, in regard to prices, is singularly in accord.

The prospective early opening of navigation is influencing prices at Chicago on articles which can be shipped from Eastern lake ports at lower than all rail rates. The volume of business handled in this way is increased every year with the better services offered by the growing fleet of steam carriers to Lake Michigan ports, as well as to points reached through towns at the head of Lake Superior.

Pig Iron.—The New York market is very quiet, although it is pointed out as a feature that quick delivery is usually demanded by consumers. Both Alabama and Virginia Irons are occasionally pressed for sale. We quote Northern brands at $14 50 @ $15.25 for No. 1; $13 75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14.25 @ $14 50 for No. 1; $13 @ $13.75 for No. 2 and No. 1 Soft.

In the Philadelphia market the demand for Pig Iron is much of the same character as noted for several weeks past, fairly active for standard brands, a little slow for other descriptions. There is no particular pressure to realize, however, so that in ordinary cases sales are at unchanged prices. At a reduction of a few cents per ton, sales could easily be increased, while a few cents advance just as effectually checks the demand, so that the market may be said to be about on an even keel. Consumption is nearly up to its maximum, and while there may be some further increase during the next 60 days, the chances are equally strong that the supply will keep pace, particularly if there is any stiffening in prices. Taking everything into consideration, therefore, there does not appear to be much chance for higher prices, while at the figures now ruling it seems equally improbable that there can be any appreciable decline, and, as a matter of fact, the trade are so much in accord on this point that it is impossible to get up anything like a scare. Buyers feel that they can get all the Iron they are likely to need at current prices, while sellers are equally sure that concessions are uncalled for, unless for an off grade, for spot cash or for some reason peculiar to that particular transaction. For the present, therefore, sales are about on a par with the supply, and prices are steadily held as follows for Philadelphia and equivalent deliveries, with 25¢ @ 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X.....	$16.00 @ $16 50
American Scotch, No. 2X.....	15 00 @ 15.50

Reports from Chicago indicate that the situation is practically the same as that reported last week. A fair amount of trade has been done in local Coke Iron, the inquiry still being good from a considerable number of consumers. Prices on this class of Iron are quite firm, and transactions are notably increasing at slightly advanced rates. March deliveries from the furnaces here were unusually heavy, running easily 25 % above those of the corresponding month last year. Southern Iron has been rather quiet. Hardly anything has been done to establish prices, but from offers which have been made the condition of the Southern furnaces does not seem to have improved, although the leading companies refuse to meet extremely low prices current within the past two weeks. The Lake Superior Charcoal producers are feeling rather sanguine over their prospects. A better demand is reported in other markets, and not a few furnace companies have already sold their entire product for several months. A good inquiry is reported here, but consumers are not disposed to pay full prices. Offers are made of 25¢ @ 50¢ below quotations, which sellers are refusing to accept. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	$16.50 @ $17.00
Local Coke Foundry, No. 1.....	13.75 @ 14.25
Local Coke Foundry, No. 2.....	13.00 @ 13.25
Local Coke Foundry, No. 3.....	12.75 @ 13.00

From Cincinnati we learn that there is a fair volume of business passing in Pig Iron, but there have been no extended purchases made during the week. Buyers are urgent for prompt delivery of current purchases and for all Iron due on previous contracts, but the tone of the market has not improved and prices are as low as ever—in fact, we hear of one sale of No. 2 Foundry made direct by the furnace to consumer as low as $8.75, f.o.b., Birmingham, and for delivery running through this year. This, of course, is an exceptional transaction on which no commission was paid, but there is no doubt that sales have been made at $9, f.o.b., Birmingham, although 25¢ more is generally obtained. While there is liberal melting of Iron by the foundries in nearly all lines of business, yet there is such an abundance of Southern Iron for sale that buyers do not seem disposed to anticipate their wants more than is absolutely necessary. Only the larger and strong Iron companies contend firmly for full prices, and other producers are so numerous as to make it easy to buy at the low rates current. Many hope that stocks will show such a material reduction during the month of March as to favorably affect the trade, but this hope is by no means confident and there are few, if any, furnaces which would not take orders to a liberal extent for immediate or short forward delivery at the current prices. A considerable part of the business here is for Eastern destination, and yet the quantity of Pig Iron passing into consumption in this district is of liberal proportions. Quotations are as follows:

Foundry.

Southern Coke, No. 1.....	$13 25 @ $13.50
Southern Coke, No. 2.....	11.75 @ 12.00
Southern Coke, No. 3.....	11 00 @ 11.25
Ohio Soft Stone Coal, No. 1.....	16.00 @ 16.25
Ohio Soft Stone Coal, No. 2.....	15.00 @ 15.25
Mahoning and Shenango Valley...	14.75 @ 15.00
Hanging Rock Charcoal, No. 1....	19.00 @ 19.25
Hanging Rock Charcoal, No. 2....	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 1.....	15.50 @ 15.75
Tennessee and Alabama Charcoal, No. 2.....	14.50 @ 14.75

Metal Market.

Copper.—The conditions are practically the same as outlined in last week's review of the market. In any event, the turn from the first to the second quarter of the year has witnessed no change in the attitude of buyers, and even with seven or eight months' restriction upon production there is still more than enough Copper to go around. For that matter, the surplus is

sufficient to have more or less depressing effect upon values, and has brought the market into a condition of feverishness, the end of which is extremely problematical. At present there are sellers of Lake Superior Ingot for prompt delivery at 11¼¢, regular terms, and Exchange contracts running as far ss August have been offered at the same price, without attracting buying orders. Cakes and Wire Bars for prompt delivery brought some premium over that price, but the demand for those is rather disappointing and orders for round lots could probably be placed at prices very close to current quotations for Ingot. Casting Copper is also easier. In fact, 10¾¢ has become a common selling price for round lots, while transactions involving only moderate quantities were effected at 10.70¢, if, indeed, not at a shade less.

The monthly report of the Bureau of Statistics affords the following comparison of exports of copper from the United States:

	February, 1893. Tons.	February, 1892. Tons.	Eight months ending February 28, 1893. Tons.	Eight months ending February 28, 1892. Tons.
Ore—To				
United Kingdom	1,300	2,723	26,708	20,315
Germany	....	....	78	2,013
Other Europe	....	....	...	100
Total	1,300	2 723	26,786	21,428

	February, 1893. Pounds.	February, 1892. Pounds.
Ingots—To		
United Kingdom	225,000	445,815
Germany	172,516	1,045,483
France	823,740	991,847
Other Europe	917,075	554,425
Other countries	....	5,000
Total	2,138,329	3,042,570

	Eight months ending February 28, 1893. Pounds.	Eight months ending February 28, 1892. Pounds.
Ingots—To		
United Kingdom	1,969,117	12,296,571
Germany	2,260,306	5,312,537
France	7,063 087	17,8 5,288
Other Europe	6,605,518	10,695,140
Other countries	57,787	46,031
Total	17,955,875.	46,205,567

Pig Tin.—The enevitable working of the law of supply and demand has dispelled the visions of the "bull" interest and turned prospective profits into realistic losses. The McKinley duty "boom," has disappointed its fathers, chiefly because of the fact that sellers on one end of the line have put out more Tin than the buyers on the other end could conveniently take care of. The accumulation has become burdensome to an extreme and the odds are that the surplus will be heavier at the end of the present month. There is more than a bare chance also that "invisible" supplies will have some weight during the interval. A reflection of what the "bull" interest have to contend against may be discovered in the statistics presented below. Since our last report, the net cash price for Straits Tin has dropped about 40¢ ℔ 100 lb. Numerous "short" sales were covered at the decline, and advantage was taken of "seller's right to double" contracts in a manner anything but pleasant to operators who bought on that form of contract. Trade and consumptive demand has been only fair and doubtless checked to some extent by the depressed condition of the market.

Below we give the total statistics for Europe and the United States, as compiled by the New York Metal Exchange, showing: Total visible supply April 1, 1893, 17,855 tons; against total visible supply March 1, 1893, 15,959 tons: against total visible supply April 1, 1892, 13,039 tons.

Shipments During March and February.

	Mar. Tons.	Feb. Tons.
Straits to Great Britain	3,750	1.450
Straits to Continent Europe	350	325
Straits to United States	1,080	880
Total from Straits	5,180	2,655
Australia to Great Britain	250	180
Australia to United States	50	50
Total from Australia	300	230
London to United States	2,050	600
Holland to United States	40	140
Total from Europe	2 090	740
Consumption, London deliveries,	1,500	1,380
Consumption, Holland deliveries,	710	700
Consumption, U. S., excl. Pacific ports	1,800	1,600
Total	4,010	3,680
Stock, London	3,558	4,350
Stock, Holland	1,720	1,220
Stock, U. S., excl. Pacific ports,	3,692	2,864
Total stock at the close of month	8,970	8,434
Afloat, London	5,000	3,685
Afloat, Holland	600	1,020
Afloat, U. S., excl. Pacific ports,	3,285	2,820
Total afloat at the close of month	8,970	7,525

Pig Lead.—During the greater portion of the week under review prices dragged on the level of 4 05¢ for Common Domestic and 4.10¢ for corroding quality In the interval somewhat extensive purchases were made by large consumers that not only cut rather deeply into spot stocks, but materially curtailed the offering for early shipment from the West. The outcome was a hardening of prices all along the line and very firm tone to the market at the close. At this writing 4.10¢ would appear to be bottom price for common Western. Some single carload lots have been sold at that during the past few days.

Spelter.—Transactions in this market have been on a smaller scale and the demand shows hardly the degree of life that was displayed a week ago. Prospects for successful outcome of the proposed combination of producers seem somewhat dubious and that fact along with continued heavy output may account in a good measure for the more conservative tendency of buyers. However, prices are still held at 4.30¢, delivered, for carload or larger lots of prime Western brands.

Antimony.—The demand has been of merely routine character and prices are barely steady at 10¢ @ 10¼¢ for Hallett's, 10¼¢ @ 10½¢ for LX and 10½¢ @ 10¾¢ for Cookson's.

Tin Plate.—Deliveries from late heavy arrivals supply trade requirements to a great extent. The probabilities are that arrivals will continue heavy for some time, as large amounts of Plates have been shipped from abroad in order to avoid probable higher rates of ocean freight. Purchases for both prompt and future deliveries are, therefore, moderate, and the business passing is practically at old prices. The past week has brought somewhat of an increase in orders for Tin Plates from consumers, owing largely to the more favorable weather for outside work. Prices remain unchanged.

Coal.

The Coal market is dull and slumpy all around. Just now the Bituminous trade is exercised on account of the low contract of the Long Island Railroad Company which has been closed with R. B. Wigton & Co., at less than $2 70 ℔ ton for 80,000 tons, delivered at Hunter's Point. It is known that the railroads were expecting to get 15¢ more ℔ ton for transportation, but with such prices as that just quoted operators do not see how this can be done. Bituminous Coal is in good supply, so that some of the Clearfield mines are known to have shut down, as supposed from the effects of severe competition.

In the Anthracite Trade the resignation of Mr. McLeod from the Reading is startling news, as nothing of the kind was looked for. The trade reasons that he was simply crowded out, the funds at command proving insufficient to carry through the immense projects of the combine. Of course the combine no longer exists, nor has it been extant since the withdrawal of the Jersey Central. The Reading and Lehigh are alone, under a single management. "Company prices" now rule, and these several companies fall back as they were, renewing former tactics, which meant little more than meeting once a month or so, agreeing to maintain a schedule, and each concern afterward doing as it thought best. Prices remain unchanged, McLeod's retirement being too recent for effects to be seen or even conjectured. Talk of an advance in June or any other time this season is absurd, unless it is intended simply to be made on paper. The April output is calculated at 3,000,000 tons. The Reading Railroad has reduced the rate of tolls on Anthracite from the Schuylkill region 5¢ ℔ ton, the new rates being $1.70 ℔ ton for prepared sizes, $1.40 for Pea, and $1.25 for Buckwheat. The Reading tonnage for week was 400,000 tons, of which 55,000 tons went to New York waters. Pennsylvania Railroad tonnage for week, 336,958 tons Coal and 112,824 tons Coke. Increase for one year 443,000 tons.

Financial.

With the gradual disbursement of some $50,000,000 in the shape of interest and dividends, due April 1, all the markets experience a sense of relief. The feeling of stringency prevalent of late in all directions has undoubtedly hampered trade to no small extent; as collections have been slow, merchants could not readily sell their bills because banks had not the money to spare, and accommodations of any kind were reluctantly granted. Even now the financial future is not cleared of doubt, for,

although Saturday's bank statement shows that the surplus reserve has increased and that loans were but slightly contracted, the renewal of gold exports shows that a plethora of money cannot be expected immediately. The hope of easier money and the chance of lower freight rates on the opening of navigation have both had a retarding effect. Bearing on the general topic as related to gold exports, Henry Clews says: "In view of the abnormally large stocks of exportable products, it seems almost inevitable that our exports must materially increase from this time forward; and if the exports should be proportioned to the over supplies, the outflow of gold might easily fall below the usual average. In other words, it is reasonable to suppose, all other things being equal, that during the next three months the merchandise exports will largely take the place of gold shipments." This view is strengthened by the lower price of wheat since the defeat of the Chicago clique, also by the break in pork and provisions, and the improved outlook for the foreign consumption of cotton, the export demand for these commodities having already revived. On Monday the failure of the Commercial Bank of Australia was used against the market.

Stocks, after a severe hammering, took a favorable turn, in prospect of easier money and large railroad earnings as a consequence of the World's Fair boom. On Monday Western stocks were slightly affected by the threat of engineers and firemen at Toledo to strike rather than to handle cars or freight of roads connecting with the Toledo, Ann Arbor & North Michigan. The news of the engagement of $1,500,000 gold for export to Europe had little effect. The decision of Judge Ricks in the United States Circuit Court at Toledo against the striking engineers imparted a firmer tone to Western railroad stocks. Manhattan was the feature, and was largely sold on the report that a syndicate is ready to provide capital for an underground rapid transit system. All the industrials were erratic. Cordage advanced rapidly and Chicago Gas was freely bought. Sugar was inclined to sag on the report of a proposed new investigation into the company's organization and methods.

United States bonds were strong at the the following quotations:

U. S. 4½s, 1891, extended	99½
U. S. 4s, 1907, registered	113
U. S. 4s, 1907, coupon	113
U. S. currency 6s	105

Chicago Report.

Scrap.—Iron and Steel stock are in fair demand again, supplies here being drawn upon for outside consumption. Dealers' buying prices are as follows:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12 00	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	6.00	....
Horseshoes	12 50	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	2¾¢

Anthracite.—Local dealers do not anticipate any change in prices until toward the close of this month. Carload lots of 12 net tons are quoted as follows:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

CONDITION OF THE

Hardware Trade.

REPORTS of the amount of goods distributed by the trade in all parts of the country continue good. Large quantities are now going into consumption everywhere. Indeed, many lines are moving off so rapidly that it is difficult to get orders promptly filled. This is particularly true in the case of seasonable goods. Manufacturers generally report a good volume of business, and very many are behind their orders. Collections, except in some localities, are fairly good.

Advices from Chicago.—The demand for Hardware is increasing steadily. Jobbers anticipate a very heavy April trade, looking for a great deal of business which is usually done in March, but which was checked this year on account of the prolongation of winter weather. Spring appears to have opened to stay, as over a week of mildness has now been experienced through the Northwest. The improved weather has brought with it a much better demand for Tin Plates, especially for ternes, as the construction of buildings is being vigorously pushed. Wire Cloth is exceedingly scarce, and is now held by jobbers at $1.40, with an advancing tendency. Stocks in Chicago are reported to be hardly equal to the wants of the city itself. The multitude of structures of all kinds now nearing completion on the World's Fair grounds and in the immediate vicinity has caused a very heavy demand for finishing Hardware, and many contractors are in straits because they cannot get supplies which they have deferred buying until they were actually needed.

Notes on Prices.

Cut Nails.—The demand for Cut Nails is being maintained extremely well, mills still quoting very generally $1.20 for carload lots at mill, although this price has been shaded in some instances. In New York the quotation is $1.40 for carload lots on dock and $1.60 from store.

Advices from Chicago.—Cut Steel Nails are slightly lower from factory, in sympathy with lower prices circulated by Wheeling makers, and can now be quoted at $1.35, Chicago. Manufacturers here are well supplied with orders for this month, but have deemed it wise to meet changing conditions elsewhere. Small lots from stock are selling at $1.50.

Wire Nails.—The manufacturers of Wire Nails held a meeting last week, at which it was decided to make an advance in the card rate to $1.55 f.o.b. at mill, with Cleveland as the point of equalization for the West and Pittsburgh for the East. This advance is smaller than was looked for at this time, and in view of the exceptionally strong position of this article it is not unlikely that another advance will be made before long. The demand continues very large. Small lots from store in New York are quoted at $1 80 to $1.85.

Advices from Chicago.—The Wire Nail manufacturers held a meeting in Cleveland last Thursday and advanced prices to $1.55, Cleveland and Pittsburgh. Reports made at the meeting showed an aggregate stock of only 100,000 kegs with contracts booked for over 400,000 and a good demand still coming in from large buyers. Conditions have seldom been so strongly in favor of the manufacturers. The advance made was very conservative under the circumstances. Reduced freight rates make the factory price equal to $1.67, Chicago, or only 3 cents advance. Another advance, however, is probable in the near future. Jobbers met on Monday and raised their prices to $1.75 for small lots and $1.70 for carloads. Those who persistently parted with their stock at very low prices, in competition with the manufacturers, now see the mistake they made.

Barb Wire.—The demand for Barb Wire continues good, and while there is no quotable change in prices a hardening tendency is noticed. We quote $2.45 @ $2 50 for Four Point Galvanized, in carload lots at mill. In New York the price is $2.65 @ $2.70 for carload lots on dock, and $2.70 @ $2.75 at store.

Advices from Chicago.—Barb Wire is in much stronger demand as the spring opens, and manufacturers expect shortly to have more business than they can well handle. Inquiries are coming in from all sections. Factory quotations are unchanged at $2.20 for painted and $2.60 galvanized, but it will not take much of an addition to the demand to push prices up. Jobbers quote small lots from stock at $2.30 and $2.70 respectively.

Rope.—During the past few days the fiber market has shown exceptional weakness. This is especially the case with

Sisal, and, though it has had as yet no appreciable effect on manufactured goods, it is thought that it may have very soon. New Zealand is of course in sympathy with Sisal, and should a decline in the latter be maintained New Zealand must follow. Quotations on Rope have so far been well maintained, and we have no change to note at the present writing.

Screws.—There are indications of a disposition on the part of some manufacturers of Wood Screws to be aggressive in seeking new customers, to whom they are offering unusual terms. This has caused a weakness in prices, and quotations are being made in some cases which are lower than any during the past few months.

Dickson Transom Lifters and Openers.—These goods are put on the market by the G. J. Dickson Mfg. Company, Albany, N. Y., W. H. Eckert, 18 Warren street, New York, agent. The self locking Transom Opener is sold at the following list, subject to a discount of 30 per cent.:

Bronzed Iron.

Diameter of rod.	Length of rod.	Length of arm.	Price each.	For extra length of rod per foot.	For extra length of arm per foot.
Inch.	Feet.	Feet.		Cents.	Cents.
3/8	2	1	$2.00	20	15
1/2	3	1	2.75	30	20
5/8	3	1	3.50	40	20

Nickel, brass, bronze and ebony plated, 70 per cent. more than bronzed iron.

Solid Bronze, Highly Polished.

Diameter of rod.	Length of rod.	Length of arm.	Price each.	For extra length of rod per foot.	For extra length of arm per foot.
Inch.	Feet.	Feet.		Cents.	Cents.
3/8	2	1	$5.00	55	40
1/2	3	1	6.50	75	55
5/8	3	1	8.00	$1.00	55

Solid brass, same price as bronze.
Old copper, antique bronze and antique brass, 20 per cent. more than bronze.
Oxidized silver, 50 per cent. more than bronze.

The Champion and Premier Transom Lifters, the Dickson Casement Adjuster and Springs for Transom Lifters are sold at a discount of 60 per cent. from the following lists:

Champion Transom Lifter.

Length.*	Diameter.	Bronzed iron. Price each.	Bronzed iron. Extra length.	Nickel plated. Price each.	Nickel plated. Extra length.
Feet.	Inch.				
3	1/4	$0.60	10 cents a foot	$2.30	30 cents a foot.
4	1/4	.70		2.60	
5	1/4	.80		2.90	
3	5/16	.95		2.85	
4	5-16	1.10	15 cents a foot.	3.30	45 cents a foot.
5	5-16	1.25		3.75	
6	5-16	1.40		4.20	
4	3/8	1.30		3.90	
5	3/8	1.50	20 cents a foot.	4.50	60 cents a foot
6	3/8	1.70		5.10	
7	3/8	1.90		5.70	
8	3/8	2.10		6.30	
6	1/2	2.55	30 cents a foot	7.65	90 cents a foot.
7	1/2	2.85		8.55	
8	1/2	3.15		9.45	

Solid Bronze Lifters, Highly Polished.

Length.*	Diameter.	Price each.	Extra length.
Feet.	Inch.		
3	1/4	$3.00	40 cents a foot.
4	1/4	3.40	
5	1/4	3.80	
3	5-16	3.80	60 cents a foot.
4	5-16	4.40	
5	5-16	5.00	
6	5-16	5.60	
4	3/8	5.20	80 cents a foot.
5	3/8	6.00	
6	3/8	6.80	
7	3/8	7.60	
8	3/8	8.40	
6	1/2	10.20	$1.20 a foot.
7	1/2	11.40	
8	1/2	12.60	

* Combined length of lifting rod and arm.
Bronze plated, brass plated and ebony plated, same price as nickel plated.
Solid brass, same price as solid bronze
Antique bronze or brass and old copper, 10 per cent. more than solid bronze.
Oxidized silver, 25 per cent. more than solid Bronze.

Premier Transom Lifter.

*Length.	Diameter.	Nickel plated. Price each.	Nickel plated. Extra length.	Solid bronze. Price each.	Solid bronze. Extra length.
Feet.	Inch.				
3	5-16	$4.35	45 cents a foot.	$5.30	60 cents a foot.
4	5-16	4.80		5.90	
5	5-16	5.25		6.50	
6	5-16	5.70		7.10	
4	3/8	5.40	60 cents a foot.	6.70	80 cents a foot.
5	3/8	6.00		7.50	
6	3/8	6.60		8.30	
7	3/8	7.20		9.10	
8	3/8	7.80		9.90	
6	1/2	9.15	90 cents a foot.	11.70	$1.20 a foot.
7	1/2	10.05		12.90	
8	1/2	10.95		14.10	

* Combined length of lifting rod and arm.
Bronze plated, brass plated and ebony plated, same price as nickel plated.
Solid brass, same price as solid bronze.
Antique bronze or brass and old copper, 10 per cent. more than solid bronze.
Oxidized silver, 25 per cent. more than solid bronze.

The Dickson Casement Adjuster.

Finish.	Diameter.	Length.	Price each.	For extra length per fifth.
	Inch	Inches.		
Bronzed iron.	5-16	10	$0.60	$0.05
	3/8	10	.75	.06
	1/2	10	1 00	.08
Nickel plate.	5-16	10	1 60	.08
	3/8	11	1 20	.10
	1/2	10	1.60	.14
Solid Bronze.	5-16	10	1 30	.11
	3/8	10	1 60	.11
	1/2	10	2 25	.20

Springs for Transom Lifters.

Size of rod.	Bronzed. Each.	Plated, any finish. Each.
1/4	$0 12	$0.24
5-16	.15	.30
3/8	.18	.36
1/2	.20	.40

Discount Sheet.—The Barnes Mfg. Company, Phœnix, N. Y., issue the following discount sheet, which applies to their 1893 catalogue and price-list. Terms, 30 days, f.o.b. factory:

	Discount. Per cent.
Phœnix Vises: All styles and sizes, including Case Assortments, Sample Blocks and Combination Pipe Jaws	33⅓
Pipe Vises	33⅓
Reinforced Bronze Metal Sash Chain	60&10
Reinforced Steel Sash Chain, either bright or copper finish	60&10&10
Victor Bronze Sash Chain	65
Victor Steel Sash Chain, either bright or copper finish	65&10
Sash Chain Fixtures	6
Plumbers' Chains—12 yard boxes or 500 feet reels; Basin, Wash Tray and Bathtub Chains; Brass Split Links; Brass Eight Hooks	New List 60
Lathe Dogs and Lathe Dog Wrench	50&10
Steel Machinists' Clamps	33⅓
Door Springs	33⅓
Door Stop and Holder	33⅓
Door Cheeks	33⅓
Barrel Trucks	40
Bench Anvils	50
Christmas Tree Holders	50
No. 1 Carpet Stretchers	40
Cork Presser	40
Mail Box No 1, with or without locks	33⅓
File Cards	33⅓
No. O Tack Hammers	40
Window Cleaners	40
Floor Scrubbers	50
Locking Chains	33⅓
Dog Leaders	40
Key Chains	40

The company issue under date March 9 a revised price-list of their Phœnix Plumbers' and Sash Chain.

Bright Wire Goods.—Prices in this line are irregular and competition is very sharp, resulting in lower quotations than have ever before been made.

Augers and Bits.—While manufacturers seem to be adhering strictly to their prices for Augers and Bits, many of the leading jobbers of the country show a disposition to undersell the manufacturers, and are quoting prices lower than the makers will sell at.

Shedder, Mane Comb and Sweat Scraper.—This article, which is manufactured by F. E. Kohler & Co., Canton, Ohio, is sold to the trade at $1.50 per dozen and $15 per gross.

Monarch Trouser Guard.—This article is put on the market by the Monarch Cycle Company, 42–52 North Halsted street, Chicago. It is sold to the trade at 75 cents per dozen.

Glass.—The local demand for Glass has shown no increase since our report last week, and while there is a moderate amount of Glass being sold, trade is far from being considered good. Factories continue to report no accumulation of desirable sizes in stock, with an increasing demand for their output. The capacity for producing American Glass at the present time is said to be the largest in the history of the Glass business in this country, the capacity now being equivalent to 1712 pots. Indications point to an increase in this number for next season. As this increase will largely arise from established concerns enlarging their plants, it would appear that makers familiar with the Glass business considered the outlook favorable for such extensions. Prices of American Glass remain unchanged as quoted. A committee from the National Window Glass Company held a conference on April 4 at Philadelphia with the New Jersey Glass manufacturers, with a view to getting them in the association, and the committee were expected to meet the New York importers of Glass in this city on the day following to come to some similar agreement with them. The New York French Window Glass Association agreed upon an advance in prices, to take effect April 3. The discount now in force is 75 and 10 and 5 per cent. from the French

list. While no official announcement has been made as to the plan adopted by which it is hoped to sustain prices, it is understood that a sum has been paid by each firm to the association which will be considered forfeited should prices be cut by any concern. The Plate Glass trade remains unchanged, the price and demand being satisfactory. The outlook for all branches of the Glass business is considered by those in the trade as encouraging, and the demand is expected to increase in the near future. We quote prices as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 60 and 2½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ₰ lb.	....	@	$0.03½
Rubber Shoes, in ton lots ₰ lb.	....	@	.03
Large Hose, ₰ ton	....	@	9.00
Wringer Rolls, ₰ lb	....	@	.04½
Wringer Wire Rolls, ₰ lb	.01	@	.02
Syringes, ₰ lb	....	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	₰ lb	9½¢
Light and Tinned Copper	₰ lb	8½¢
Heavy Brass	₰ lb	7¢
Light Brass	₰ lb	6¢
Lead	₰ lb	3½¢
Tea Lead	₰ lb	3½¢
Zinc	₰ lb	2¾¢
No. 1 Pewter	₰ lb	14¢
No. 2 Pewter	₰ lb	7¢
Wrought Scrap Iron	₰ gross ton,	$13.00
Heavy Cast Scrap	₰ gross ton,	9.00
Stove Plate Scrap	₰ gross ton,	6.00
Burnt Iron	₰ gross ton,	4.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York.

No. 1 White Rags	₰ lb		4	¢
No. 2 White Rags	₰ lb		3	¢
Mixed Rags	₰ lb	1½ @	1¾	¢
Blues and 3ds	₰ lb	1¾ @	2	¢
Hard Sized White Shavings	₰ lb	2¾ @	3	¢
No. 1 White Book Shavings	₰ lb	2½ @	2¾	¢
No. 2 White Book Shavings	₰ lb	1½ @	1¾	¢
Light Book Shavings	₰ lb	⅞ @	1	¢
No. 1 Mixed Shavings	₰ lb		1¼	¢
No. 2 Mixed Shavings	₰ lb	¾ @	⅞	¢
No. 1 Printed Books	₰ lb	1¾ @	1½	¢
Ordinary Mixed Books	₰ lb	¾ @	⅞	¢
Newspapers	₰ lb		½	¢
No. 1 Manila Paper	₰ lb	1½ @	1¾	¢
No. 2 Manila Paper	₰ lb	⅞ @	1	¢
Bogus Paper	₰ lb	¾ @	⅞	¢
Common Paper	₰ lb	⅝ @	¾	¢
Straw Chips	₰ lb	½ @	⅝	¢
Binders' Clippings	₰ lb	½ @	⅝	¢
Jute Butts	₰ lb		1¼	¢
No. 1 Jute Bagging	₰ lb	1¼ @	1½	¢
Mixed Bagging	₰ lb		1	¢
No. 2 Bagging	₰ lb		⅞	¢
Hemp Twine	₰ lb		2½	¢
Manila Rope	₰ lb		2¼	¢
Jute Rope	₰ lb	1½ @	2	¢
Mixed Rope	₰ lb	¾ @	⅞	¢

Trade Notes.

THE STANDARD STAMPING COMPANY, St. Louis, Mo., issue a 30-page illustrated price-list of Stamped, Pieced and Japanned Tinware of their manufacture, besides a variety of other goods that they handle. The first pages are devoted to Tin Plates and Sheet Metals and Tinners' Supplies. Then come Tinners' Tools and Machines, Milk Cans, Water Coolers, Oil Stoves, Oil Cans, Clothes Wringers, Plated Spoons, Bath Tubs, Wire Cages and a variety of other goods.

THE PROGRESSIVE tinware manufacturers, the Geuder & Paeschke Mfg. Company, Milwaukee, Wis., are evidently convinced that brevity is not only the soul of wit, but also of business. What they announce to the trade elsewhere in this issue is brief and to the point, and cannot fail to attract the attention of intending purchasers.

H. CLAYTON & CO., WM. VOGEL & BROS., selling agents, 37-47 South Ninth street, Brooklyn, N. Y., issue an illustrated price-list of patented specialties, including Sultana Sad Irons, Alcohol, Gas, Nursery and Volcano Stoves, Combination Stoves for gas or alcohol, Carpet Stretcher and Tack Holder combined, Fire-Place Hoods, Stove Pipe Shelves, Window Cleaners, &c.

A. B. FISHER, 385-387 Kent avenue, Brooklyn, N. Y., issues a catalogue and price-list of Culinary Brass Goods and Trimmings, including Gauge Faucets for coffee, tea and hot-water urns, coolers, refrigerators, &c. Urn Faucets, Side Handles for Urns, Knobs, Urn Feet, Milk and Liquor Faucets, Double-Acting Safety Valves, for preventing explosions or collapse of urns or boilers, Pipe Taps, &c.

WILLIAM VOGEL of William Vogel & Bros., manufacturers of Tinware, Brooklyn, N. Y., who left New York February 16, in search of rest and recreation, returned much pleased with his trip, April 5. He was accompanied by his wife and daughter, their journey extending as far West as California.

THE NATIONAL VAPOR STOVE & MFG. COMPANY, Cleveland, Ohio, make an announcement relating to the New Idea stove of their manufacture. They refer to its many excellent features and fredom from smell, either when in use or when extinguished. A picture of the stove is presented in the announcement and a list of wholesale agents given.

J. H. CORT & SON, 220 Water Street, New York City, are directing attention to the new style of hot plate with even top made in two sizes. An illustration in their advertisement shows the device.

THE CHEROKEE ZINC COMPANY were incorporated a few days since at St. Louis, Mo., with a capital stock of $300,000. We understand that the concern have acquired and consolidated a number of Zinc mining properties in Jasper County, Mo., the Joplin district, and smelters in Crawford and Cherokee Counties, Kan. They propose the further acquisition of properties, but at the time of writing, the details had not been made public. The capital stock is divided into 3000 shares, the bulk of which is held by Willard P. Heath, secretary and treasurer of the Kansas & Texas Coal Company.

AMONG recently authorized corporations in Illinois are the following: The American Car & Railway Construction Company at Chicago; capital stock, $1,200,000; for the manufacture of motors and locomotive engines, rolling-stock appliances and supplies for railways; incorporators, Watson Franter, William A. Conover and J. G. Wolfe. The Robinett Hydraulic Motor Company at Chicago; capital stock, $100,000; for the manufacture of hydraulic motors; incorporators, W. H. Robinett, C. W. Selfridge and George A. Masters Triumph Boiler Cleaner Company, at Chicago; capital stock, $30,000; for the manufacture of machinery; incoporators, Olin H. Johnson, George G. Williams and Fred. S. Benjamin. The Champion Self-Heating Sad Iron Company at Chicago; capital stock, $25,000; manufacture and sell sad irons; incorporators, Theodore Steuger, Thomas F. Powers and Harry F. Farnsworth. The Automatic Furnace Company, Chicago; capital stock, $50,000; incorporators, Charles F. Haines, C. S. Wallis and Charles M. Weaver. The American Smoke Preventer Company, Chicago; capital stock, $100,000; incorporators, William R. Mills, Charles Smith and Charles A. Pratt. American Steam Boiler Compound Company, Chicago; capital stock, $100,000; incorporators, William E. Deuer, William I. Cronin, Charles P. E. Dumas, Charles E. Coogan and James Young.

JAMES B. SCOTT & CO., Pittsburgh, Pa., favor us with several circulars and price lists that they are sending out. One relates to their steel roofing and siding, and they mention that a comparison of their price-list for 1893 shows a considerable reduction from last year's quotations, which is the result of careful calculation upon the basis of lowest cost and smallest margin of profit. Other circulars relate to Scott's Extra Coated Roofing Plate, and a circular of quotations on Sheet Iron is enclosed.

PATTERSON, GOTTFRIED & HUNTER, 146 to 150 Centre street, New York, have just issued a large catalogue, representing their stock of Machinery, Metals, Hardware, Tools and Supplies. The book is 10 x 13 inches in size, containing over 500 pages, substantially bound in cloth. Over 1,500 illustrations are shown, together with list prices and valuable tabulated matter; while the arrangement indicates much thought and labor. The index is very complete, occupying 20 pages near the front of the book. A careful study has been made of the requirements of machine shop, factory and mill, so that many goods not usually considered as belonging to these lines are now included. Many of the lists are given in a more compact form than heretofore, while others which were compiled separately are now grouped under one head. Descriptions in words have been so far as possible omitted, the dimensions and list prices being depended upon to give the necessary information, and the phrasing has been reduced to the utmost simplicity consistent with clearness and explicitness. A saving of space has resulted from omitting lengthy descriptions, and by throwing as far as possible, various tables into one, so that the book contains a large amount of matter, without giving the pages a crowded appearance. Among the goods listed, are Roll and Sheet Brass, Embossed Brass, Perforated Brass, Tin and Copper, Brazed Tubing, Wire, Steel, Screws, Bolts, Nuts, Nails, Tacks, Rivets and Burrs, Milling Cutters, Metal Saws, Gauges, Calipers, Steel Rules, Squares, Drills, Reamers, Taps, Dies, Screw Plates, Files, Checks, Wrenches, Clamps, Cutting-off Tools, Knurls, Mandrels, Dividers, Pliers, Vises, Chisels, Auger Bits, Carving Tools, Saws, Plumbs and Levels, Gas Burners, Measuring Tapes, Oilers, Fire Pots, Molders' Tools, Gas Blast Furnaces, Forges, Blowers, Lathes, Shapers, Shearing and Punching Machines, Grinding Machines, Pulleys, Gears, Belting, Brushes, Packing, Steam Gauges, Pipe and Fittings, Lanterns, Electrical Goods, Acids, &c. From the foregoing enumeration an idea of the range of the stock may be obtained.

THE CLINTON WIRE CLOTH COMPANY, Clinton, Mass., have a new mill in which they are putting looms for weaving Window Screen Cloth. The company have recently increased the force in the machine shop to upward of 30 men, who are now busily engaged in getting out the new looms. The estimated increase in production will exceed 10,000,000 square feet per annum. We are also advised that the Westinghouse Company of Boston are putting in the works two dynamos by which the seven mills will be equipped

with incandescent lights. The company are running double turn in several of their mills and on the fine weaving a very steady light is necessary, for if a wire breaks it must be seen instantly or the fabric weaving is liable to be ruined.

THE QUARTERLY ISSUE of the desk calendar of the Nubian Iron Enamel Company, Cragin, Ill., comes to hand, with the following sprightly introductory note by manager Chas. E. Bonnell: "When we last came to you with our New Year's Salutatory we were in the flush and heydey of the new year. '92 had been especially gracious, but since, we have been in sack-cloth and ashes, with the accent on *ashes;* we presume for appearance sake we should write in a lugubrious tone of voice, but we are naturally a sprightly and vivacious young thing, with a superabundance of animal spirits and we can't look blue; besides, the outfit was too small for us anyhow, and—well on the quiet, we were fully insured, but that, of course, is not the reason for our broad smiles and good appetite—it is because the 'still, small voice' whispers: 'Well done, good and faithful, &c.' you make *the best blacks on earth*, and that means—well, here's to you for the next three months." It evidently takes a good deal more than a mere fire to check the enterprise of this company.

AMONG THE ATTRACTIVE PUBLICATIONS for the present season is one issued by the Pope Mfg. Company, Boston, entitled "Out-Doors," a book of healthful pleasure. The work contains 77 pages, liberally illustrated, with articles on different sports by recognized authorities. Both covers are illustrated in colors representing some of the popular out-of-door recreations. The topics treated are Lawn Tennis, Yachting, Terrestrial Flight—Bicycling—Football, Baseball, Horsemanship, Health and Rowing, Recreation and Sport in Canoes. The advertising is all confined to a few pages at the back of the book.

NORTON EMERY WHEEL COMPANY, Worcester, Mass., have been allotted a space 37 x 10 at the World's Columbian Fair. The exhibit will be open on three sides, and will include various sizes and shapes of Emery Wheels and numerous Emery grinding machines in operation.

THE INLAND WHITE LEAD COMPANY, 149 and 151 Huron street, Chicago, have recently begun manufacturing operations outside of the combination. They will sell pure White Lead, White Primers and Putty in small lots to the Hardware and drug trade. Thos. S. Vaughan is president, and Benj. F. Hadduck is vice-president and treasurer.

EUGENE MUNSELL & CO., 218 Water street, New York, are increasing their facilities for manufacturing Micanite. It will be remembered this is a production for insulating purposes that is being largely used by electrical companies. By improved processes of manufacture waste mica, heretofore almost valueless, is being made into an endless number of forms and shapes, sheets that can be cut to size included. We are advised that orders are coming in very freely, and, while so far they have managed to execute them with reasonable promptness, they are being pushed to keep pace with the demand. Electricians have experimented with almost everything for this purpose, but have fallen back on mica, which for many uses has heretofore been unavailable on account of great cost.

THE DUBUQUE WHITE ENAMELING WORKS at Dubuque, Iowa, whose plant has been in course of erection for some months, turned out their first product on the 27th ult. It was pronounced of very high quality by those who had the privilege of examining it.

THE CLIFTON SPRINGS MFG. COMPANY, Clifton Springs, N. Y., are manufacturing an extensive line of Evan's anti-rusting Tinware and other Tinware specialties. Among these are included Pails, Sprinkling Pots, Dish Pans, Tea Kettles, Foot Baths, Toilet Sets, Chamber Pails, Commodes, Wash Boilers, Dippers, Cups, &c. They also make the Harland and Angle Faucet Oil Cans; Mrs. Van Deusen Cake Molds, Coffee Pots and Dinner Pails.

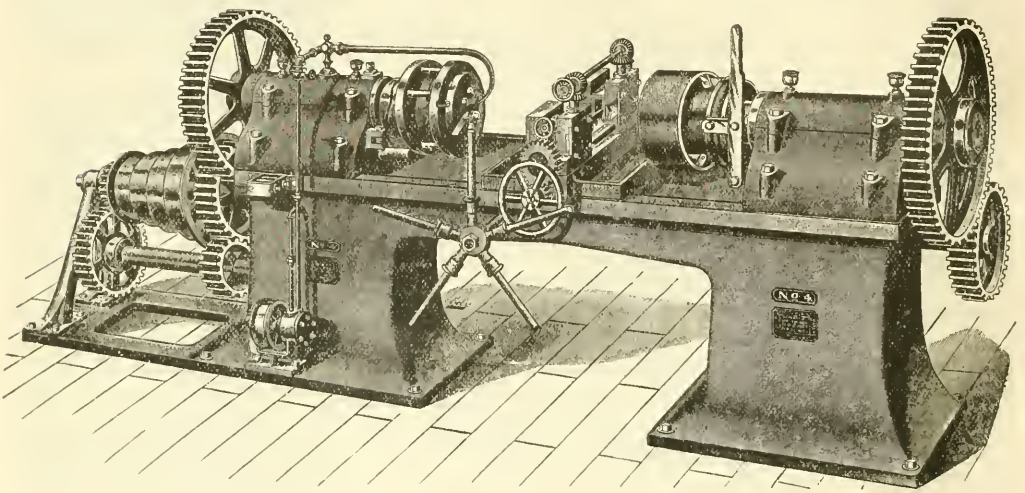
BELLAIRE STAMPING COMPANY, Harvey, Ill., are manufacturing a line of Columbian Enameled Steel Kitchen Ware, noticeable among which are tea and coffee pots. These are made with both tin and enameled covers. The enamel, it is remarked, differs slightly in appearance from other enameled ware on the market.

THE LONG ROOFING & CORRUGATING COMPANY, 416 East Ohio Street, Indianapolis, Ind., make an announcement elsewhere respecting corrugated standing seam and crimped steel roofings of their manufacture.

Capitol Pipe-Threading and Cutting-Off Machine.

The Capitol Mfg. Company of Chicago have made quite a radical departure from present methods employed in pipe-threading machinery, having adopted for this special service the methods used by them in threading and milling rods and bolts and cutting off iron and steel. Instead of revolving, the pipe being threaded, it is held stationary and the threading head, which contains the dies or chases, revolves. We have repeatedly referred to the principles involved in the design of the Adams automatic threading head, which the Capitol Mfg. Company used in their machinery. In this case it is simply larger in dimensions. It opens and closes automatically like the regular bolt-threading machinery made by the company.

By reference to the accompanying engraving, it will be observed that on the opposite end of the bed to the threading head is a chuck which grasps the pipe after the thread has been cut to proper length. One movement of the lever holds the pipe sufficiently well for cutting off purposes. The cutter itself is fastened in a holder which is located in the vise jaws on a carriage by the cutting head and the gripping chuck, as seen in the engraving.



THE CAPITOL PIPE-THREADING AND CUTTING-OFF MACHINE.

The cutter used for cutting off is a regular cutting-off lathe tool, while the vises on the carriage act as steady rests and are self-centering. The threading dies are flush with the head holding the same, and short pipe can be threaded on both ends its entire length. The cutting off tools can be moved to cut the pipe any desired length, and the machine can be used for both cutting off pipe into short or long lengths. The threading dies are just the same as those used on the Adams bolt thresding machines. They are durable and can be rebobbed several times.

Both spindles are hollow and are provided with collars on the inside to prevent the pipe from sagging or bending. The oil or lubricant required for threading purposes is held in the basin of the machine and is pumped by means of a rotary pump and used over and over again. The supply can be regulated to suit the requirements.

The machine takes up little room and

does the work quickly. The engraving represents the No. 4 machine with a capacity from ¼-inch to 4 inch pipe. The machines are made in all sizes up to 16 inches. The machine can also be used advantageously for threading and milling rods and bolts and for cutting of iron and steel.

Rubbing Out the Wrinkles.

Writing to *The Age of Steel*, Fred Woodrow says: It is a fad with many who are blessed with more birthdays than brains to spend money and time in rubbing out the wrinkles time has made on their would-be juvenile countenances. It is needless to say that a fool and his money soon part, and that the dream of returning youth is as artificial as the remedies that are bought with a dollar and repaid by repentance. What is true both of a fool and his face is equally so with others who, in other forms, attempt the same miracle. A man in business, for instance, engages in dishonest practices; it is policy, so he thinks, to do so. Others indulge in the same tricks, which, if successful, are rewarded by social distinction, and only in cases of failure are called by their proper names. There is no intention of perpetuating the larceny, the idea in nine cases out of ten being to retire into the shade with the stolen fruit and prepare for another world while masticating the plums obtained in this. The attempt is a failure. The evil has soaked into the bones and time has not enough of sarsaparilla to clean it out. The moral and mental nature are infected with the same disease, and the vice of trickery disguised under that modern heroic known as smartness, is a curse till death ends the comedy. The wrinkles refuse to be rubbed out.

Some men, born with a dry spot on their tongue which no success in life can irrigate, develop a spirit of selfishness that is supposably harmless and is no exception to the arid territory of his neighbors. It is not necessarily associated with dishonesty or any such vice as might be amenable to any law on the statute book. It commits no crimes in the domain of police authority or in reach of that scorching simoon known as public scandal. It simply locates everything worth having in its own vest. Its eye is keen and its throat of ample proportions, and sooner or later makes life a sponge that is never dry. A character made up of this absorbent is not easily changed. In a business sense it may or may not be a success, while in a character sense it is simply moral damnation. We have seen men of this formation in their later years endeavoring to change their habits as a youthful crab does its shell, but their fingers to the last struggled for the largest apple, and if they died in peace it was with the delusion of having a ticket for the softest seat in the invisible parlor. The wrinkle never rubbed out.

Some, and these are not in a minority, are simply indiscreet and careless. Prudence is a missing virtue. It has no place in their character. Their life alternates between the spring board and the penitent bench. They are tadpole and frog all their lives. In business their mistakes are as many as their opportunities, and each one of the continued series is interpolated with regrets and resolutions. The idea at the back of these errors is that in making a leap, if one lands in a mudhole a return jump will remedy the matter. The misfortune is that but few return tickets are issued on the other side. The losses that occur in business through this folly are by no means the smallest of its debits, nor is the evil at their root so rare as to need a Diogenes to find it. The spirit of recklessness and precipitation, though not exclusively, is yet characteristically, American. "Let her rip" is something more than a slang phrase, and is, in fact, a national motto. The results are weekly tabulated by Bradstreet or Dun, with not a few men in the country making more time than success in endeavoring to rub out the wrinkles.

The idea that the consequences of any folly can be changed as easily as a necktie is a grave delusion. With young men especially, who have teeth yet to grow and not a little to learn, the delusion is specially captivating. This or that habit is formed and this or that trait of character developed under the convenient or deceptive assumption that it can be as easily disposed of as an old glove or a hirsute bang. This is impossible. The evil cannot disappear in a sponge, or its consequences be averted by a resolution made on Sunday night. Character, whether noble or otherwise, is a growth and not a purchase. If this was considered as it ought to be, both in morals and in business, there would be fewer futile attempts at rubbing out the wrinkles.

NEW PUBLICATIONS.

FORTY-SECOND ANNUAL REPORT OF THE TRUSTEES OF THE SYRACUSE STATE INSTITUTION FOR FEEBLE-MINDED CHILDREN, for the year 1892. Albany. 1893.

The latest annual report of the beneficent institution at Syracuse which cares for the helpless and unteachable idiotic children of New York State shows that good work is being done in this direction. During the year 1892 541 children of this helpless class were sheltered in the asylum at a total cost of $92,635.64. Perhaps the most interesting feature of the present report is, however, the inquiry into the causes of typhoid fever, which has been epidemic in the institution during the three last years. The Syracuse Board of Health having discovered that the main sewer passed under the kitchens of certain of the buildings which were themselves pronounced unsafe, William Paul Gerhard, C.E., of New York was engaged to make an examination of the plumbing and sewerage systems; and his report occupies a large portion of the pamphlet. It was found that the pollution existed in two out of three wells which had been drilled in the grounds of the establishment after the city water had been pronounced contaminated, also that the sewerage system was imperfectly planned, and that the crude sewage was emptied directly into an adjoining creek, making its neighborhood quite unsanitary. Moreover, the storeroom and meat-room were exposed to the action of sewer air, which may have contaminated the food supply. The plumbing was, on the whole, found to be satisfactory and could not, in Mr. Gerhard's opinion, have contributed to the outbreak of typhoid fever. Since the inspection we learn that all Mr. Gerhard's recommendations for the alteration and removal of the probable causes of infection have been carried out.

According to a European exchange, a Frenchman, M. J. Novel, has invented a new process for soldering aluminum and other metals. The soldering material is stated to be very consistent and easily and quickly applied, while it leaves the metal uninjured. This solder is claimed to be cheaper than any material at present used for this purpose, and it possesses the advantages over acids and other substances of not oxidizing the metal and of being itself not liable to deterioration. It can also be used for coating aluminum, if necessary, and is capable of soldering the aluminum to either iron, tin, zinc, copper, steel, brass or nickel.

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See Standard Lists on Following Pages

CHICAGO, APRIL 6, 1893.

Tin—

Straits pigs.....23¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

	Per box.
IC, 10 x 14	@ $6.75
IC, 12 x 12	@ 6.75
IC, 14 x 20	@ 6.75
IC, 20 x 28	@ 13.50
IX, 10 x 14	@ 8.75
IX, 12 x 12	@ 8.75
IX, 14 x 20	@ 8.75
IX, 20 x 28	@ 17.50
DC, 12½ x 17	@ 6.50
DX, 12½ x 17	@ 8.50

Allaway Grade, IC, 10 x 14 @ 6.50
" IC, 12 x 12 @ 6.50
" IC, 14 x 20 @ 6.50
" IC, 20 x 28 @ 13.00
" IX, 14 x 20 @ 8.00
" IX, 20 x 28 @ 16.00

Coke Plates—Bright.

Per box.

Steel Coke—IC, 10x14, 14x20 @$6.00
IC, 14x20.90 lb. @ 5.75
IC, 14x20, 100 lb. @ 6.85
10 x 20 @ 9.00
20 x 28 @ 12.00
" IX, 10x14, 14 x 20 @ 7.50
BV Grade.—IC, 10x14, 14x20 @ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—
IC, 14 x 20 @ $5.62½
IC, 20 x 28 @ 11.25
IX, 20 x 28 @ 14.25

Worcester Brand and equal.—
IC, 14 x 20.. @ 6.12½
IC, 20 x 28..12.25 @
IX, 14 x 20.. 7.62½
20 x 28..16.25 @

American Tin Plates.

Charcoal Plates.—Bright.

Irondale, A, A.—IC, 14 x 20 $7.00
" " IX, 14 x 20 9.00
" " IXX, 14 x 20 11.00
" " IC, 20 x 28 14.00
" " IX, 20 x 28 18.00
" " IXX, 20 x 28 22.00

Florence.—
IC, 10 x 14, 12 x 12, 14 x 20..$0.75
IX, 10 x 14, 12 x 12, 14 x 20.. 8.75

Palma.—
IC, 10 x 14, 12 x 12, 14 x 20..$7.50
IX, 10 x 14, 12 x 12, 14 x 20.. 9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, Tissue Packed, IC, 14 x 20 $9.25
Royal, extra, IC, 14 x 20 7.25
Merlon, IC, 14 x 20 7.00
Almond, IC, 14 x 20 6.50
Mint, IC, 14 x 20 0.25

Coke Plates.—Bright.

Elwood.—IC, 14 x 20 $9.00
" IC, 20 x 28 12.50

Roofing Plates.

Arch (205 lb), 20 x 28 @$11.75
Prime (225 lb), 20 x 28 @ 12.60
Crescent, IC, 20 x 28 @ 12.60
Crescent, IX, 20 x 28 @ 15.75
Empire, IC, 20 x 28 12.75
" IX, 20 x 28 @16.00
Hickory, IC, 20 x 28 @ 13.00
" IX, 20 x 28 @ 16.10
Alaska (heavily coated), IC, 20x28 @$14.50
Alaska IX, 20 x 28 @ 17.75
Special, IC, 20 x 28 @ 15.00
" IX, 20 x 28 @ 18.25
Merchant's Roofing (extra coated), IC, 20 x 28 @$17.75
Merchant's Roofing (extra coated), IX, 20 x 28 @$21.50
Merchant's Old Method (extra heavily coated), IC, 20 x 28 @$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28 $23.00
Irondale A:
IC, 14 x 20 $6.25
IX, 14 x 20 7.75
IC, 20 x 28 12.50
IX, 20 x 28 15.50
Kensington:
IC, 14 x 20 $6.75
IC, 20 x 28 13.50
IX, 14 x 20 8.00
IX, 20 x 28 16.00
Queensborland:
IC, 14 x 20 $6.25
IC, 20 x 28 12.50
Juno:
IC, 14 x 20 $5.75
IC, 20 x 28 11.50
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20 $8.50
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20 11.00
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28 19.00
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28 22.00
Neville, Stamped, IC, 14 x 20 6.25
" " IX, 14 x 20 7.50
" " IC, 20 x 28 12.50
" " IX, 20 x 28 15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared) $9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared) 19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared) 8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared) 16.50
Columbia, IC, 14 x 20 (Stamped) 7.25
" IC, 20 x 28 (Stamped) 14.50
Maple, IC, 14 x 20 (Stamped) 6.75
IC, 20 x 28 (Stamped) 13.50
Willow, IC, 14 x 20 6.25
" IC, 20 x 28 12.50
Knoxall, IC, 14 x 20 6.00
" IC, 20 x 28 12.00
Globe, IC, 14 x 20 5.75
" IC, 20 x 28 11.50
Mimmi, IC, 14 x 20 6.00
" IC, 20 x 28 12.00
" IC, 20 x 28 15.00
" (Redipped), IC, 20 x 28 17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50

	Per box of 56 sheets.
X, 14 x 56	16.50
XX, 14 x 56	18.20
X, 14 x 60	17.65
XX, 14 x 60	20.90

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 16	℔ lb 2 7-10¢	3 3-10¢
17 to 20	℔ lb 2 8-10¢	3 4-10¢
21 to 24	℔ lb 2 9-10¢	3⅜¢
25 and 26	℔ lb 3¢	3 6-10¢
27	℔ lb 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Fateot Planished....℔ lb A, 10¾¢; B, 9¾¢
dis. 5%
Craig Polished Sheet Steel.....℔ lb 8¾¢

Galvanized.

List on following page.
Juniata or first quality.....dis. 70&2½%

Copper—

Ingot.

Lake.....13¢ @ 13¼¢
Casting Brands.....12¢ @ 12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.

Copper, Bronze and Gilding Tube, 3¢ ℔ lb additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to theabove prices, or ℔ 100 lb.

Above 5-16 inch to 3 inch inclu...	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ¼ inch	55¢
Plain, 3-16 inch	$1.00
Plain, ⅛ inch	$1.50
Fancy Tubing, Brass, to No. 20 inch	43¢ lb
Bronze Tubing, 3¢ ℔ lb more than Brass.	

35 @ 40%

Roll and Sheet Brass.

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 lb casks.....6¼¢
Less than Casks, ℔ lb.....7¢

Lead—

Soft Pig Lead.....4¢
Bar.....3½¢@5¢
Pipe.....5½¢, dis. 10%
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10%

Solder—

½&½.....13¼¢@13¾¢
Extra Wiplog.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....13¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain	60&10%
1¼ and under, Galv	52½&10%
1¼ and over, Plain	70&10%
1¼ and over, Galv	60&10%
Boiler Tubes, list Oct. 24, 1892	70%
Casing, list Nov. 16, 1892	62½%
Inserted Joints Casing, list Nov. 16, 1892	47½%
Steel Boiler Tubes	27½%
Cold Drawn Seamless Steel Tubing	60%

Cast-Iron Soil Pipe—

Cast-Iron Soil Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted....55%
Austin's Corrugated.....60%
Gordon & Glibert's Corrugated.....65%
Ritchie's (Galv. Iron only) Cor'd.....65%
Ritchie's Spiral Lock Seam, Galv'd....60%
Austin's Spiral Ribbed Pipe.....65%
Plain Adjustable Elbows.....60%
James A. Miller Bros. (Galv'd Iron only) Corrugated.....55%

Furnace Fittings—

Discount from Excelsior Steel Furnace Co's list.....50%

Steel Roofing—

Perfection.....$3.75 square
Climax.....$3.60 square
The Lloyd Spanish Tiling....$1.50 square

Metallic Shingles—

Cushlan 1.....$1.25 square
Merchant & Co.'s Spanish Tiles:
Copper, 14 oz.....$36.00 square
Steel, painted.....$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine.....7½@8 ¢
Iron Paints, Bright Red.....℔ lb, 2 ¢
" " Brown.....℔ lb, 1½¢
" " Purple.....℔ lb, 2½¢
" " Ground in oil, B. Red ℔ lb, 6½¢
" " Ground in oil, Red..℔ lb, 6½¢
" " Ground in oil, Brown ℔ lb, 5½¢
" " Ground in oil, Purple ℔ lb, 6 ¢
Linseed Oil, Boiled, in bbls.....53¢
Linseed Oil, Raw, in bbls.....50¢
Mineral Paints.....2@4¢
Orange Mineral.....10¼¢
Pure White Lead in Oil.....6¾@7¼¢
Dry White Lead in bbls.....6½@6¾¢
Red Lead, American in oil.....7@7½¢
Red Venetian, English, dry...$1.65@$1.70
Red Venetian in oil; asst'd cans, 8¼¢; kegs.....7¼¢
Slpe's Japan Oil, in bbls, ℔ gal.....34¢
Spirits Turpentine, in bbls., ℔ gal..37½¢
Asphaltum, Trinidad Refined, ℔ ton..$15
Coal Tar, Felt, 1 Ply, ℔ 100 lb.....$1.05
Coal Tar, Felt, 2 Ply, ℔ roll 108 sq. feet.....$1.50
Coal Tar, Felt, 3 Ply, ℔ roll of 108 sq. feet.....$2.00
Roofing Pitch, ℔ bbl. of 300 lb.....$3.20

NEW YORK, APRIL 7, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots..℔ lb, $0.75
No 1 guaranteed to be 98 % pure and over, in ton lots.....℔ lb .90
Lots less than 1 ton, 10¢ ℔ lb additional.

Antimony—

Cookson.....℔ lb, 12¢
Hallett's.....℔ lb, 10½@10¾¢

Brass—

Planished—

List on following page.....net

Roll and Sheet—

List on following page.....35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per lb.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above 3 inch	45
Plain, 5-16 inch to No. 20	45
Plain, ¼ inch	60
Plain, ⅜ inch	1.00
Plain, ½ inch	1.50
Fancy Tubing to No. 20, inclu	43

35&40%

Copper and Bronze Tubing—

3¢ ℔ lb more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c.

Over ¼ to 3½ inches inclusive....17¢ ℔ lb
Over 3½ to 5 inches inclusive....18¢ ℔ lb

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ lb
Over 3½ to 5 inche inclusive.....19¢ ℔ lb

Clips—

Tinned Copper Nos. 1, $1.25 per 100 to 1 doz. 10&10%

Conductors

Corrugated. *Round or Square.*

List on following page.

Galvanized	60%
Galvanized, Locked Joints	50%
Tin	40%

Spiral Riveted—

List on following page.

Galvanized	50

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.

List on following page.....15@25%

Ingot.

Lake.....12½¢
Ansonia Grade Arizona.....12¢
Ansonia Grade Casting.....11¾

Planished.

List on following page.....net

Sheet and Bolt.

List on following page.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See Irons, Soldering, in Current Hardware Prices.

Damper Clips Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

List on following page.
Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

List on following page.
Lap or Slip Joint.....list, net

Elbows—

List on following page.

Plain Adjustable

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four Piece

3	4	5	6	7 inch.
$0.75	.85	.90	1.05	1.20 per doz..20 %

Elbows and Shoes

List on following page.

Flat Crimp.

Tin.....35%
Galvanized.....35%

Corruzated. *Flat Crimp.*

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—

Black.

	Common American.	R. G. Cleaned American.
Nos. 10 to 16	℔ lb, 2 ¼@—	3¾¢
Nos. 17 to 20	℔ lb, 3 @ —	3¾¢
Nos. 21 to 24	℔ lb, 3¼@—	3¾¢
Nos. 25 and 26	℔ lb, 3¾@—	3¾¢
No. 27	℔ lb, 3¾@—	3¾¢
No. 28	℔ lb, 3¾@—	4¼¢
American B. B.	℔ lb, 4¼@4½¢	

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ lb, 12@13¢
Patent Planished....℔ lb, A, 10¢; B, 9¢, 6%
Craig Polished Sheet.....℔ lb, 8¾¢

Galvanized.

	R. R.
Nos. 10 to 16	℔ lb, 4 2-10¢
Nos. 17 to 22	℔ lb, 4¼¢
Nos. 23 to 24	℔ lb, 4¾¢
Nos. 25 to 26	℔ lb, 5¢
No. 27	℔ lb, 5¼¢
No. 28	℔ lb, 5¾¢
Nos. 29 and 30	℔ lb, 6¾¢

Filter Joints—

List on following page.
Lee's.....33¾%

Lead—

American Pig.....4¼¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....15¢, 20%
Block Tin Pipe.....37½%, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ lb.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ lb, .05¢, 10&5%
Sheet Lead in whole coils, ℔ lb, .05½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Door Mats, Galvanized	25%
Window Guards, Paneled	15%
Tree Guards, Paneled	15%

Mitres, Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.—

Lead, Ann. White, Dry or in oil:
Kegs, lots less than 500 lb.... 7 @ 7¼¢
Kegs, 1 to 5 tons to 5 tons.....6¾ @ 6¾¢
Kegs, lots 5 tons to 12 tons...6¼ @ 6¾¢
Kegs, lots 12 tons and over..6¼ @ 6¾¢
Lead, White, in oil, 25 lb tin pails, add to keg price.....@ ¼
Lead, White, in oil, 12½ lb tin pails, add to keg price.....@ 1
Lead, Red, bbls. and ½ bbls..6 @ 7
Lead, Red, kegs.....6¼ @ 7¼
Ocher, American.....½ @ 1¾
Red, Venetian, American.....℔ 100 lb..1.00 @ 1.10

Linseed Oil:
City, raw, ℔ gal.....@ .50
City, boiled.....@ .53
Western, raw.....@ .50

Spirits Turpentine:
In regular bbls.....@ .34½
In machine bbls.....@ .35

Putty:
In barrels and ½ bbls.....01¾ @ .01¾
In tubs.....01¾ @ .01¾
In tin cans.....01¾ @ .02¾
In bladders.....01¾ @ .02¼

Roofing Material, &c.:
Asphaltum, Trinidad Refined, ℔ ton.....$30.00@$36.00
Asphaltum, Gilsonite, ℔ ton.....$14.00
Coal Tar Felt, 1 Ply, ℔ ft.....2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft. $1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft. $1.85
Roofing Pitch, ℔ bbl.....$2.24

Pipe, Drain—

List on following page.....50%

Pipe and Fittings, Cast Iron Soil—

List on following page.
Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive.....dis 60&10%
Other sizes.....dis 55&5&10%
Cast Iron Fittings, Tarred, sizes 2 to 6 inches.....dis 50&10%
Other sizes.....dis 55&5&10%

Pipe, Spiral—

List on following page.
Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

List on following page.
For discounts see Current Hardware Prices.

Rivets and Burrs—

List on following pages.
For discounts see Current Hardware Prices.

THE METAL WORKER

NEW YORK AND CHICAGO.

Saturday, April 15, 1893.

DAVID WILLIAMS, - PUBLISHER

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CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....312 The Cuyahoga

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Trade Education for Young Plumbers.

It is an encouraging sign of the times to note how employers of skilled labor are turning their attention to the advantage of trade or technical education for the young mechanic of the present, so that he may in the future be in a position to come up to the progressive requirements of the age. Within the past few weeks several of our correspondents, notably those engaged in the plumbing and tinning trades, have been deploring the existing tendency to neglect the helper (the plumber or the tinner of the future) and allow him to pick up his trade as best he may without much, if, indeed, any assistance from either the foreman or the master. The existence of this interest in the young mechanic of the period is largely due to the action of Col. R. T. Auchmuty in founding the New York Trade Schools 12 years ago. While technical or theoretical education is of great value to members of every trade, it is indispensable to the boy or young man who adopts the plumbing trade as his life-work, because of the responsibility which it will bring in the future. The health of the community depends so largely on the sanitary condition of our homes—for which the plumbing work is largely responsible—that the coming plumber will be held to a strict accountability for the results of his work. In order to provide worthy successors in this important field of duty, the plumber of the present should take time by the forelock, and adopt some means of imparting necessary information to those under him as to the "why and wherefore" of plumbing, the theory on which it rests, and the operations of natural laws with which its work should be in harmony. It should be stated that a large proportion of the prominent master plumbers of the country have been won over to the cause of technical or trade educa ion, and that in certain of the large cities the establishment of the trade school is an accomplished fact. But outside of these centers of industrial progress, the plumbers' helper—sometimes called, by courtesy, the "apprentice"—is, for the most part, practically outside the pale of trade sympathy, and is considered in the shop as of no practical account beyond what work may be got out of him.

The Master Plumber as an Educator.

It may be in order just here to inquire how the plumber's helper is expected to get a knowledge of the trade which he hopes one day to follow. It is a settled thing that a boy must be at least 16 years of age before he becomes a plumber's helper. He is expected to "carry the bag" for the journeyman, to do all sorts of errands and be the drudge of the establishment. If he is bright he may pick up some knowledge of how to do things, but why they should be done in that particular manner and what the consequences would be if done otherwise he has to find out as best he can. When four or five years of this sort of work is completed the boy, now come to man's estate, gets his "tools" and takes rank as a journeyman, with little knowledge to fit him for properly undertaking a job of plumbing work beyond the merely mechanical part, proficiency in which, according to his conception of the term, makes him what is known as a "practical plumber." The trade school, where available, supplies the remedy for this state of things, but unfortunately at the present time the scope of that useful institution is, as already stated, limited to a few cities, and the aspiring young mechanic located elsewhere is left to circumstance to acquire the needed information. This is where the opportunity for the master plumber comes in, and it should, in the interest of the trade and the community, be utilized. There should be no better plan for making a good plumber out of a young man than working in the shop or on a job during the day, and doing some study at night which would make plain the work of the day. The master plumber should aid his young men in this work and as far as possible encourage it. The supply of useful elementary books would be of comparatively trifling cost to him but would be of immense benefit to his employees, and the display of even a moderate amount of interest in their advancement would bring its recompense in a closer attention to the work intrusted to them and a greater ability to perform it properly.

Wages and Expenses in America and Europe.

An interesting light is thrown on the question, as to whether the workingman in the United States is in the end better off financially than his European compeer, in a recent report laid before the Royal Commission on Labor by the British Foreign Office. The report deals very comprehensively with the industrial conditions obtaining in the United States, as compared with those in Great Britain and Belgium, and shows the relative wages earned, together with the cost of living in the three countries. The data presented having been presumably gleaned from reliable sources, a brief review of the figures and facts brought out in the document in question will be interesting and instructive, in view of the misapprehensions which exist in regard to the question. Iron and steel workers were selected as a fair average class, which in all three countries possess the status of skilled workmen. From the statistics offered, it appears that the average yearly income of an American employed in the iron and steel industries is $513.52, while that of a family in the same line—that is, in a case where a man is assisted by his wife or one child, the income is slightly larger, namely, $591.61. In Great Britain a family income in the same trade averages $456.86, while in Belgium it is only $374.53. To offset this, however, some living expenses in the United States are greater than they are in Europe. House rent, for example, averages $65.02, as against $38.35 in Great Britain and $31.72 in Belgium. Taxes and subscriptions to labor organizations cost more than they do in Europe.

Comparative Cost of Necessaries.

The outlay for food in this country is not quite so disproportionate, but it is, nevertheless, greater than in Europe. Each family of iron workers in the United States spends on an average $243.65 annually in nourishment, while on the other side of the Atlantic the average expenditure on this account is $222.52. The quantity and quality of the food obtained in this country is, however, probably much superior to that used by the European workman and his family. In other words, the American artisan lives better than his fellow in England or Belgium. The average expenditure under the head of intoxicating liquors by a workman's family in New York is $35.14, being a fair medium between $61.73 in Illinois and $8.08 in Virginia; while the drink bill of an English workman's family averages $21.86, and that of a Belgian, $9.66. The American workman spends less on amusements than does his European contemporary, while the annual expenditure for books and newspapers is about the same in America and England. To sum up, the average excess of income over expenditure of 511 families in the United States was $99.23, while the average deficit of 1249 families was $64.75. In Great Britain the average surplus of a number of families was $47.02, while in Belgium it was $22.24. On the whole, the statistics presented about point to the conclusion that, although British and Belgian iron workers have some advantages in the matter of cheap living, these do not by any means counterbalance the higher wages earned by similar craftsmen in the United States.

Steam Specialties.

Nothing indicates the inventive character of the age more than numerous contrivances designed to reduce the labor of attendance upon steam boilers, whether

used for power or for heating purposes. A great many instances of a double use of steam boilers, both for power and heating, now exist wherein the exhaust steam, after having developed power in an engine, is utilized for heating. Even where condensers are employed a double use of the same boiler for heating and power is occasionally met with, either high-pressure steam being directly used in coils or radiators, or live steam reduced to a pressure much lower than that used in the boiler, through the aid of a pressure-reducing appliance.

Wearing Out and Rusting Out.

Every one is familiar with rust and knows that it puts in its work quietly and often when the substance affected is not in use. Many people who have hot air furnaces need to be told that the spring is the time to take down the smoke pipe, clean it thoroughly and put it away until fires are wanted in the fall. While it is connected with the chimney flue the dampness collects and corrodes the inner surface and the old accumulation of soot is kept damp and destructive. This work must be done once each year any way to save the corrosion of five or six months of time when it is out of use and when the injury is greatest. Stoves and pipe are getting their worst wear also in the idle season and need to be wiped over with an oiled cloth and put in dry places. The wash boiler rusts out in the time it is out of use, if not thoroughly dried. Cutlery should be carefully wiped with a chamois as often as it is handled, and so on to the end with all goods that have polished surfaces. Nickel plate on stoves is easily kept bright if often wiped off and not allowed to corrode. The tin roof is not injured during a rain storm and should be painted as often as it becomes bare in spots. In the tin shop, the tools brought in after use outside in wet weather should be carefully cleaned and then a square will show its figures—as many do not—and the other hand tools will do their work easier and better. If it is inevitable that a man rusts out by idleness sooner than by wear, it is equally true of many articles?

A Western Foundrymen's Association.

We have been requested by prominent Western foundrymen, says *The Iron Age*, to assist in the development of a sentiment favorable to the establishment of a foundrymen's association at Chicago. The request is one with which we do not find it difficult to comply. There is no reason why a good strong organization of foundrymen should not be established in the West. The manufacture of castings for all purposes has grown there to immense proportions, the growth having been especially rapid in recent years. This has made the Western foundry interest numerically large. The scope of the work done is equal to that of the older sections of the country, and in some respects the practice is in advance of that obtaining elsewhere. The West is unconventional in almost everything, and hard and fast rules are not there regarded with the reverence displayed in too many old manufacturing localities. New methods are tried in foundries, and results are often accomplished which startle a hard-headed veteran who thinks he learned it all 40 years ago. At one time there was much criticism of Western work, which was strong enough and answered the purpose but lacked the smooth finish, the careful fitting and the general nicety found in castings turned out by crack Eastern concerns. This was, of course, due to the push and haste, so characteristic of Western life generally, when time was deemed too precious to be wasted in mere frills and furbelows. A change has been made in this respect as in others, and increasing attention is constantly being paid to the details which were once so neglected.

The most progressive foundrymen are among those who are most in favor of an association which shall have for its main object the improvement of foundry methods, to be attained through the mutual interchange of practical ideas. It is thought also that the commercial side of the business need not be neglected, but that more intimate acquaintance and better comprehension of trade conditions would prevent much of the very severe competition which almost wipes out the last vestige of profits. An association of this character could not regulate prices, as that would be wholly outside of its province, but a salutary effect might be exercised in the direction of conservatism. A room in some central location, open daily for the use of members, would be found a great convenience, the value of which would steadily appreciate.

The question naturally occurs: Would not such an association prove of value in the case of wages disputes? Experience teaches that the two cannot be well combined; that an association for the improvement of its members should have nothing to do with the settlement of labor troubles. It should be purely technical or educational, with regular meetings for the reading and discussion of papers or for reports of committees appointed to conduct tests or investigate new methods. The consideration of wages or other questions directly connected with the regulation of employees should be left to individual manufacturers or else should be taken up by a special organization for that purpose and for no other. The stove manufacturers arrange their affairs in this way, having found it vastly more satisfactory to handle strikes by means of a special organization than through a general association. One great objection to the latter is that many manufacturers prefer to adjust their own labor troubles and will have nothing to do with an association that assumes to take cognizance of such matters. A technical society should therefore be free from such entanglements.

We would suggest to those desirous of forming a Western Foundrymen's Association that reams of paper can be consumed in advocating it and yet no practical results be attained. The plan to be pursued is for a few prominent manufacturers to get together and issue a call to their fellow foundrymen to attend a meeting at a given time and place for the purpose of forming an association. If to such a beginning can be added the selection of a live, well-informed, and above all thoroughly-qualified foundryman as secretary, who will at least for a time furnish lots of practical ideas evoking interesting discussions which will attract a good attendance at the meetings, an association can be started that will be a credit to the men who mold iron in the West.

The Boss's Lament.

BY TINK.

Oh, what has become of the tinner of yore
Who learned his trade up over the store?
Who worked for the boss with interest and love,
Did the chores at the house as a part of the trade,
And took pride in seeing that things were well made,
And with his three years of apprenticeship passed
Sought a job as a jour., and could work very fast;
Took pride in seeing six dozen pans nest,
Could raise a tin cover, or teakettle breast,
Would whistle and sing as he soldered the seams
In pans, kettles and boilers, and all such things;
And when sent on a job would strike a good gait,
And took extra care to never be late,
But at seven o'clock would off with his coat
And go at his work as though work was a joke.
I'm afraid he is dead, in fact I'm quite sure
That his place is now filled by a new-fashioned jour.,
One who worked six months and finished his trade,
Then travels on cheek from one town to another,
Laying tin here and there, and don't care which or tother,
Can't make a tin cup water-tight if he tries,
Only puts in his time till the ten hours are spent,
And leaves for the next town with nary a cent.

What Shape Should Chimneys Be?

The same query applies to hot-air flues as well, and it was put and answered very positively by a man of a wide and successful experience as follows:

"Having an idea that it was not all uphill work in a chimney I concluded to investigate the operation of the one in my house to see if there was any down currents in it, as I had heard frequently asserted. I took light tissue paper and made some small light balls of it. I was particular not to crush them tight and make them heavy, and also was careful to keep them round. With these I went to the top, and balls that were dropped into the center of the chimney were invariably blown out. Those dropped into the corners in a majority of cases went to the bottom, where I found them on taking out the pipe to look for them. Those that did not go down I think struck some projection and were thrown into the central up current and blown out. This settled in my mind that rectangular flues were wrong, and while the area of a round flue of the same diameter might be less it was equal in air-carrying capacity, as it had only one up pressure, with no corners for friction and tendency toward a vacuum. This led me to making the ends of my partition hot-air flues round, and while they are easier to make and cheaper they are equally as effective as if they had square corners, satisfying me that all flues should be round."

From another equally experienced source this idea has been expressed:

"I believe that in two houses of exactly the same build and exposure, except that one has partition flues for heating and the other round flues of liberal capacity, the house with the round flues can be heated satisfactorily for the six months necessary with at least a ton of coal less, and possibly with a 32-inch portable furnace where the other house would not be as comfortably warmed with a 36-inch furnace of the same make using the extra ton of coal and possibly more."

These views of practical and experienced men on a subject of so much interest to the trade open up a question that might be discussed with advantage.

THE LETTER BOX.

Better Education of Tinners' Apprentices.

From M. C., *Spokane, Wash.*—In *The Metal Worker* of March 25, "J. D." St. Louis, Mo., says he finds it impossible to obtain a tinner who understands his business. Perhaps "J. D." is an exceptionally fine mechanic and very set in his ways, and would find fault even with the man who had taught him the trade (if he is a mechanic) because he did not happen to know how to do something which "J. D." has learned since. On the other hand, he may expect to obtain a first-class mechanic for a mere song—and sing the song himself. I think good mechanics are to be had if "J. D." will pay good wages; I will warrant that he will not have to go out of his city to find competent men and as many as he wants, if he will pay 25 cents per day above the regular standard wages and use a man civilly.

The Metal Worker says that there is a general complaint coming from business men of the West, because of the lack of good, competent mechanics. I would like to know from what part of the West these communications come. I am inclined to think they come from Dakota, Iowa, Kansas, Missouri and Texas. I cannot see where else they can come from. I have been a reader of your paper for the past eight years, and during that time I have read of very few people in Montana, Washington, Idaho, Oregon, California, Utah or Colorado who wanted good mechanics. Perhaps they are dissatisfied with their men and are laying wires for a good supply. At any rate, they say nothing here about being dissatisfied. I would suggest that your correspondent try paying more money and then good mechanics will not be so apt to move to some State where they pay higher wages. I do not deny that there is room for vast improvement in our line of business by most of us; yet I think there are a good many good mechanics on earth. It requires a good deal of time and study to be master of as many trades as some people who use your want columns seem to think a tinner should possess. Here is an example: "Wanted. A tinner who can do plumbing, steam and hot water heating, also stray jobs of gas fitting and put in electric bells, put up wind mills, and during harvest go out and run a self-binder and explain all its mysteries. Will pay $9 a week to good man." Is it any wonder that good men who understand their business are scarce?

New Roof Over Old Roof.

From R. J., *Pulaski, Va.*—Will you kindly advise me in the following case: There is a flat-seam roof which has worn out and I am to re-cover the building with a standing-seam roof. It has a fall of 1½ inches to the foot. Would it be advisable to cover over the old tin or take it off.

Answer.—It is best to take off the old roof as the new tin can be laid faster and better, beside none of the seams or lumps in the old roof will remain to make trouble in the new roof if it is walked over, nor will there be nearly so much condensation as there would be between them if the old one remained. If two thicknesses of roofing felt were laid over the old roof before putting on the new the objections stated would be overcome. We have in mind a roof laid 14 years ago where the new roof was put on over an old standing-seam roof, the seams being flattened down and paper used between, which is still in good condition.

Making Solder Drops.

From OLD TIMER.—I send you a sketch, Fig. 1, of the way I make solder drops for soldering where it is not convenient to use a bar, or to take up the solder on the

Making Solder Drops.—Fig. 1.—Pouring the Solder.

copper. There is no secret about it, and many of your readers have made them, I presume, but others may not have known of this simple and quick way. Melt the solder in a ladle and pour a fine stream from the sharp lip into a pail of water. The solder must not be over hot, and the size of the stream will determine the size

Fig. 2.—Solder Drops, Full Size.

of the drops. Hold the ladle about 6 inches above the water, and it will at once be seen in pouring if all is right. The shape is oblong, and pointed at the ends, as in Fig. 2, and the drops lay much closer in corners on work than those made from the point of a copper, while the process is ten times faster.

Sweating Roof.

From J. H. W., *Williamsport, Pa.*—In reply to "G. W. B.," Newville, Pa., whose inquiry appeared in *The Metal Worker* of March 11, I presume the tin he speaks of is on the lower part of the roof or near the drip, and the iron roof is next and runs up to the highest point. I also assume that the ceiling below is plastered and that the space between the ceiling and roof is air-tight. If these are the conditions I would advise "G. W. B." to cut one or more holes in the highest part of the roof, say 8 inches in diameter, and put in a galvanized iron pipe with a hood on top, fastening it to the roof. The pipe need not be longer than 12 inches, so as to keep out the snow. There should be one pipe to every 20 feet square of roof, and I feel sure that the trouble will cease as soon as it is done; at least this is my experience in similar cases.

The cause of a roof sweating is the extreme cold outside and the pent-up air between the joists and rafters becomes warm, and coming in contact with the cold metal it condenses the moisture, which begins to drop down.

Does It Pay to Do Good Work?

From J. T. H., *Washington, D. C.*—"They have no incentives to push them on, and consequently are content to remain as helpers." The above is the conclusion of an article in the Letter Box department in *The Metal Worker*, March 25, and I would like to see the employers and employees discuss the matter, so that we may see if it has not a wider application than to the boys who are learning the trade. There are necessary evils, and nowadays, when low figures and ruinous competition control the bulk of work, I would like to know if the botch workman is not a necessary evil. However, it is the educated botch that is in demand. I find that the mechanic who is able to do his work quickly, slighting it in every possible way, and yet have it appear well (like some of the solder we buy, which has a good face, and is practically worthless) is the one that is preferred by employers. I have known in many cases, and it happened to me when a journeyman, that employers would complain if work was done well, and would advise their men that quantity was more to be preferred than quality. I have heard employers complain that they could not get paid for doing good work, and I know it to be a fact, particularly in the roofing trade, so much so that I have almost had to sacrifice this branch of my business, because I hold up for reasonably good work, for which but few are willing to pay. Does it pay a man to do work that gives more than temporary satisfaction? It is well known that the jobbing branches of the mechanical business are profitable, and I have heard bosses, as well as the men, reason that they did not want to do work that would last longer than a short while; that only a few would pay for good work, and that they could reap better harvest for repairs, and that the losers through bad work were those who were not willing to pay for good. Regarding the above logic from a purely selfish standpoint, I would ask, does it pay better to be a botch than a workman? I should like to see the matter discussed, that I may see if these points are well taken. Mechanics cannot afford to be philanthropists, and they certainly cannot have a proper regard for good work unless a fair price is paid for it.

Expansion of Iron Pipe.

From W. N., *Washington, D. C.*—Can you give me the following information? How much expansion will occur in a 6-inch iron pipe 100 feet to 500 feet in length at 20, 40 and 60 pounds pressure?

Answer.—One hundred feet of iron pipe will expand 0.008 inch for each increase in temperature of 1° F. This is the basis of

a calculation from which it will be easy to figure out an answer to our correspondent's inquiries. We assume that he wishes to know the expansion from ordinary temperature to the temperature of steam at 20, 40 and 60 pounds pressure. The temperatures to correspond to these three pressures are approximately, 259°, 287° and 307° respectively. Assuming the temperature to start with to be 60°, the increase of temperature of steam at 20 pounds will be equal to 199°, which would be equivalent to an expansion of 1.6 inches in 100 feet of pipe. The increase in temperature at 287° from 60° would be 227°, which would bring about an expansion of 1.8 inches in 100 feet of pipe. The increase in temperature to 60 pounds, which is 307° would be 247° amounting to 1.98 inches in 100 feet. In 500 feet, the quantity would be five times as great, or 8 inches for 20 pounds pressure; 9 inches for 40 pounds pressure and 9.9 inches for 60 pounds pressure

Quality of Water from Radiator.

From C. R., *Utica, N. Y.*—I am desirous of heating my bathroom from the kitchen range. This, of course, is easily accomplished. What I wish to know is, will such a connection when made spoil the water for washing or for culinary purposes? Will not the iron rust affect the linen, and how can I overcome the difficulty if I so heat the bathroom?

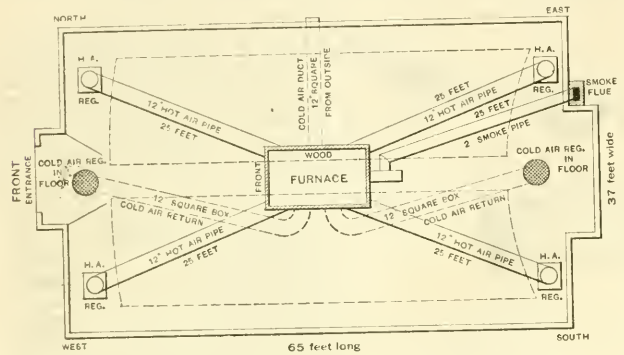
Answer.—If the amount of water in the system referred to by our correspondent is considerable we do not believe that there will be any more annoyance from the rust in the water than in ordinary cases where the water is delivered through iron pipes. The chief source of trouble is likely to be, that after the warmed water has been standing in the radiator and pipes for a considerable length of time, it will become enough contaminated with rust to stain linen, and at the same time be noticeable if used in cooking. Our correspondent need not be reminded that in a water system, the water for drinking and other purposes is often carried through many miles of cast-iron pipe without being appreciably affected by the rust. This is not exactly parallel, for the water being heated would have a more corrosive effect than if carried through the city main. A great deal, furthermore, depends upon the quality of the water in his locality.

Warming a Church.

From W. D., *Oxford, N. S.*—Inclosed please find the plan of a church heated by a wood furnace which was put in some time ago, but does not heat satisfactorily. It is large and capable of heating a building much bigger than the one shown by the plan. I have an idea of my own on this matter, but would like to have your opinion through the columns of *The Metal Worker*. The smoke pipe is connected to the flue on the outside, running through the cellar dug out underneath the church, and is not encased.

Answer.—The plan submitted by our correspondent shows the location of the furnace, the smoke flue and various other necessary fixtures, with their dimensions. While it would be desirable to know the depth of the cellar, hight of the ceiling in the audience room, and hight of the furnace, the details given are sufficient to show that care has been taken and that good workmanship has been employed, so that the trouble lies in planning the job and not in the execution of the work. A better flow of hot air through the 12-inch pipes could be secured by making the two cold-air return boxes or ducts equal in capacity to the four 12-inch hot-air pipes. The cold-air register faces must be of ample capacity to allow this quantity of air an easy passage to the two ducts; also enlarge the cold-air duct through which the air is taken from the outside, to equal in area three-fourths the combined cross area of the four 12-inch pipes. These changes will improve the flow of hot air, but not to the extent which will be required to heat the church in a satisfactory manner. Assuming that the ceiling of the church is at least 15 feet high above the floor, the total cubic space to be heated would amount to 36,000 cubic feet. To perform this amount of work properly would require four pipes, each 15 inches in diameter. The cold-air duct from the outside of the building to the furnace should then be 477 square inches in area; a cold-air duct, 32 x 15 inches, would be about the proper proportion.

The two cold-air return pipes or ducts should each be equal to two 15-inch pipes—that is, 354 square inches in area and provided with a suitable register face in the floor. Properly placed division plates must be provided in the furnace setting, so that the currents of air from the ducts will not interfere with each other, before they come together in the hot-air or mixing chamber. The hot-air or mixing chamber should be at least 12 inches high above the top of furnace. Suitable dampers should be placed in the cold-air duct and also in the return pipes, so that the flow of air can be regulated. The hot-air pipes should have at least a rise of 1 inch in every 12 inches from the furnace to the hot-air registers in the floor, and when the length of the pipes is so near the practical limit more rise should be given. If the cellar is a very cold one they should be well wrapped with a non-conductor to prevent any undue loss of heat from this source. To provide a good draft, the chimney must have ample area, and the smoke pipe, if necessary to prevent its becoming cooled before it connects to the chimney, should either be encased by a larger pipe or otherwise protected. If it is allowable to place the hot-air registers in the side aisles, this should be done, as it would shorten the hot-air pipes with great advantage and increase their rise as well as the distance between the hot-air registers and the cold-air return.



Warming a Church.—Plan Showing Furnace Pipes.

Dimensions of Ice Cream Freezers.

From W. S. C., *Tallahassee, Fla.*—A number of tinners would like to be informed through the columns of *The Metal Worker* regarding the diameter and hight of ice cream freezers ranging in size from 1 to 20 quarts.

Answer.—The following measurements of the tin receptacles for ice cream have been secured. It will be observed they are larger than the indicated capacity:

Size. Quarts.	Diameter. Inches.	Hight. Inches.
1	4	5¾
2	4⅝	7¼
3	5⅜	8¼
4	5⅞	9½
6	6¾	10½
8	7¼	12
10	7½	13¼
14	8	17¾
16	8¼	19
20	8½	21

The wooden ice tubs are made somewhat higher than the freezers, and from 3 to 5 inches larger in diameter.

Some Tin-Plate Queries.

From M. A. D., *Neenah, Wis.*—I have been using American tin plates and find them satisfactory, but it puzzles me to see them put up in the same kind of boxes as the imported plates, and think perhaps that they are not made here. I never knew the kind of wood tin-plate boxes were made of, but always supposed it to be a kind common in Great Britain only. Is there any tin in the coating of roofing plates?

Answer.—Some American tin-plate manufacturers use imported black plates, which are received by them in the usual tin-plate boxes. After dipping and finishing these plates they ship them to customers in the same boxes, merely as a matter of economy. Our correspondent may have received some of these. American tin-plate boxes are now usually made of pine, although some have only pine tops and bottoms, while the sides and ends are made of refuse hard wood, bought cheap in lumber districts. The Welsh boxes are made of beech and elm, native to the locality. They are sawed and made up green, then left to dry for packing. The quantity of tin in the coating of roofing plates varies. There is always some used. In the brighter-looking grades as high as 33⅓ per cent. of the coating is tin, the remainder being lead.

WORLD'S FAIR NOTES.

Perfection of Transportation Facilities.

Work has been hastened on the various lines by which the fair grounds will be reached from the heart of the city of Chicago. Those who have suffered from the annoyances of inadequate transportation on similar occasions will be interested in some of the details.

The Illinois Central Railroad, is of course, far in the lead of any other means of passenger conveyance. Additional tracks have been laid on this road, and for a considerable distance the entire roadbed has been elevated so that the World's Fair service can be performed without interference with the railroad company's immense general business and also at a high rate of speed because there are no crossings. The outlay by this company in merely making preparations for World's Fair local traffic has run up into millions.

The South Side elevated railroad has just completed its extension into the grounds, and is arranging to carry passengers from the business center of the city by rapid trains and to land them in the midst of the great fair buildings. On Dedication Day last fall, this road, then in operation from Congress street to Washington Park (Fifty-fifth street), carried within a period of 12 hours 115,000 people. Its equipment then was 85 cars and 19 locomotives; it has now 180 cars and 46 locomotives. The station of this railroad within the grounds will be an elaborate structure, with a capacity of accommodating perhaps 35,000 persons an hour. Outside the gates at Sixty-third street will be the Stony Island avenue station, with a capacity for accommodating 10,000 more.

"We have arranged our traffic programme," said President Barnard, "so that we will run through trains from Congress street, Twelfth street and from Thirty-ninth street, south bound; and from Jackson Park station and Stony Island avenue station, north bound. They will run perhaps one minute apart. The road is in thorough order; it is being equipped with the union switch interlocking system at all points where the tracks cross each other. We are now putting in electric light plants not only for all stations, platforms and yards, but also for all switch and target lights for our entire system; finding this much cheaper as well as more efficient than gas. Under these conditions the road has a carrying capacity—running trains one minute apart, which is well within the limits of safety—of 40,000 people an hour each way."

In the south division of the city, where Jackson Park and the World's Fair are situated, great demands will be made on the resources of the cable and horse car systems to take care of the unusually large proportion of passenger traffic which will fall to them during the six months of the exposition. The Chicago City Railway Company (the name under which the South Side cable and horse car systems are managed) are making preparations for the extra demands on their service. The two systems comprise not less than 152 miles of track which gridiron that part of the city pretty thoroughly. Twenty-nine different lines are operated on as many different streets, and the company have at their demand nearly 2000 cars, including those for their new electric lines.

The two big cable lines of the company, namely, the Wabash avenue and the State street lines, will be the great feeders of the fair grounds, while the radiating lines will be like veins contributing to these main arteries. Last October, at the time of the dedication, only the Wabash avenue line was available for feeding the fair grounds. The State street line is to be made also available by May 1 by connecting it with an electric cross-town line at Sixty-first street. Speaking of the enlargement and extensions which the company are making in preparation for May 1, Supt. M. K. Bowen said:

"We will have in operation a high-speed electric line from State street to midway Plaisance by May 1. Each motor car will have two trailers, and the capacity of the line will be sufficient to take care of all passengers transferred from the State street cable. The round trip from State street to Midway Plaisance, a distance of a mile and three-quarters, will be made in about 20 minutes. For the special accommodation of Englewood traffic another electric line will be opened at the same time on Sixty third street, running to the fair grounds, making a loop at the Sixty-fourth street gate. This will be a high speed line also, but the motor cars will have no trailers. Both lines described are built under the Westinghouse trolley system. Extensions have been made to our Thirty-fifth and Forty seventh street cross town lines, and they will be operated as electric lines after May 1 Last October, on Dedication Day, we moved about 750,000 people, using only closed or winter cars, each of which seats only 26 persons. Now, our open or summer cars will each seat 50 persons, and the World's Fair months, from May to October, will allow us to use both summer and winter cars. In my opinion we will be able to handle three or four times as many people per day as we did on the big day of the dedication season last October."

In addition to these facilities the Northern Pacific Railroad will run trains from the West side of the city direct to the grounds, and numerous boats will carry passengers by lake.

Missouri's Exhibits.

Missouri, the fifth State in wealth and population in the union, bids fair to become one of the first in the number and excellence of her exhibits at the Exposition. The exhibits of this State will embrace the departments of agriculture, horticulture, minerals, forestry, live stock, manufactures, liberal arts, fish and fisheries, ethnology and archæology, wool and dairy.

J. K. Gwynn, the executive commissioner of the Missouri State Board, says the Chicago *Record*, has been untiring in his efforts to promote the success of the State's showing.

"The Missouri State Building," he said, "is of the Spanish renaissance style of architecture and will not be used for exhibition purposes. In the finishing of the building a large variety of native structural materials, such as hardwoods, limestone, sandstone, marble and onyx, have been used. The building promises to be an exceedingly popular headquarters, aside from its entertainment of Missourians. The Commercial Travelers' Association has been assigned quarters in this building. The reason of this is that the president of this order happens to be a Missourian, hence the propriety of assigning the national organization of commercial travelers a home in the Missouri Building. The quarters of this organization will be handsomely furnished, and elaborate preparations are being made for the entertainment of the members of the fraternity who shall attend the fair.

"The executive commissioner of the State of Missouri is the secretary and treasurer of the national executive officers, so the Missouri Building becomes the headquarters of this organization, the object of which is to promote in any way the best results of the States and Territories whose executive officers are members of the association, and also to cultivate fraternal relations with the representatives of foreign governments making exhibits at the fair. Thus it will be seen that it would be difficult to devise ways and means to more fully popularize a state building than have, by accident, as it were, fallen to the lot of the Missouri Building.

"Missouri is, perhaps, more celebrated for her mineral wealth than any other one product of the State. Iron Mountain is known the world over. However, while more famed for this celebrated mountain than for any other one feature, iron is by no means the most important mineral product. Missouri now produces two-thirds of the zinc produced in the United States, and her zinc industry is yet in its infancy. She also ranks second in the production of lead, being surpassed by Colorado only. The lead mines located in San Francisco County produce more lead than any other plant in the world, with one exception. This plant will be represented in the exhibit by a handsome model in brass and cherry, costing about $3000. Numerous magnificent specimens of disseminated ore from this mine will also be exhibited. The zinc region lies principally in southwest Missouri and the zinc industry has had greater development in Jasper County than elsewhere. Enormous quantities of lead have also been produced in this county, and a specimen of pure galena weighing 6500 pounds will be shown. Specimens of zinc ore, or 'jack' as it is commonly called, weighing 2500 pounds will also be an attractive feature.

"Numerous other large specimens of great interest to the mineralogist will be among the collection. No better criterion of the relative importance of the mineral industries of Missouri could be given than the favor shown the State in the allotment of space. Two main aisles, one running east and west and one north and south through the Mining Building, intersect at the center, making the four corners at this intersection especially desirable. To Missouri was allotted one of these choice corners, and the installation of her mineral exhibits is now well under way. The facade of this exhibit along the aisle lines is composed of granite, Roman brick and terra-cotta products of the State. These in turn are surmounted by a cornice painted to conform in color with the terra-cotta composing the pilasters and coping. The general effect is most impressive and has already elicited favorable comment from all who have seen it. Numerous ornamental figures relieve what was otherwise monotonous and severe in the pilasters composing the colonnade of this exhibit. The cases in which the specimens will be exhibited are all of quarter-sawed oak of handsome design, with polished finish. In addition to the lead and zinc an immense number of minerals, stones, clays, shales, slates and coals will be exhibited. An interesting feature of this exhibit will be a large topographical map of the State giving the distribution of the more important minerals, also the elevation above the sea level and the general lay of the country. There will be two small models made with especial view to exhibiting two prevailing types of topography, one of the hilly portion of the State and the other of a rich prairie locality in the State underlaid by coal. The commission has endeavored, by means of specimens, models and maps, to give to the visitor a complete epitome of the mineral resources of the State. Other models showing the mode of the occurrence of the ore in the different geological formations of the State have also been provided, so that nothing has been left undone to facilitate investigation into the mineral resources of Missouri."

The entire administrative work involved in making this collection of exhibits has been done by Mr. Gwynn. In selecting men to do the work he regarded the special training and fitness of the in-

dividual, backed up by a natural love of a particular pursuit. The work progressed smoothly and successfully, as the showing of the State demonstrates. In the department of minerals Dr. E. O. Hovey was made superintendent, and under his general direction the mineral collection has been made. James A. Reeves of Joplin, a practical miner of large experience, was placed in charge of the lead and zinc collections. Professor Arthur Winslow, State Geologist, was given the general supervision of the collection, so far as its scope and intent are concerned, and he and his excellent corps of assistants rendered not only valuable but earnest and enthusiastic aid in securing specimens of every valuable mineral product in the State.

British Catalogue Ready.

Sir Henry Wood, representative of the British Royal Commission, has presented to Chief Walker Fearn of the foreign affairs department a copy of the official catalogue of the British section at the World's Fair.

The volume is reported to be very complete, and comprises 544 pages of actual catalogue matter, divided under department heads with appendices, and the whole work supplemented with a complete alphabetical index. The departments of the exposition are treated in the order followed in the official classification and each department is introduced by a preface upon the scope and character of its exhibits written by some eminent man, a specialist in that direction. For instance, that of agriculture is written by Ernest Clarke, a well known authority; horticulture by W. Thistleton Dyer, C.N.G., F.R.S., director of the royal gardens, Kew; mines and mining by C. Le Neve Foster, D.S.C., F.R.S, inspector of mines and professor of mining in the Royal College of Science; transportation exhibits by Sir Douglass Galton, K.C.B., D.C.L., F.R.S.; the preface of fine arts, painting, architecture and decoration is written by J. E. Hodgson, R.A., professor of painting to the Royal Academy of Arts. The introductions to other departments are written by men equally eminent in their special directions. The list of members of the royal commission in the book is headed by H. R. H. the Prince of Wales, K. G., as president of the Society of Arts. A general plan of the grounds and buildings is included in the book.

Sending Exhibits Unmarked.

Master of Transportation Holcomb is getting in deep water at Jackson Park. He has a small railroad there on which he is endeavoring to handle expeditiously the cars of exhibits which are daily arriving. Mr. Holcomb's railroad is not large enough for the occasion, and a blockade is seriously threatened. It will come about not so much on account of the facilities at Jackson Park as because of the heedlessness of American exhibitors, who have exercised no care in billing their goods. Specific instructions were sent out months ago with blanks stating that each exhibitor should indicate on the blank just where the exhibits were to be installed, and then nail the card on the side of the car. If these instructions had been followed there would have been no difficulty in hauling the car to the proper building when it reached the park. As it is there is no indication on hundreds of cars as to their destination in the grounds. It requires hours at a time to go to the records and discover merely by the number of the car where it belongs. The result is that they are mixed up in the yards, and any degree of facility in handling them is out of the question.

Foreign exhibitors obeyed instructions and have greatly aided the work of installation. There has been no difficulty in placing their shipments. Mr. Holcomb is beginning to feel the seriousness of the situation, especially when he goes down into the freight yards in the southwest corner of the grounds and discovers almost every track covered with long trains. But little switching can be done during the day. All this work has to be performed at night, and the cars left standing throughout the day to be unloaded at the several buildings. Every day the number of cars received increases, and a few more pile up in the yard.

At the Centennial there were about 5000 carloads of exhibits. It has been estimated there will be at least 10,000 at Chicago. Of this expected number but little over 2000 have been received. If the remaining 8000 should come in regularly there would be an average of over 300 cars each day for the remaining time before the opening May 1. Thus far the highest number received has been about 200, and if difficulty is experienced now it is easy to predict what will happen toward the end of the month.

The Bethlehem Iron Company's Exhibit.

Lieut. W. H. Jaques is now in Chicago supervising the installation of the exhibit of the Bethlehem Iron Company of South Bethlehem, Pa., which comprises the following articles:

	Dimensions.												Approximate weights.	
	Length.		Breadth.		Hight.		Thickness.	Diameter. Outside		Diameter. Inside			Pounds	Tons. *
	Ft.	In.	Ft.	In.	Ft.	In.	In.	Ft.	In.	Ft.	In.			
Armor:														
First experimental plate, 1891 (plain steel)	6	...	4	6	....	...	11½	....	....	..	....		12,782	5.7
Barbette plate, battleship "Indiana" (nickel steel)	12	1	8	4	....	...	17	....	....	....	....		69,798	31 2
Experimental plate (nickel steel, case hardened)	8	....	6	....	..	..	10½	....	...	..	....		20,754	9.3
Ventilator for "Puritan" (nickel steel)	....	....	..	....	4	1	6	7	...	6	....		20,388	9.1
Guns and Gun Forgings:														
12-inch B. L. rifle, navy, Assembled Naval Gun Factory	36	9	....	..	..	....	..	3	9	1	...		101,248	45 2
Trunnion hoop, 12-inch B. L. rifle, army, smooth forged	....	..	1	9¾	5	6¾	..	4	⅛	3	31/16		5,100	2 3
Jacket, 13-inch B. L. rifle, navy, smooth forged	17	½	....	....	....	....	..	3	2¾	1	11¾		56,800	25.4
Tube, 13-inch B. L. rifle, navy, smooth forged	38	5	...	....	....	....	..	2	1⅛	1	..		59,000	26.3
Gun hoops, smooth forged	Various lengths and diameters.												102,747	45 9
Hammer:														
Full size model of 125-ton† steam hammer‡	....	.	38	....	90		....	....	....	..	....		.....	23863
Ingots:														
Fluid compressed, 54-inch round	15	...	....	...	...	..	...	4	6	.....	....		108,190	48.3
Armor plate, rectangular (wooden model)	.....	...	8	6	18	..	52	....	....	....	....		251,686	112.5

	Length. Over all.		Webb.		Diameter. Shaft		Pin.		Hole. In.	Throw one-half stroke.			Pounds	Tons. *
Shafting:														
Double-throw crank, built up, Pacific Mail Steamship Company, "City of Sidney," finished	20	6	7	10	1	5	1	4	6	3	6		52,550	23.5
Single-throw crank, United States cruiser "Minneapolis," finished	9	7⅝	3	2⅝	1	4½	1	5¼	7½	1	9		8,850	4.0
Spare shaft Old Colony Steamboat Company, finished	39	5	.....	.....	2	3	.....	.....	9	.....	.....		65,000	39.4
Hollow-forged shaft, black, as coming from the forge	66	11	...	.	1	8	.....	.....	8¼	...	...		55,200	24.6
Torpedo:														
Air flask for Whitehead	4	11	....	...	1	5⅞	....		15⅜		...		1,110	0.5

Miscellaneous:
Air cushion cylinders.
Cases containing open-hearth and Bessemer steel billets of various percentages of carbon, showing fractures, tests, &c.
Case containing pieces of rails of various sections, showing fractures.
Pieces of rails subjected to drop tests.
Pieces of rails showing splices subjected to drop tests.

* Weight to nearest tenth.
‡ Largest in the world.
† Piston rod, piston and tup (falling parts), 125 tons.
§ Hammer and foundation.

Specimen German Parlor Car.

One of the interesting foreign exhibits in Transportation Hall is a parlor car such as German railroads use, built by Van Der Zypen & Charlier of Cologne. This car was shipped in pieces filling 20 large boxes, each piece finished so that the whole can be put together without a hammer. The body of the car is 30 feet long, 10 feet wide, and is built mostly of steel. The lower half of each side is a solid sheet of steel 30 feet long, 3 feet broad, and ⅛ inch thick. On the side plates rest the window frames made of wood, covered with sheet iron. The cross bars of the running gear are made of pressed steel. The interior of the car is finished in solid brass of fanciful design, buff silk and blue velvet. The top, made of sheet steel, is oval in shape and tastefully decorated. The platform at either end is surrounded by beautifully wrought railings of iron. The interior arrangement is similar to that of the day coaches found on American railroads. The seats are arranged along either side with an aisle in the center. After it has served its misson at the exposition this car will be taken back to Germany and put in service on a branch of the Prussian State railway between Wiesbaden and Langenaschwalbach.

Relic of Early Railroading Days.

Another interesting relic of early railroading in this country has just been forwarded to the Transportation Department of the exposition by the Illinois Central Company. It is a locomotive of English build brought to the United States in 1836. For several years it was operated on the Natchez & Hamburg road, now part of the Illinois Central system. In 1868 it was taken to Vicksburg, but

shortly after ran into a river, where it was buried until 1870, when the superintendent of the road had it dug out and put in service again. Although largely out of date and at least a full generation behind the times, it was kept in use on a small branch road down in Mississippi up to three years ago. The engine is a curious looking machine and will be an interesting attraction. When first put in service it ran on strips of iron bolted to wooden rails laid lengthwise. A section of the old track 30 feet long will also be shown.

Foreign Exhibits.

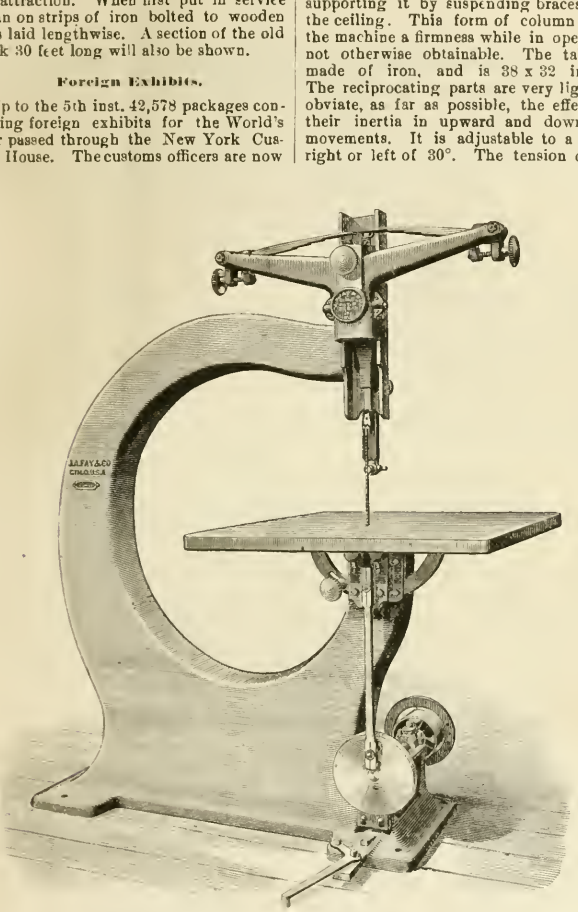
Up to the 5th inst. 42,578 packages containing foreign exhibits for the World's Fair passed through the New York Custom House. The customs officers are now looking after between 1400 and 1500 packages which were shipped from Bremen. They belong to the Italian Government, the bulk of whose exhibits have been sent on a national vessel to Portland, Maine. The packages in New York will be shipped to Portland in charge of a special officer, and will be taken to Chicago with the main lot. Two hundred British soldiers, representing every branch of the English military service, and the crack representatives of some of the most famous regiments of the British army, arrived from London on the 5th by the steamer "Massachusetts."

The Great Ferris Wheel.

The axle for the Ferris big wheel on the Midway Plaisance was put in place on the 6th inst. It was hoisted 150 feet from the ground, where it now rests on the supporting columns. The casting weighs 56 tons. When the arms are built out around it and the cars attached to their ends the turning of the wheel will lift passengers to a hight of 270 feet.

The Fay & Egan Fret Scroll Saw.

The fret scroll saw here illustrated is designed for use in pattern shops, and for all external and internal curve sawing. The column is made in the cored form, has a broad base, and extends over the table to support the entire strain attachment, thereby obviating the necessity of supporting it by suspending braces from the ceiling. This form of column gives the machine a firmness while in operation not otherwise obtainable. The table is made of iron, and is 38 x 32 inches. The reciprocating parts are very light, to obviate, as far as possible, the effects of their inertia in upward and downward movements. It is adjustable to a bevel right or left of 30°. The tension of the



THE FAY & EGAN FRET SCROLL SAW.

machine is flexible, the upper end of the saw being attached to a strap, which at its upper end is connected with a segment pulley having an eccentric roller, connecting with two steel leaf springs. This combination produces, in operating, an almost uniform tension throughout all parts of the stroke of the saw, the eccentricity of the roller being so adjusted that, as the saw is drawn in its downward stroke, the lessening flexibility of the springs is compensated for by the shortening leverage of the eccentric roller. The springs are attached to a sliding cross frame, adjustable to and from the table for different lengths of saws. It has an efficient brake and shipper attached for starting and stopping. The cross head is made adjustable, and can be quickly set to any desired rake.

This machine is built by the J. A. Fay & Egan Co. of Cincinnati, Ohio.

The consumption of coal in London is calculated at 15,000,000 tons yearly.

Subterranean Temperatures.

In answer to a question as to the method of taking temperatures of rocks at different depths in mines, the *Mining and Scientific Press* of San Francisco gives a description of the *modus operandi* adopted by Charles Forman in determining the temperatures in the Forman shaft some ten years ago. The temperatures were taken from the surface to a depth of 2300 feet. They were ascertained by drilling holes not less than 3 feet deep into the rock and inserting into the hole a Negretti and Zambra slow-acting thermometer of the pattern adopted by the Underground Temperature Committee of the British Association and standardized at Kew. These holes were closed with clay and the thermometers were left in for 12 hours, not less than three holes being tried at each point. The following are the depths in feet and the temperatures in degrees Fahrenheit:

Feet.	Deg.	Feet.	Deg.
100	50½	1300	91½
200	55	1400	96½
300	62	1500	101
400	60	1600	103
500	68	1700	104½
600	71½	1800	105½
700	74¾	1900	106
800	76¼	2000	111
900	75	2100	119½
1000	81½	2200	116
1100	84	2300	121
1200	89¼		

It may be stated that more accurate results might have been attained had the holes been filled with water, the thermometers put within a foot of the bottom, the holes then plugged and the thermometers left for 12 hours. In the dry state the average heat of the rock is not so well ascertained as it is when equalized by the water. However, the results would not differ very greatly. Of course, higher temperatures than this are experienced in certain drifts and close places in a deep mine, but it was the actual temperature of the rocks which was desired. In the record quoted, no mention is made of the varying characters of the rock itself.

From an engineering exchange we learn that a process of recovering tin from clippings of tinned iron has been devised by M. Lambotte of Brussels. The clippings are introduced into a vertical cylindrical furnace, which is surrounded by a spiral. Air charged with chlorine gas passes through the spiral, where it is heated by the heat of chemical action going on within the furnace and, entering the furnace below, passes through the clippings. The tin is attacked and stannic chloride is formed, which volatilizes and is subsequently collected upon condensing surfaces moistened with a solution of the same chloride. The iron is not attacked, and when entirely cleaned from tin is removed from below and again used. At the Molenbeck works of M. Lamotte some 2,500,000 pounds of tin clippings are annually treated by this process.

"Outdoors" is the title of a refreshing little book published by the Pope Mfg. Company, Boston, in the interest of the Columbia Bicycle. The covers are in ten water colors, and inside are articles on Lawn Tennis, by F. A. Kellogg; Yachting, by George A. Stewart, successor to Edwin Burgess; Cycling, by Julian Hawthorne; Football, by Walter Camp; Baseball, by J. C. Morse; Horsemanship, by H. C. Merwin; Rowing, by Benjamin Cartis; Canoeing, by C. Bowyer Vaux; a collection of authoritative articles on healthful outdoor pleasures, illustrated by Copeland, Beals, Gallagher, Young and Shute.

THE TIN SHOP.

Patterns for an Oil Tank.

From R. H. W., *New Albany, Ind.*—I inclose the drawings of an oil tank that has caused me considerable trouble in laying out. The problem will probably interest many of the readers of *The Metal Worker*. The article is an oil tank, to be made in six pieces, including the sides.

Referring to Fig. 1, I begin to lay it out from N and O and bend the sheet at A' and B'. This brings me to K and K', which is all right. I next begin at K and K' and bend the sheet at G' and H. After bending at G' and H', the sheet reaches M on the left side, and much further up on the other. Then I begin at N and O and bend the sheet at C and D, F and E reaching P on the left side, then put in a piece between P and M. It is evident the problem of laying out comes before the bending. How should the various parts be described?

Answer.—For convenience, the parts of the tank in our correspondent's sketch have been numbered. No. 1 is the large side, No. 2 the small side, No. 3 the front, and No. 4 the bottom of the tank.

In Fig. 2 is shown the side and front elevation, also the plan of bottom. The various points are lettered and the sides and end numbered to correspond with Fig. 1. The plan is also drawn in line, and below the elevation. The side elevation shows the article as it would appear with the smaller of the two sides to the front. This enables us to show the top No. 5 and top No. 6 in elevation, two important features that are lacking in our correspondent's drawing. In Fig. 1 the shapes or patterns of the two sides, end and bottom are shown. If the tank was to be made from heavy iron, and the joints made at the corners, all that would be required to complete the patterns would be the patterns for tops Nos. 5 and 6. In Fig. 6 is presented a view of the finished article as it would appear when viewed with the side No. 2 to the front. This figure will help the reader in understanding the shape of the article, which shape is rather vaguely indicated by the parts shown in Fig 2. The reader is also at liberty to study the plan and elevations in Fig. 2, and determine what assistance is rendered when the various parts are drawn in proper relation to each other.

Supposing the article to be made in six pieces, and with the seams at the corners, the shapes shown in Figs. 1 and 2 are all that are required for the patterns of the two sides, front and bottom.

We will next proceed to develop the two remaining patterns for tops Nos. 5 and 6. For the pattern of top No. 5, using the drawings in Fig. 2 for the purpose, proceed as follows: Draw any line, as Qa Rb in Fig. 3, in length equal to C' D' of front elevation, which gives us the slant hight. This line is shown in plan by $a'b'$, and in side elevation by $c\ d$. From the point Qa of pattern erect the perpendicular $Qa\ Sf$, in length equal to $c\ f$ of side elevation, or $a'\ f'$ of plan. From the point Rb of pattern erect the perpendicular Rb Te, in length equal to $d\ e$ of side elevation, or $b'\ e'$ of plan. Draw the line Sf Te, which completes the pattern for top No. 5.

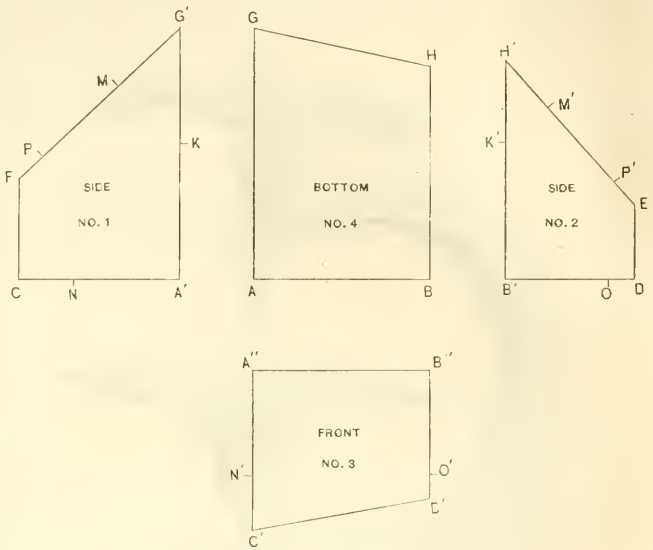


Fig. 1.—Sketches Submitted by "R. H. W."

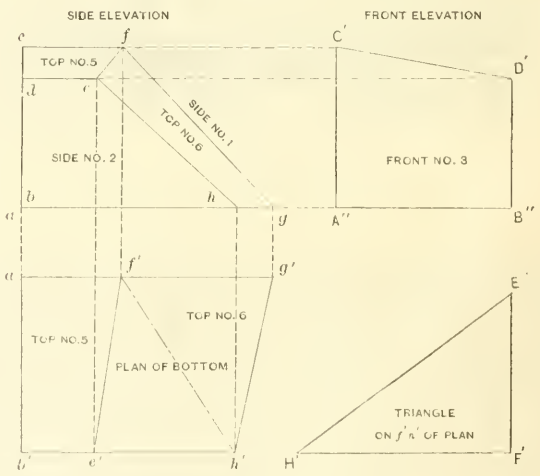


Fig. 2.—Side and Front Elevations, also Triangle on f' h' of Plan.

PATTERN FOR AN OIL TANK.

As the sides Nos. 1 and 2 in the side elevation are the true patterns of the respective sides, it must be evident that the lines $f\ g$ and $e\ h$ give the correct length

for the two sides of the pattern for top No. 6. As we have just obtained the pattern for top No. 5, the line Sf Te of the pattern just obtained must be of the same length as the left side of top No. 6, as shown in plan by line $e' f'$, or in side elevation by line $e f$. Then for the pattern of top No. 6 draw the line Uf Ve, in length equal to the top line in Fig. 3. The next step is to obtain the location of points Wg or Xh of pattern. We will obtain the location of point Xh. To do this draw the line H' F' in Fig. 2, in length equal to the broken line $f' h'$ of plan. From the point F' erect the perpendicular F' F'', equal to the hight of article, as indicated by $a c$ of side elevation. Connect H' F'', which gives the distance from point h' in the material. If the work was to be done in a shop that was not provided with a suitable brake for bending heavy iron, supposing the article was to be made from such material, it might be found convenient to cut out each piece shown separately, bend the edges for lap over a block of hard wood or iron and thus have the seams or joints come at the corners.

As no opening is either shown or mentioned, it is supposed the article is to be either double seamed or riveted together. Supposing the various pieces are to be joined by riveting, allowance must be made for the last piece put in, so the riveting can be done from the outside and thus avoid the danger of riveting the helper inside.

tom, front, and the two tops, the various parts being placed together as our correspondent attempted to do, the intention evidently being to have the article so constructed that the bending will be mostly done on the corners, the metal being joined as indicated by the dotted lines. As a similar system of lettering has been employed in Figs. 1 and 5, the reader will have little difficulty in following the description.

Referring to Fig. 1, our correspondent commences at N O, making the first bend at A' B', A'' B'' of Fig. 5. For some reason, it is decided to have a seam at K K'. The next bend is located at K K', K' Kk of pattern. At this stage of the proceedings the correspondent remarks

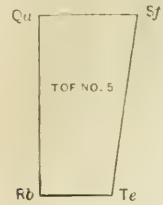


Fig. 3.—Pottern of Top No. 5.

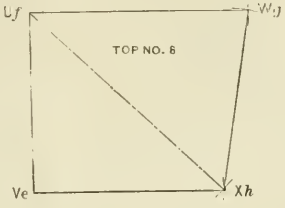


Fig. 4.—Pattern of Top No. 6.

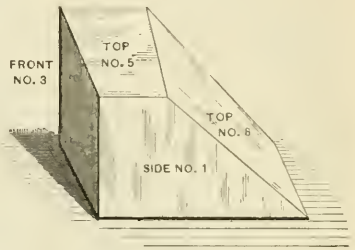


Fig. 6.—The Finished Article.

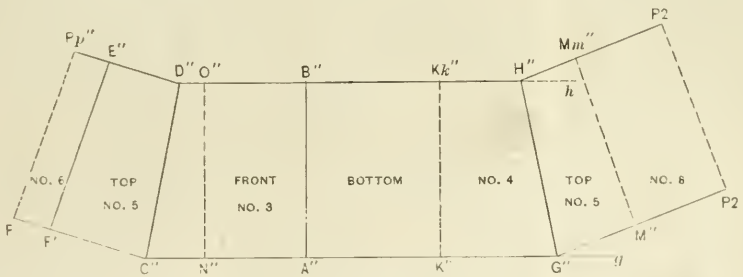


Fig. 5.—Pattern of Bottom, Front and Tops.

PATTERN FOR AN OIL TANK.

plan to point f of elevation, as if measured on the finished article. With H' F'' of triangle as radius and Uf of pattern as center strike a small arc, as shown. With point Ve of pattern as center and Sf Te of Fig. 3 as radius strike a small arc, thus establishing the point Xh of pattern. Draw the line Ve Xh. With Uf of pattern as center and $f g$ of side elevation as radius strike a small arc, which intersect with one struck from Xh of pattern as center and $h' g'$ of plan as radius, thus establishing the point Wg of pattern. Draw the lines Uf Wg and Wg Xh, which completes the pattern of top No. 6.

We have now obtained the patterns for each of the six sides, and, supposing the patterns to have been cut out of some convenient material, as cardboard, it would be easy to "lay out" the pattern on the sheet iron in any way desired or as might be considered the most saving of

The front, sides and top No. 6 could be cut an inch wider at the bottom and an allowance of an inch made about the bottom. This would make the article 1 inch higher than shown in the elevation, but the inside would be of the desired dimensions. By this means the bottom could be riveted in without trouble. Inch boards could be placed under the bottom to take off all strain from the metal when the article was full of oil.

If the article was to be made by double seaming the joints at the corners, the bottom, front and two tops could be cut 1 inch wider, and a suitable allowance made about the two ends so a "double" edge turned, so when the edges of the ends were pounded down the soldering could be done from the outside. If desired, the article could be made in any convenient manner and the front put in last.

In Fig. 5 is shown the pattern of bot-

"After bending at G' and H', the sheet reaches M on the left side, and much further up on the other." In Fig. 5 the shape of No. 4 is clearly shown, as is that of No. 6. The continuation of the sheet is indicated by $h g$, and it is quite evident that a "straight" sheet of iron is not adapted to reaching the points of pattern indicated by M'' Mm''.

Starting again from N and O of Fig. 1, or N'' O'' of pattern, points N'' O'' are reached with safety, but disaster attends the turning of the corner C'' D'' if a straight sheet is used, as the sheet is not inclined to reach the points F'' E''.

The coal area of New South Wales, Australia, is computed to be about 36,000 square miles. The available coal contained in seams more than 2½ feet thick is 78,198,000,000 tons, or about the same quantity as there is in the coal fields of Great Britain. The beds are stated to be so situated as to be readily accessible without deep mining.

The Foundrymen's Association.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club, in Philadelphia, on Wednesday evening, the 5th inst., with a large attendance of the members.

In the absence of the president, the chair was taken by P. D. Wanner of the Mellert Foundry & Machine Company of Reading, Pa.

The Executive Committee, Railways and Freight and Special Committees reported progress.

Four new firms were elected to membership in the association.

Reports from the different sections of the Price Committee were received and discussed. While reporting for his section of the committee, P. D. Wanner said that he thought prices had somewhat improved since last meeting owing to the dry weather experienced during last year. He had noticed in past years that such a condition had a great tendency to stimulate the cast iron pipe trades owing to the building of water works and the bringing in of additional streams, necessitating many castings and supplies. Such was the case last season and again this season. A good many of the pipe foundries East and West would be fully employed until probably the middle of the year, and, perhaps, until fall. He thought that even if the shops had only low-priced work a better feeling would be created, especially among those whose shops were not quite as well filled and others who had room to fill in at quite an advance in price. Beyond that he did not think he could promise anything.

The capacity was, of course, much beyond the demand. He believed that pipe foundries all over the country would during the year be pretty well supplied with work, and at much better prices. Through the present month prices had, he stated, ranged from $1.05 to $1.17, according to the different sizes. Special castings had held their own at about 2½ cents. Some had gone below that price, but there had been no reason at any time to make the cuts. Many would cut for fear some one else might take an order which they considered they ought to have themselves. The lowest price on general castings he had heard reported under this heading was for a letting on lamp posts in the city of New York. There was a letting in that city a few weeks ago for 1200 posts, made in three pieces and weighing about 350 pounds These posts were taken at $1.65. This price he thought was a record breaker. He believed the lowest price at which they had previously been supplied was $1.79. There were four competitors on this letting. One bid was $1.65, two others $1.90 and the remaining one $2 23.

Howard Evans, the secretary, reported a contract just awarded to a concern in Trenton for columns for some works in Boston at a fair price—higher than $1.65. He was not informed as to the terms of delivery of the columns, but the contract called for 250 tons.

L. B. Whitney of A. Whitney & Sons, manufacturers of car wheels, Philadelphia, reported that only two manufacturers of car wheels were members of this association, hence there was a difficulty in arranging a meeting of this section of trade. He would, however, mention that his firm were invited, among others, to make a bid on 2400 Pennsylvania standard wheels. They duly quoted a price, but afterward learned that the wheels could be bought at from 50 cents to 75 cents per wheel less than the price at which they could offer. Their price was at $7 50. A wheel weighs 500 to 600 pounds, and the freight at 9 cents per 100 pounds and the commission to be paid would make the net price to the party taking the contract $7.10, or less than the iron from which his firm made wheels would cost. As soon as they learned of the offer already made they notified the parties asking for bids that they did not care to bid on business of this kind, as they could not afford to allow their names to appear on castings which could be sold for such a low price. This incident, he thought, proved that there was no necessity for quoting less than at least $7, and with a little of the nerve displayed by many of the members in the association, he had no doubt the contract might have been taken at $7.50. All in the business seemed to be afraid of each other.

E. E. Brown of E. E. Brown & Co. reported progress of the small castings section of the committee.

The subject of forming sections in the association being again up for discussion, P. D. Wanner said that it was apparent that very little had been done thus far. According to the report of the Executive Committee it might be judged that it would be a dangerous step so far as the raising of prices was concerned. On this point he wished to say that he agreed in the main. He thought that it would be dangerous for any persons representing the different specialties of this association to combine with a view to raising prices to an unreasonable extent, although it should be understood that they were not running their respective businesses for the fun of the thing. All were working for something, and the general object was to make money for the bettering of conditions. In the present condition of civilization he considered that advance could only be made by profit in their respective lines, and it was, he thought, quite lawful for them to do so. In any combination formed with the view of running a business, improving conditions, or of bringing themselves into position to make money, they were keeping themselves within the law. It was, he said, only where a combination proposed to take hold of something to the exclusion of every one else that the law would step in and declare it an illegal procedure. It was quite advisable for an association to seek to control prices. He believed that every class of men should form associations to advance their trade, and in doing so might have to advance their prices. He understood this as the idea of the present day and regarded it as a leading feature in business in this and every other country. They were all aware of their weakness and therefore united for strength. In union there was strength, and a combination or association would be strong. He thoroughly believed in the principle and they should to that extent favor the measure and try to get those interested together, although he admitted there would be a great deal of trouble in the effort to do so. Some would not want to come into the arrangement for special reasons of their own. He would recommend that such be left out, but it would be well to get in as many as possible. He had been actively connected with the pipe trade for 15 years or more, and an arrangement had been attempted many times to cover the whole country, and especially the East. Some would come in, others stay out, and as a consequence it always ended in failure. But as he had before stated, he would be willing to stand up with any three, four or five manufacturers in the pipe trade, and adhere to arrangements for an association. There were many things he thought they could do for each other if they would only come together. A common sympathy should exist in regard to orders. What one did not make, another might, and mutual help be beneficial. He thought they should not be discouraged, but go on. It might take some time before all could be brought in, but it was no reason why these sections should not be formed. He had no doubt all discouragements could be overcome. Eventually all would unite, as those who would band together could materially affect those who declined to enter an arrangement, and they would finally wish to come in. He had great faith in the consummation of the arrangement. Very often he had found that those who appeared to be strongest had proved to be the weakest when their business was gone into, and were the first to cry for pardon. Their bravery had been all on the outside.

In regard to the possibility of the pig-iron trade effecting an arrangement for better prices, consumers should not be surprised at any time to find that the pig-iron men had been taking care of themselves in that direction. He certainly should not blame them, and would like to see it. They would probably find that in the South all the pig iron and the furnaces would go into the hands of a few concerns and thus a step toward the control of the whole trade and the command of prices would be made. Such a step would not come unexpected to him, and if the prices were not entirely unreasonable such a course would meet his approval.

The secretary announced that a number of letters had been written to prominent people upon the subject of coke, as the matter had proved of so much interest to the trade, and in response there were representatives that evening among them for the purpose of giving any information required. Many had expressed a desire to hear more on the subject, and particularly as to how coke was manufactured from the beginning; what kind of coal was used; how long it took to turn coal into coke; what kind of water was used in cooling it, and points generally in regard to its manufacture.

Jones Wister of L. & R. Wister & Co., Philadelphia, then made instructive remarks on the subject, supplementing the address delivered by him before the February meeting of the association, embodying a vast amount of information relative to the manufacture of coke and its adaptability to foundry uses. At the close of the address the appreciation of the meeting took the form of a vote of thanks to Mr. Wister.

Mr. Winks of the Davis Coal and Coke Company stated that Mr. Ramsey, the superintendent of his company's West Virginia ovens, had intended to be present and had prepared a paper to read before the meeting. Mr. Ramsey had had a great deal of experience in the manufacture of coke, and it was to be regretted that he had found it impossible to attend.

The chairman invited discussion on the subject of pay days. He considered it an important subject and one which the association would do well to consider at its meetings. He believed wages should be paid once a month only. In paying their hands weekly or fortnightly they were doing more than they ought to do in justice to themselves. He thought that there was no necessity for more than one pay day per month. This course, he claimed, would save a good deal of time and trouble to manufacturers. His company paid their employees every fortnight and experienced a good deal of trouble under that plan. He alluded to the Pennsylvania State law on the subject as ineffective and unconstitutional, inasmuch as it could not be carried out. He thought the subject should be open for discussion at future meetings.

Mr. Lewis of the Waterbury Foundry & Machine Company, Waterbury, Conn., said that he had derived much pleasure and instruction from the meeting. He had been in business 47 years with satisfactory results, but he regretted that it had really come to the point in his section when they could not get a decent living on raw castings. This company were large builders of machinery, and it was from this branch of their business he thought that their profits largely accrued. While he

would desire an advance in prices, he considered it would be very difficult to get co operation, there being so many in the trade. He had not as much confidence as he felt he should like to have in its accomplishment, as he thought every business man recognized that each concern was doing the best it could for its own interest. However much it might respect its neighbors and friends in the trade it would figure on a contract as low as possible and would then go a little lower if it found its neighbors were likely to get the job. While he admitted that it would be very well to get up a friendly and fraternal feeling, he did not think an arrangement could rest upon that. A bond would have to be in some way effected whereby a forfeiture in the event of violation of an agreement would be made. As an instance of the working of the friendly plan he cited the case of a meeting in another section called for the purpose of obtaining an advance in prices where a member, after asking to be excused a moment, in the interval rushed to the telegraph office and wired his customers: "Put in your orders. Prices advance to-morrow." He did not think that human nature varied a great deal in the different latitudes. He believed the best method for effecting an arrangement regarding prices would be the one involving forfeiture for violation.

Floor plates in his section were being made at 1¼ cents per pound, delivered on cars, and the prices of large castings were very low. He considered that the confidences enjoyed at the meetings of this association were productive of much good to its members. He hoped that the details of foundry practice would not be overlooked in their discussions. He felt that he could learn many things concerning the making and positions of cores and the insuring of good sound surfaces.

The chairman stated that at previous meetings of the association much valuable information had been elicited on the subject of foundry details. Core sand was, however, in his opinion, a good subject for discussion, as also foundry facings. He believed there were a number of gentlemen connected with the association who could furnish valuable information on these subjects. A motion was then made that the Executive Committee be asked to arrange addresses to be delivered at the next meeting on "Foundry Facings" and "Core Sand."

The meeting then adjourned.

Ventilation in London Workshops.

The Public Health Department of the London County Council have issued a report of a medical inspection of workshops in some of the most crowded of the poorer metropolitan districts, which proves that the system of ventilation in these shops is of the most elementary kind. "In no instance," says the report in question, "was any artificial means of ventilation seen Such interchange of air as might occur could only be brought about by the 'natural ventilation' afforded by the chimney flue and other openings—windows and doors. A note was made of all windows which were not found shut. In the 114 workshops inspected there were in all only 11 in which open windows were found. One master, on being asked whether the windows were ever open, replied: 'Only in the spring and summer months.' Another master excused the overcrowded condition of his workroom by remarking that when the workpeople felt the air to be close and oppressive he did not allow them to remain in one place, but caused them to 'move about from one part of the room to another.' It appears to be questionable whether any attempt is ever made during the winter months to cause a current of cool fresh air to circulate through some of these workrooms."

Prize Competitions

$25.00.

Prize Competition No. 20.

SUBJECT:

A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

The adoption of cash sale tickets, cash carriers, cash regiaters, &c., has provided for the strict accounting of cash sales. As credit is almost universally given to a greater or less extent in connection with cash, it is necessary that goods thus sold should not leave the store without being properly charged. The object of this competition is to draw out practical suggestions or descriptions of systems in use whereby the charging of all goods is insured. The subject touches also the following points: How to avoid charging undesirable parties without giving offense, and how to avoid charging small amounts.

This competition will remain open until May 6, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than May 6, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Prize Competition No. 20.

The committee to whom the contributions in Prize Competition No. 6 were referred have awarded the prizes as follows:

First Prize of $50 to FERDINAND TUSCH, Brooklyn, N. Y.

Second Prize of $25 to JAMES D. RICHARDS, Covington, Ky.

Third Prize of $15 to M. STRANSKY, New York, N. Y.

Fourth Prize of $10 to F. F. GILMORE, Louisville, Ky.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 17. Closing April 15.
How Merchants Should Treat Traveling Salesmen.

No. 18. Closing April 22.
The Extent to Which Merchants Should Devote Their Attention to Outside Interests.

No. 19. Closing April 29.
Electrical Goods as a part of a Hardware Stock.

No. 20. Closing May 6.
A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

Another subject will be announced in our next issue.

In responding to the toast of "The Corporation of Salford," at a dinner of the Manchester Association of Engineers, recently given in Manchester, England, Alderman Bailey of Salford, in referring to the value of technical education in connection with the engineering industry, made some pointed remarks in the matter of American competition in the line of mechanical products, and the best method of meeting it. "The wars," said the alderman, "which at one time were waged between the princes and potentates of different countries were now things of the past; the wars which were now being waged were between the workmen of one country and the workmen of another country, and he urged that his hearers should carefully study the imports to see where the workmen of other countries were beating them. He was convinced that there were a number of articles in which they were allowing their American and Continental rivals to beat them, which they could make not only just as cheaply, but much better, at home. He had been singularly successful in preventing many German and American goods coming into the country; and if they would only bestir themselves, there were a great many other articles which were being supplied from abroad, which they could make themselves at a right down good profit. The English were, however, very much behindhand in one thing—the foreigner knew how to sell better than they did. The Americans could bring over their lathes to England, and get higher prices than were being paid there to English makers. This was a thing that English manufacturers ought to be ashamed of; it was simply a question of the foreigners being better salesmen than they were. Their competitors had united the Anglo-Saxon enterprise with the German technical knowledge, and produced so much better salesmen that frequently they were able to sell goods in England of inferior quality and at a higher price than they could be produced in that country. He would urge that they should take up technical education in a thoroughly efficient manner; and with the natural advantages possessed by Great Britain, she ought, he believed, to be able to defy the world."

In announcing the prize winners in Prize Competition No. 5, in our last issue, it was stated that the first prize had been awarded to H. S. Drummond of Newark, N. J. Mr. Drummond's middle initial is, however, G. and not S as printed.

The New York Trade School.

Closing Exercises for the 1892-1893 Season.

Notwithstanding the inclemency of the weather a large and interested company of students and visitors assembled on Friday evening, April 7, at the New York Trade School, First avenue and Sixty-seventh street, New York, to witness the result of the work of the classes during the season just closed and the presentation of certificates to the graduates of the 1892-93 term. Soon after 7 p.m. students and their friends, together with invited guests, began to arrive. The time until 8 o'clock was spent in the inspection of the work of the students, which was displayed in the different classrooms, each collection or piece of work being duly labeled with the name of its author.

The specimens of handicraft shown reflected the greatest credit upon the instructors in the various trades, as well as bore testimony to the diligence and application of the learners who in a short course of three months could attain such proficiency. The exhibit of plumbing work was exceptionally extensive and good, calling forth many expressions of approval from practical plumbers, several of whom were present as guests. A specially interesting feature of the display was the exhibit of trade school work in all its branches which is about to be forwarded to the Columbian Exposition at Chicago.

CLOSING EXERCISES.

Shortly after eight o'clock the meeting was called to order in the Bricklaying School, which had been fitted up for the occasion so as to form a most effective auditorium. At one end of the room the platform, draped at the back and canopied with blue silk, fringed with gold, and decorated with national flags, accommodated the speakers of the evening, members of the committees and some invited guests and friends of the school, including several ladies. The body of the hall was brilliantly illuminated and decorated with flags and patriotic emblems. It was occupied by the graduated students, seated under banners bearing the names of the different classes, the posts of honor being given to the day and evening plumbing classes, which together almost outnumbered all the remainder.

CHAIRMAN'S OPENING REMARKS.

In opening the proceedings of the evening, the chairman, William E. Dodge, made feeling allusion to the enforced absence from the closing exercises, for the first time in the history of the school, of the beloved and honored founder, Colonel Richard T. Auchmuty, who during the long winter months had been an intense sufferer and who had recently been obliged to submit to a critical operation, from which, he was thankful to be able to say, there was every hope that their friend and benefactor would before long recover, as he was now steadily gaining strength. He was glad to assure his hearers that even in the time of his greatest weakness and sufferings the Colonel had maintained the absorbing interest which he had always felt in this, the great work of his life. Continuing, Mr. Dodge said that this was a special epoch in the history of their institution, because for the first time the school stood in the dignity and position of a workman's college. It had been incorporated as such under the laws of the State; trustees had been appointed, and the entire institution had been placed on a solid and business footing. The buildings and the lot on which they stand, as well as a large sum of money, had been absolutely made over to the schools by the generosity of Mrs. Auchmuty, who fully shares her husband's interest in the school. With these generous donations and the noble gift of Mr. J. Pierpont Morgan, amounting to $500,000, they stood there that night owning property worth over one million, free from all incumbrances and ready for much useful work in the future. (Prolonged cheers.)

The chairman then presented Guy Culgin, president of the General Society of Mechanics and Tradesmen, who addressed to the students some earnest words of counsel and encouragement, recommending to them particularly the qualities of honesty and self help, which he himself had found in a business experience of over 40 years to be the only real means of insuring a lasting success.

At the close of Mr. Culgin's remarks, the chairman said: "I wonder what we should do, in the modern civilization of our cities, without plumbers. They have been called expensive luxuries; but people find they can afford to pay for good work; and it is one of the objects of this school to elevate the standard of plumbing work. I will now introduce Mr. Henry G. Gabay, president of the Master Plumbers' Association, who has come here to address you." Mr. Gabay spoke as follows:

MR. GABAY'S ADDRESS.

There is an old maxim—"Brevity is the soul of wit." Be as brief, then, in all matters as is consistent with a strict interpretation of your subject, especially in a speech. Some persons I have heard speak put me in mind of the wife of a friend who had been married but three weeks. While walking down the avenue the gentleman in question met an old school chum, who, seeing the look of despair on his face, said: "Why, Jones, what is the matter? You look very unhappy—look as if you had lost every friend in the world." Jones replied, "Oh! yes; I am the most miserable man in existence; very unhappy indeed." "Why?" was the reply. "You unhappy; you who have just been married! You should be one of the happiest men on the face of the earth. Come, now, tell me what troubles you." "Well," Jones replied, "my wife can't sing." "Can't sing!" said the other. "Why, that should add tenfold to your happiness. Come, that won't do." "Well," said Jones, "the great trouble is, she thinks she can."

Now, boys, I will just say a few words to you on the subject of "grit." Impress that word on your mind and live it in your life. I don't mean cheek. Some folks mistake cheek for grit. I have known some who seemed all cheek. If one side was not enough they were ready to turn the other also.

The young man who possesses "grit" will not be daunted by difficulties or yield up the fight at the first defeat. He may be crestfallen, but will spring back and grapple with the obstacle. He won't sit down and say, "Well, this is the way of the world and I may as well make the best of it." Making the best of it, in that way, means, stifling every ambition, sinking down into the lowest plane of life. That class of individuals can always be seen during the summer—especially in the country—at any railroad station, sitting on freight boxes, whittling a stick aimlessly, satisfied if they can get a plug of poor tobacco. In winter they hang around the village storekeeper's stove, hands in their pockets—Micawber fashion—doing nothing but "waiting for something to turn up." Nothing of any value to them will ever "turn up" in their lifetime. They will turn up themselves sooner, and over their remains might well be placed this epitaph—

"At last he's dead, and here he lies;
And now his soul at "aise" is,
With the end of his nose and the tips of his toes,
"Turned up" to the roots of the daisies.

Then have energy, self reliance, courage, determination. Success and greatness were never won without them. Don't have the false idea that success in life hinges upon what fools call "good luck." A man who claims to be unlucky is guilty of indolence, or carelessness, or else has not the clear judgment which must be cultivated and is so essential in the affairs of life. Every man makes his own luck, and the young man who seeks to throw upon "chance" the burden of his mistakes and failures is a miserable coward.

"Grit," then is what you all must have in order to succeed in this life. It is the one great and essential factor in national growth and development. The difference between the material and political conditions of peoples may be traced in a large degree to the presence or absence of this quality.

The condition of the masses in Ireland was once expressed by an emigrant, who when asked 50 cents for a bushel of potatoes cried, "Faith and I could get a bushel in ould Oireland for fourpence."

"Why did'nt you stay in Ireland an I get them?" said the vender.

"Begorra," said Pat, "but Oi could'nt get the fourpence."

You are now graduating from this school. Every one here, no doubt, has felt that the trade he has selected is the one he desires, has a taste for and is best fitted for. But, alas, how many are mistaken and have planted themselves in a desert, so to speak, only finding it out when it is too late. I trust none of you have mistaken mere liking for real talent. Sidney Smith once said, "Be what nature intended you for and you will succeed; be anything else, and you will be ten thousand times worse than nothing."

Now, having selected your trade, do not be in a hurry to change it. Remember, "A rolling stone gathers no moss." Neither would I despise it. There is no discredit in being a tinker, but there is in being a bad one.

Work diligently; be, above all, modest and humble; and, when you find yourself excelling others, then compare what you have done with nature itself, or with the ideal of your own mind, and you will be secured by the contrast which will be apparent against the effects of pride or presumption.

A word in regard to the founder of this institution, Col. R. T. Auchmuty.

Beginning in a small way with a few students, under his persevering energy and "grit," and the resolution to build up a lasting institution in this city, it has grown and has continued to grow year by year

until it's success is no longer a question, and it is now liberally endowed by one of our prominent men. I trust other philanthropic citizens will follow Mr. J. Pierpont Morgan and continue to further endow it until this great and grand institution can further extend its usefulness and be at the same time entirely self supporting. Then can the Colonel look with pride on the work of his life and feel that he has not lived in vain.

I am sorry he is not here with us this evening; we all know how glad he would be to be present, and I am positive that it is the heartfelt wish and prayer of all that his recovery will be speedy and lasting, and that he may be spared to us for many, many years to come.

I will not detain you longer. The quality I have commended to you will stand you in good stead in the work that lies before you. By it you can overcome any ordinary opposition that may be in your path. Make up your mind that nothing shall daunt you, no difficulty turn you aside from an honorable purpose. If irremovable obstacles be in your way march over them.

"What would you say, sir," said a man to George Stevenson, the famous originator of the iron horse, when the first passenger railroad was being laid—"what would you say if a cow should get on the rails when the train was coming?" "Weel," said the great mechanic, "I should say it would be vera bad for the coo." Boys, you must "make it bad for the coo."

Thomas Fowell Buxton said: "The longer I live the more I am certain that the great difference between men, between the feeble and the powerful, the great and the insignificant, is energy, invincible determination, a purpose well fixed, and then death or victory."

It is very well for genius to light up the path of life, but it must be "grit" that carries a man successfully over the ruts, mounds and hilltops in that pathway. Remember—

"The heights by great men reached and kept,
Were not attained by sudden flight,
But they, while their companions slept,
Were toiling upward in the night."

Mr. Gabay was followed by Theodore C. Johansmeyer, who addressed his remarks principally to the painting and decorating classes.

PRESENTATION OF DIPLOMAS.

The next event on the programme was the presentation of certificates. Those for the day plumbing class were presented by Edward Murphy of the School Committee, and those for the evening classes by James Muir. The name of each recipient was read aloud as the presentation was made by Henry Brill, secretary of the school.

The following are the names of the members of the day plumbing class who received their diplomas on the occasion:

DAY PLUMBING CLASS.

Adamson, George D., St. Paul, Minn.
Babcock, Charles A., Los Angeles, Cal.
Bauer, George E., Crotona Place, N. Y.
Baumann, E. G., Mount Vernon, N. Y.
Beardsley, Charles E., Dunkirk, N. Y.
Bertine, Harry D., Mt. Vernon, N. Y.
Clements, Hezekiah M., Liberty, N. Y.
Cochrane, Thomas S. Jr., New York City.
Crowley, Edward J., Ansonia, Conn.
Demarest, John H., Hackensack, N. J.
Denise, John V., Freehold, N. J.
Dibble, Benton R., New Britain, Conn.
Dimond, Irving G., Penacook, N. H.
Donovan, Dennis F., Bayonne, N. J.
Doscher, B. G., Charleston, S. C.
Drake, Frank, Clinton, Iowa.
Dutcher, Ora D., Middlesex, N. Y.
Eckhardt, H. C. P., Bethlehem, Pa.
Fairchild, H. A., Riverside, Cal.
Feeny, Charles W., Paterson, N. J.
Fellows, James D., Belvidere, Ill.
Fisher, Chas. G., Catskill, N. Y.
Fox, John, New Britain, Conn.
Fox, William H., Eau Claire, Wis.
Frehsee, William B., Lockport, N. Y.
Griffith, William H., Chicago, Ill.
Gutfleisch, Albert A., Lancaster, Pa.
Hamilton, Claflin E., Hillsborough, N. H.
Hann, William, Lyons, Iowa.
Hauser, Frank J., New York City.
Heimann, August, New Haven, Conn.
Herrick, Frederick W., Beverly, Mass.
Herring, George D., Yonkers, N. Y.
Higgins, Frank H., Ithaca, N. Y.
Hollister, William K., Cortland, N. Y.
Holtz, George, Jersey City, N. J.
Hood, Albert K., Newport, N. H.
Horwell, Thomas H., East Liverpool, Ohio.
Hotopp, Otto A., Hoboken, N. J.
Howard, Charles C., Mt. Vernon, N. Y.
Hutchison, Tom W., Kingston, Pa.
Kearney, James L., Meridian, Miss.
Kelsey, John H., Lowell, Mass.
Kreader, Charles W., Tiffin, Ohio.
Law, Edward M., Fall River, Mass.
Lohr, Edward, Johnstown, Pa.
Mackrell, Henry, Paterson, N. J.
Mangold, John A., Moundsville, W. Va.
McCrobrey, James, Green Island, N. Y.
Meeks, Chauncey S., New York City.
Merkel, Dan'l, Jr., Carlstadt, N. J.
Mitchell, William M., Springfield, Ohio.
Morris, Chauncey R., Falls Village, Conn.
Murhard, C. B., Portland, Ore.
Quellet, John W., Westbrook, Maine.
Pearson, Royal W., Calumet, Mich.
Perry, A. D., Belvidere, N. J.
Putnam, Ralph F., Danvers, Mass.
Reed, Amos J., Pen Argyl, Pa.
Rights, Samuel E., Salem, N. C.
Roberts, D. Leon, Moundsville, W. Va.
Rodman, R. W. A., New York City.
Rosenthal, Ernest C., St. Louis, Mo.
Rouse, T. Brainerd, Colorado Springs, Col.
Schoudel, Irving, Highland Falls, N. Y.
Serfass, Aaron, Ashley, Pa.
Sholes, Ransom S., Jr., Norwich, Conn.
Shumway, Geo. S., New York City.
Stebbius, Frederick A., Williamsburg, Mass.
Studley, Alfred E., Worcester, Mass.
Tolan, Thomas L., Hornellsville, N. Y.
Wagner, Harry, Bayonne, N. J.
Weiant, Albert E., New Britain, Conn.
Weikert, Edward, Canton, Ohio.
West, Edward D., Oberlin, Ohio.
Whelpley, Ed. M., Washington, Ohio.
Whitehead, Henry, Los Angeles, Cal.
Wordell, Abiel H., Fall River, Mass.
Worth, Walter F., Davenport, Iowa.
Zehultz, Louis J., Toledo, Ohio.

VALEDICTORY.

The bricklaying and plastering, painting, carpentry and blacksmithing graduates were then in turn presented with their diplomas; after which the following Valedictory was delivered by Hamilton E. Claflin of Hillsborough Bridge, N. H., a member of the day plumbing class.

The duty has been assigned me to speak farewell words at the closing of this school term. A parting under such circumstances has in it some shade of sadness or regret.

At this hour we may recall with just pride how strangers have become friends. Friendship is a strong word. Its ties bind hearts in common sympathy.

May the friendliness, the mutual hopes and aspirations enkindled here be constant reminders of our Trade School life. The past term has been one full of benefit and pleasant associations to all the students.

If it shall be so ordered by Providence that some of us may not be together again let us cherish happy memories of the term's fellowship.

There is not one who has failed to enjoy the daily school life and who does not feel grateful for the constant efforts of the officers and instructors for our progress and happiness.

In bidding farewell we would assure them of our respect and our appreciation of their earnest labors for our best welfare. The value of their kindly teachings to us is inestimable. May just rewards come to them for all the trials, the care, the sacrifices which have been used for our good and advancement. It behooves us as men to prove a credit to their instructions and thus show to others the advantages of this instruction.

We wish to express our heartfelt sympathy to Colonel Auchmuty in his painful affliction, and our earnest wishes for his speedy recovery, that he may further perfect this most excellent school and enjoy the fruit of his benevolence. We know he is with us in heart, and words fail to express the gratitude we feel for the assistance and inspiration he has furnished to our life's work.

Fellow-students, when we look squarely into the face of life we may read written thereon a real, earnest story. With manhood let us meet life's realities and obstacles. These shall prove our capacities.

Amid all our gettings the star hope of living should be to have manly character. Though knowledge, money, property, principalities pass away before our very eyes, character shall abide and live throughout all time.

Let us hold in mind as we separate tonight the apt words of Fletcher on the true measure of life:

"He most lives,
Who thinks most, feels noblest, acts the best."

The chairman then presented to the students their good friend and his. J. Stanly Thomas, who addressed the young men in part as follows:

ADDRESS OF MR. THOMAS.

In this age, the representative artisan stands for all that is greatest and best in the fraternity of tradesmen, and with common sense judgment declares that the acquisition of dollars does not mean success. As this student body goes forth from these walls to enter upon the avenues of business, they need not be reminded that the mere accumulation of money does not underlie true happiness.

To denounce the possession of money is no less than hypocrisy. To say that it is "a necessary evil" is a false sentiment. Money is a power, and gotten honestly bears testimony to a man's capacities. Rightly used, it transforms aims and wishes into loftier purposes and achievements. Expended wisely and cautiously by a willing spirit of self-sacrifice for the elevation of the interests of the less fortunate and depressed in life, it may determine the development or destruction of locked-up abilities and sympathies. Oh! it is the unwarrantable greed, the callous love of money, that is blighting men's souls and stamping out human happiness.

Virtue is the password to individual and national progress, and duty is the keynote to success. The conscientious doing of individual duty, whether private or public, in addition to earning reputation, adds the golden luster of manliness and holds dear the instinctive perception of what is just and right in business transactions, no matter what others may say or do. Build up character and reputation by labor and merit, that the confidence and good will of those struggling to rise in situation and power may be enjoyed. Never fail to dignify your trade by respecting, encouraging, strengthening its members. Any man whose advancement in the world is pur-

chased by surrendering his convictions and crowding down others is selfish and criminal. Never trample on conscience for worldly gain, and remember that it is a privilege to help onward a brother tradesman.

Courage of honest convictions is the best stronghold amid the vicissitudes of human experience. It will energize failing hope in feverish times of adverse circumstances. If fearless convictions of duty, of truth, of the right incite—intensify many purposes and aspirations, the world will be the better for our living in it, and happiness shall crown our career in life. Habits of industry, of economy, of temperance, a love for the purity and sanctity of our homes, make the ideal artisan. Business methods founded on these elements will inevitably bring success of the best and most abiding sort.

All the rich, touching and beautiful encomiums heaped upon the labors and enterprise of the beloved Colonel Auchmuty, who seems to realize his stewardship to mankind as of divine calling—only hint the ongoing, upbuilding influence of his thought and life upon the industrial classes of men. The celebrated "Auchmuty system" having produced in the past 11 years such remarkable results in the manual and scientific branches of the trades to which it has been applied, has attracted attention in this country and in Europe. Is not the true glory of any institution the record of the students after they enter upon the walks of life? The progress and positions of the New York Trade School students proclaim the expediency and success of the system of instruction used. Their useful career stands as a living monument of its value and influence. And, Mr. Chairman, shall we in our tributes of praise to Colonel Auchmuty forget her whose influence and inspiration have so much helped to eulogize and encourage his mind and heart? For often is woman's sympathy and faithfulness lightly considered. The world to day feels and acknowledges her vast uplifting power for good. Nowhere is woman's influence so felt as in the home. And may the love of wife always keep man truest to all that is highest and best within him and stir to noble deeds the noblest affections of the human soul.

After a few hearty words had been addressed to the classes by Harry Brill, the chairman said that all that remained to be done was to read to the students the letter from their kind friend, Colonel Auchmuty. Mr. Dodge then read the following communication:

COLONEL AUCHMUTY'S LETTER TO THE STUDENTS.

NEW YORK, April 6, 1893.

To the members of the New York Trade School:

It is with very great regret that I have been unable to meet the classes of 1892-93. I write to wish you one and all success and prosperity.

I would call your attention to the fact that the chief secret of success is perseverance. Some may drop at once into good places; but, by the great majority, places are only to be found by seeking for them and not becoming discouraged if not easily found. There are many hundreds of letters on file in the office from those who have preceded you here. Most of them show how those who would not give up finally succeeded.

I hope you will write or call on Mr. Brill from time to time. That your lives may be happy and prosperous and that you will never regret the time you have passed at the New York Trade School, is the earnest wish of your sincere friend,

RICHARD T. AUCHMUTY.

CHAIRMAN'S CONCLUDING REMARKS.

At the conclusion of the reading, Mr. Dodge requested those of the students who wished, in return for his greeting, to send to Colonel Auchmuty their sympathy and respectful congratulations on his returning strength, to rise. This request was followed by a general uprising in the body of the hall accompanied by three ringing cheers for the Colonel, which the chairman remarked would act as a tonic to their friend when he was told of them. At the next celebration he trusted Colonel Auchmuty might be again among them to give from his own lips the words of kindly counsel, full of common sense, which he knew so well how to offer. It was due, said Mr. Dodge, almost solely to the pluck, energy, determination and faith of this one man that the New York Trade School stands where it does to-day.

The chairman then concluded with a few earnest and affectionate words of advice to the young men, in the course of which he pointed out to them that the fundamental secret of succes in life is character. He strongly urged on the young workman as the essentials of a good and successful tradesman the qualities of sobriety, reliability, punctuality, and above all, honesty. Wishing the students success and happiness in the course of the life they had individually chosen, Mr. Dodge brought the formal proceedings to a close with a happy allusion to the perhaps more important function that was to follow, namely, refreshments.

The New Mormon Temple.

On Thursday, April 6, the great Mormon Temple, at Salt Lake City, was dedicated, just 40 years from the day the corner stones were laid. The building is of granite, much of which was hauled to the spot by ox and mule teams, and consists of four stories. It is said that the cost of construction has been about $5,000,000. The temple is built in nondescript style, and is 186½ feet long and 91 feet wide. The granite walls are 9 feet thick at the base, narrowing up to 6 feet. There are three towers on the east and three on the west side of the building, the corner ones being 200 feet and the central ones 222½ feet high. The whole structure covers an area of 21,850 square feet. It is provided with all the most modern appliances for heating, lighting, ventilation and sanitation, and is richly decorated with carved stone work exteriorly, while the interior contains much costly decoration in colored marbles, mosaics and rare stones with which the walls are inlaid, besides beautiful metal work in brass and iron. The assembly room, which is the principal auditorium and place of worship, is on the fourth story of the building and accommodates 2500 persons.

Plowed land in England becomes less and less in area every year. From the official agricultural returns it appears that during the last 20 years the country shows a diminished area of nearly 2,000,000 acres under the plow, or over 14 per cent. Arable land in Wales has dwindled 21 per cent., but Scotland, on the contrary, shows an increase of 78,000 acres.

The total quantity of gas consumed last year in Berlin, Germany, amounted to 4,062,568,000 cubic feet, an increase of nearly 3 per cent. over the year 1891. On the other hand, electric lighting has increased 29 per cent. in the city during the same 12 months, and the importations of petroleum advanced 6.5 per cent.

The Westward Movement of the Center of Population.

In his speech at Pittsfield, Mass., Senator Dawes made pointed reference to the marvelous growth which the Western section of the United States has achieved since his entrance on public life. "The country," he said, "has been widening and going westward and westward to the Pacific Coast, and then on beyond, until the latitude itself fails to chronicle our onward march, and westward falls into the eastward, so that the sun will not go down to night upon our westward border until it shall have risen on the coast of Maine." The continuousness of this growth is shown by the steady westward movement of the center of population. When the census of 1850 was taken, two years after Mr. Dawes' public career began, the center of population was located at a point 23 miles southeast of Parkersburg, W. Va. The census of 1890 puts the point 20 miles east of Columbus, Ind. Here is a westward movement of 229 miles in 40 years, giving an average rate of 5.72 miles per year.

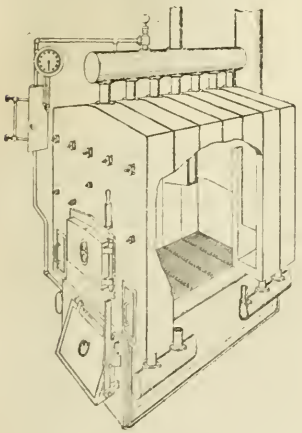
If the measurement is carried 60 years further back, to the first census of 1790, we find that there has been in the 100 years a movement westward of 505 miles, the center of population having passed from a point 23 miles east of Baltimore, Md., to the location in Indiana noted above. The rate of progress for the whole period averages 5.05 miles a year, or 73 feet a day. In other words, for a century the center has been moving westward at an average rate of 1 yard an hour, with 1 foot thrown in every 24 hours for good measurement. The slowest progress was made in the second decade, from 1800 to 1810. In this period the population center achieved only 36 miles of westing, or at the rate of about 2 feet 2 inches per hour. The swiftest progress came in the seventh decade, from 1850 to 1860, when the center moved westward no less than 81 miles, or at the rate of about 4 feet 10 inches per hour. During the last decade of the census enumeration, from 1880 to 1890, the rate dropped a little below the average, 48 miles of westing being made, which would be about 2 feet 11 inches per hour. We may add, to bring the estimate down to the beginning of 1893, that, if the rate of progress noted in the past census decade has been maintained in the two and one half years since the census was taken, the present center is found at a point 8 miles east of Columbus, Ind., about half way between that city and Waynesburg. And the census of 1890 will, at the same ratio, bring it to a point nearly 2 miles south of Unionville, Ind.

It is a curious fact that while the westward movement of the population has covered no less than 9¾ degrees of longitude (9 degrees 21 minutes 7 seconds), this movement has run almost in a straight line, the extreme northern and southern variations embracing less than one-third of a degree of latitude (18 minutes 56 seconds). To put the contrast more distinctly, we may say that while the western movement for the century aggregates 505 miles, the extreme northern and southern variation is a little under 22 miles, and the finishing point of the line is only some 6 miles south of the starting point. The slightness of this variation may be taken as showing that if you divide the United States by the thirty ninth parallel of north latitude the growth of the population in the two sections thus made has been very nearly equal during the 100 years covered by the 11 censuses. In view of the fact that the tide of immigration from foreign countries has set mainly into the northern section, such an equality in the growth of the population is a development that would hardly have been looked for.

STEAM AND HOT WATER.

The Dietrich Heating Boiler.

The accompanying illustrations show three views of a new form of heating boiler lately patented, and now put upon the market by H. A. R Dietrich, South Bethlehem, Pa. The boiler, it will be noticed, consists of cast-iron sections, the broken view in Fig. 1 showing its general construction and indicating the arrangement of headers and the shape of fire pot. In Fig. 2. which is a longitudinal section through the fire pot, the water spaces are shown. Fig. 3, which is a broken view, shows the fire passages and the direction



The Dietrich Heating Boiler.—Fig. 1.—Broken View, Showing Interior of Fire Pot.

of the currents of hot gases on their way to the flue. The general features of the boiler will be understood by an examination of these three engravings. We understand from Mr. Dietrich that the boiler is designed principally for heating and ventilating under gravity conditions. The vertical cast-iron sections have dome and nipple connections and are so placed together that a perfect gas-tight joint, it is claimed, is obtained by the use of a small quantity of asbestos in the openings between the sections. The construction of the boiler permits the use of the entire outside surface as a radiator for warm air. This is done by building a brick wall around the boiler and furnishing cold-air supply to it and conducting it away through heating flues. The boiler proper rests on a cast-iron base, has a shaking grate and all the latest conveniences for automatic control. The combustion chamber is in the top, the draft from the fire being up to the crown of the sections, then to the side and down to the bottom side flues, from where it is carried to the rear and into the smoke box, which is fastened to the bottom of the rear section. By this construction it is pointed out that the water is taken from the hottest part of the boiler and the gases escape from the coolest part. It is also claimed that the boiler is exceptionally clean, as all the heating surfaces are either vertical or overhanging horizontal. The construction, it is pointed out, is such that direct circulation takes place in each section from center to side, thus causing two independent circulations in each section. The boiler is furnished in sizes

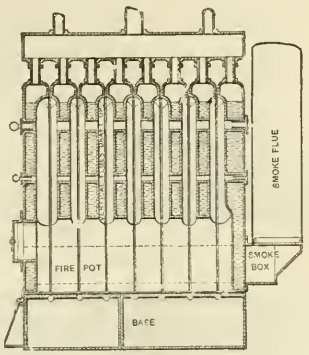


Fig. 2.—Sectional View through Fire Pot.

varying in capacity from 250 to 2500 square feet of radiation. The application of the grate to the boilers is such that a boiler of four sections will have three bars of grate. Thus the No. 1 boiler, with four sections, has an 18 x 18 inch grate, equal to 2¼ square feet, with 56 square feet of fire surface, adapted to heat from 250 to 350 square feet of radiating surface. The No.

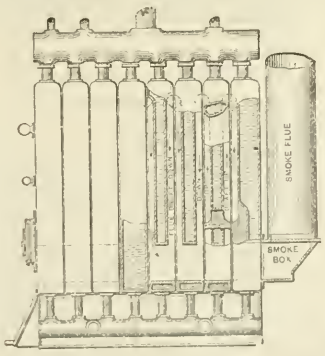


Fig. 3.—Showing Fire Passages.

2 boiler, composed of six sections, has a grate 27 x 30 inches, equal to 5⅝ square feet, and 162 square feet of fire surface, and adapted to heat from 900 to 1050 square feet of radiating surface.

The office of the United States Heater Company, which is the new name of the Capitol Heater Company of Detroit, Mich., is located in the Bagley Building, Randolph and Congress streets. The office on the first floor has a frontage and entrance on either street, and is handsomely finished in quartered oak with furniture of the same material. In all respects it is excellently equipped for the convenience and comfort of the officers of the concern and their assistants.

HEATING NOTES.

At a meeting of the Executive Committee of the Master Steam and Hot Water Fitters' Association of the United States, held Friday, April 7, it was decided to accept the proposition from the proprietors of the Revere House to entertain the steam fitters during the coming convention, which opens in Chicago at 10 a.m., June 6. The Revere House, therefore, will be the headquarters for the sessions of the convention. We learn from Secretary George H. Reynolds that the rates will be $3 and $3.50 per day, including meals.

Dirigo Heater Company, Portland, Maine, makers of the Dirigo hot-water heater, have established an office and showroom at 51 Oliver street, Boston.

W. H. Pennell, a hot-water expert, formerly of Jamaica Plain, Mass., and operating in New England, will now represent the the Model Heating Company, at their office at 144 North Second street, Philadelphia.

A growing interest is manifested in hot water for heating purposes, and is turned to profitable account by John C. F. Trachsel of 246 Arch street, Philadelphia, who makes a specialty of the line of the Gurney Hot-Water Heater Company of Boston, Mass. The operation of the plants he has installed during the past year has been, without exception, very satisfactory.

The Foskett & Bishop Company, New Haven, Conn., issue a circular letter to the trade calling attention to their new organization and stating that they will continue doing the business conducted by the firm of Foskett & Bishop. They are prepared to furnish and erect steam power and heating plants, provide boilers, pumps, &c. They also make a specialty of large and heavy piping for high pressure, as well as general mill work. They further announce that they will make the installation of automatic fire extinguishers a leading feature.

A curious specimen of advertising circular reaches us on the back of a postal card sent by Smith & Winchester, Boston, Mass. The top half of the postal is a panel with the name of the firm plainly printed in the middle, and the rest an undecipherable mixture of capitals and small letters, italics, script and several other forms of type. In some unexplained way, this jumble bears upon the fact that Smith & Winchester will furnish steam, gas, water and plumbing supplies promptly at reasonable prices.

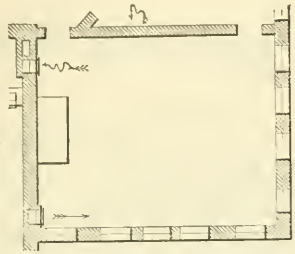
Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until May 3, for all the labor and materials and fixing in place complete of low-pressure return-circulation steam heating and ventilating apparatus, and high pressure steam boiler, &c., in the United States Court House and Post Office Building at Duluth, Minn., in accordance with drawings and specifications, which may be obtained of the Supervising Architect at Washington, or at the office of the Superintendent at Duluth.

Heating and Ventilating School Houses by the Blower System.—II.

By Walter B. Snow.

APPLICATION OF THE SYSTEM.

With any system of heating and ventilation, other factors being satisfactory, success or failure may be dependent upon the location of the inlet and outlet registers, and upon their sizes. The best practice now dictates that the inlet register shall be at least 8 feet above the floor level in one of the inner walls of the room, and that the vent register shall be in the same wall, at floor level, or in the floor itself close to the wall. Furthermore, that so far as possible, the heated air shall be discharged toward the coldest and most exposed wall; that in the case of a corner room, it be discharged from an inner wall close along one of the outside walls, and that the vent register shall be in the same inner wall, as far removed from the supply register as possible, all as indicated in Fig. 1. As a result, the air passes above head level to the opposite wall; in its passage by the side wall its temperature is slightly decreased, and a portion gradually descends along the window and wall to the floor; the remainder follows a similar process on the other outside wall, with the result that there is thus produced a downward movement of the air on both outside walls; when it reaches the floor the only means of escape for this air is through the vent register in the inner wall, and consequently the general tend of the air is in a mass diagonally across the room to vent register. In its transit it warms the pupils and removes from them the vitiated air.



Heating and Ventilating School Houses by the Blower System.—Fig. 1.—Arrangement of the Registers.

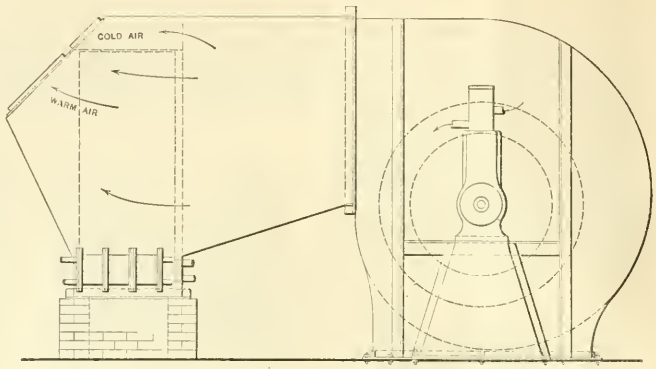


Fig. 2.—Special Hot-Blast Apparatus for Hot and Cold Air.

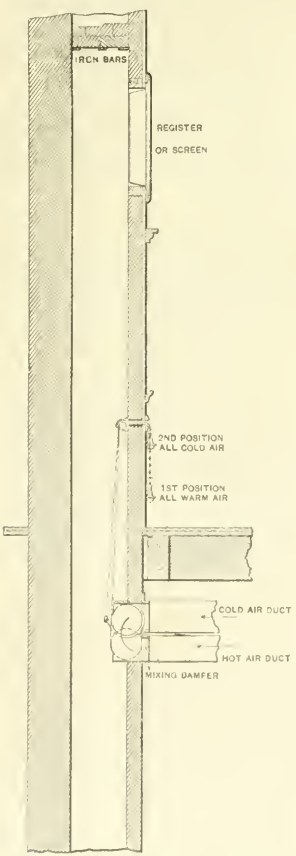


Fig. 3.—Section through Heat Flue.

Of course all air currents impinging upon the person must be at such low velocity as not to be perceptible. Accordingly, the velocity through the inlet register itself must be moderate—not over 50 feet per minute under ordinary circumstances.

ARRANGEMENT OF THE SYSTEM.

Having thus made clear the requirements in the schoolroom let us descend to the basement and follow the air in its passage through the system.

The steam supply, at say 40 pounds, being provided, as under any steam heating system, we may concern ourselves only with the particular features of the blower system.

Although the fresh air supply is often taken from above the roof, yet probably in the majority of cases it will be found to be drawn in through the basement windows from the ground level. In the moderately open country, if the openings are properly located there can be no reasonable objection to this arrangement; but ample area to supply the fan must be provided.

The fan, of the incased type, either paddle or disk in form, is located in or connected with a fresh air room and is driven either by independent or direct-connected motor—preferably steam engine or electric motor. The fan should be of large capacity, so that its speed may be low; likewise the engine—which if possible should be belted to the fan—should be large, so as to drive the fan at its required speed under low steam pressure. A direct-connected engine having a shaft in common with that of the fan is in the position of having any noise transmitted directly into the fan, whence the air stands only too ready to transmit it up the flues to the rooms.

The air from the fan passes directly through the heater, which may be simply a primary heater tempering the air to say 60°, leaving the remaining increment of temperature to be supplied by individual supplementary heaters or coils at the base of each of the flues. Such an arrangement, while having some special advantages, has at least the demerit of extra expense, which becomes more prominent when it is shown that the same results may be accomplished at less expense without the use of the supplementary coils. It is this more economical arrangement that is to be here described.

Placed directly in front of the fan is the main and only heater, capable of heating the air from, say, 0° to 130°. Air to be heated is forced directly through this coil into a system of horizontal ducts connecting with each of the flues. Fig. 2 illustrates a small apparatus with incased fan and direct-connected engine. It will be noted that above the top of the heater proper is a duct or passage through which air may pass without becoming heated. From this passage there is a second set of horizontal ducts immediately above the hot-air ducts previously described, and also connecting to the bases of the flues. The arrangement of ducts and flues is represented in Fig. 3, where is shown at the junction of the ducts a mixing damper, operated by chain from the room above, and so designed that either all hot air or all cold air may be admitted, or they may be mixed in any proportion without changing the total volume. There is thus provided without complication or the objectionable feature of numerous independent coils a ready means of varying instantly, at will, the temperature of the air admitted to any given room, and thereby overcoming the effect of various wall exposures without in any way changing the quality of ventilation.

Obviously these mixing dampers may be controlled by thermostats in the respective rooms, or, if desired, the control of the entire system may be placed in the hands of the janitor.

ARRANGEMENT OF DUCTS.

As shown in Fig. 2, the unheated air passes over the top of the heater and thence the cold air is conducted above the hot air. A reversal of positions is possible, dependent on type of apparatus and location of ducts. If, for instance, they are underground, it will be better to carry the cold air beneath the hot, both ducts being of brick, the cold being separated from the hot by slate, stone, brick or cement on cross carrier bars, or by two separated sheets of iron.

In all the distributing ducts a proportionately high velocity may be maintained. Leaving the fan at about 2500 feet per minute, the velocity should be reduced to 1500 or 2000 feet per minute when the air passes through the mixing damper. The velocity then immediately drops to that designed for the flue, say 800 feet per minute. Of course, the larger the ducts the lower the velocity and the less the loss from friction. But under moderate pressures with a force driven by an engine whose exhaust steam is completely utilized in the heater, the extra expense of moving the air is inappreciable, while the reduction in expense of the distributing ducts

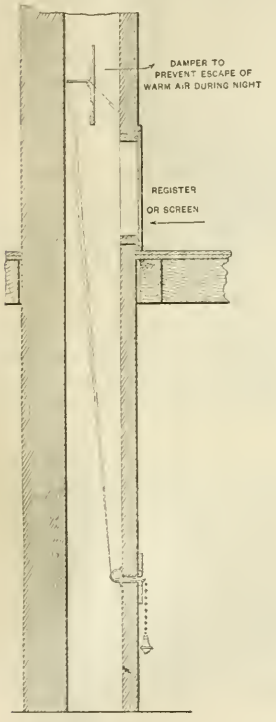


Fig. 4.—Section through Vent Flue.

and the space they occupy is of sufficient importance to receive careful attention.

VENT FLUES.

While with many systems there is required a complicated system of downward vent flues extending to the basement and there connecting with large and expensive aspirating shafts, there is necessary in the hot blast system only the simple flues extending above the roof line with no aspirating arrangement, for the pressure maintained within the room is always sufficient to produce the requisite discharge. In order to economize heat when the building is not occupied, it is best (assuming the inlet and outlet openings to be provided with screens only) to place in each vent flue above its screen a damper controlled from the basement, as shown in Fig. 4, so that no escape of air shall be allowed through the vent screens when the room is unoccupied.

When starting up in the morning, all vent flues should be closed, all doors opened into the corridors, the fresh-air supply to fan closed and all the air for heating taken direct from the building, thus simply heating it over and over. All of the rooms containing sanitary fixtures or devoted to toilet purposes should be provided with direct heat and have no hot air discharged into them, but be generously supplied with vent openings. The benefit of this arrangement is twofold: it allows of keeping heat on these rooms only and thereby preventing freezing while the rest of the building is shut; it furthermore, by the omission of the hot air supply, causes all drafts to be inward and prevents the possibility of escape of odors to the remainder of the building. The vent from the sanitaries should be carried into the space between the iron boiler stack (if such is used) and its surrounding chimney proper. A stove with its smoke pipe extending up this space should be provided for use to produce effectual ventilation when the boiler is shut down.

ECONOMY OF SPACE.

The general compactness of the blower system must be at once evident. All of the supply pipes are usually carried overhead in the basement, occupying no valuable space. The entire apparatus can ordinarily be placed in a single room of moderate size, usually within the limits of a single schoolroom.

The alledged compactness of this system cannot be better evidenced than by contrasting the cellar plans of similar school buildings heated by the blast and by the hot air furnace systems. In a case in mind where furnaces are employed, two basement rooms are completely occupied and two others to a large extent by the four furnaces with their fresh air rooms. A large amount of wall space is also required for large heat and vent flues and the numerous smoke flues, each with its individual stack heater. The blower system for a similar building, on the other hand, as illustrated in Fig. 5, is contained in a single room, all of the distributing pipe is overhead, out of the way, the flues do not occupy valuable space—in fact, the building with the blower system may be made smaller than when the furnace system is applied.

With the blower system the first cost is always less. When the expense of the flues is considered, the cost of actual time consumed in attendance is less, as only one fire must be tended instead of four and the coal bill will be found to be well inside that for the furnace system. To this must be added the ever-present advantage of positive action under all climatic conditions.

The furnace system has long been in the field; the indirect or direct with its aspirating shafts has followed at a later date and the blower system in the form here described is a product of the last three or four years — although isolated earlier examples may exist.

Every intelligent engineer, conditions permitting, is now ready to install the blower system in some form; but he must await the convictions of the builder, the owner or the officials in authority before he may be permitted to introduce this economical, efficient and health sustaining system in the place of the arrangements so frequently specified.

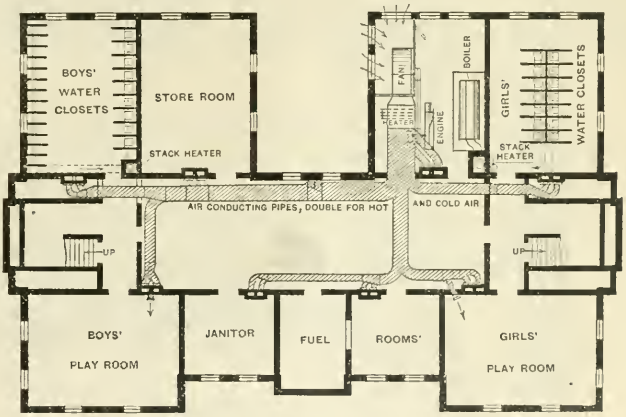


Fig. 5.—Arrangement of Blower System.

THE DIRIGO HEATER COMPANY, 51 Oliver street, Boston, Mass., distribute circulars describing the Dirigo hot-water heaters of their manufacture. An accurate description is given of the apparatus, and particular attention is bestowed upon the heating surfaces and the feature of circulation. Table of dimensions and prices are appended, and a number of testimonial letters are given.

Suggestions for a Spelling Bee.

The *American Chemical Journal* for March contains some reading, which, judging by the titles of its articles, could not be classed as "light literature." The following are the names of some of the papers included in this number: "On Chlorsulphopyromucic Acids"—a treatise which, by the way, contains such awe-inspiring compound words as "baric-chlorbromfurfuransulphonate"; "On M^e, thylfurfurol and Methylpyromucic Acid, in which fearsome substances, entitled, "dibrommethylpyromucic acid" and "methylpyromucicetrobromide," are mentioned; "On Amidophosphoric Acid," treating of such light and airy things as "diphenylamidophosphates" and "phenylamidophosphoric acid"; with a concluding paper, "On the Action of Succinimidebromide or Sodiummethylate in Dilute Solution." To the scientific chemist these polysyllabic nouns doubtless convey great ideas, and to the digger among Greek and Latin roots they would offer a rich field for investigation; but to the laity in general these papers might prove a trifle too abstruse.

The Compagnie Transatlantique strongly advocates the lighting of the Atlantic route from Ireland to Newfoundland. It is proposed to put ten powerful flosting lights 200 miles apart, and connect them by electric cables.

PLUMBING AND GAS FITTING.

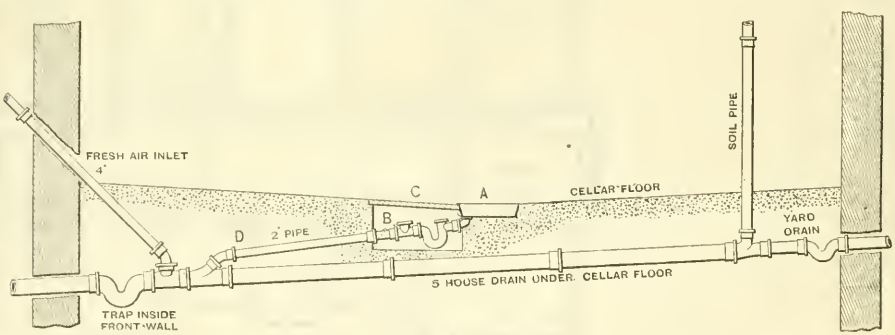
The Chicago Master Plumbers.

The regular meeting of the Chicago Master Plumbers' Association was held at 206 La Salle street, Monday evening, March 10, a fair attendance of members being present. The association indorsed the application of Andrew Young for chief tenement, factory and smoke inspector; also that of William H. Denung for secretary of Chicago Building Department. Jacob Kiessling, 1199 Milwaukee avenue, and Daniel Sullivan of McCann & Sullivan, 463 Forty-seventh street, were elected members of the association. Those who applied for membership were Peter Gow, 858 North Rockwell street; Henry B. Foster, 800 West Twelfth street; G. J. Julien, 430 West Twelfth street; Richard T. Ward, 1487 Harrison street, and John Leibolt, 311 West Twelfth street. Secretary Alex. W. Murray having been invited over to the house warming of the Builders and Traders' Exchange, Alexander F. Irons acted as secretary for the evening.

Cellar Surface Drainage.

From E. G. M., *New York.*—Your reply to the inquiry of "G. F. R." in *The Metal Worker* of March 11 appears to me to favor a very elaborate system of cellar subsoil drainage. Your plan calls for a sunken sink instead of a perforated plate, and a trap and flap valve, which seems to be more than is at all needed. Then, as regards the fitness of either the globe or gate valve to serve the purpose of a cut-off valve, there should be no difficulty in flushing out whatever of grit or ashes would find a lodgment therein. The flap valve, as is well known, may be all right at the beginning, but a very little thing will serve to prevent the flap from closing tight after the passage of water, or rather matter, through the pipe, and then there is no way to get at it. Why not let well enough alone, and put only a trap under the strainer at the mouth of the pipe? If the Board of Health or the Building Department require something else, let them tell the plumber what is necessary to have the work in the building passed. There is another thing also to be considered, and that is how the cellar is generally finished. How many of them do you think are properly graded so as to throw surface water to a given depressed point? Not one in 50, unless the contractor is looked after, and it does not always pay to be looking after other people's work.

Answer.—Our correspondent has not, evidently, considered the subject on which he writes in a spirit free from prejudice in favor of whatever system he has been carrying out himself. Let us see what are his objections. The first is the sink in the floor, presumably because he thinks it might be dispensed with and a perforated plate substituted. There is, in the first place, no saving, because good sanitary practice requires safes under all fixtures and safe waste pipes therefrom carried into the cellar to discharge into a trapped and water-supplied sink. It should therefore cost less to put a sink in a cellar floor which will answer the double purpose of a perforated grating for surface drainage and a receptacle for the occasional discharges from the safe wastes. A sink on the cellar wall with trap properly vented, and waste carried to house drain, will be much more expensive. Our correspondent does not suggest a means of flushing out the globe or gate valve while he suggests such a course. Where is the water? Surely not what runs off the cellar floor, for even if it were clear it has not sufficient force to wash anything out of its way. Again, he must bear in mind that the flap valve is not intended to keep out sewer gas, as the water-supplied trap will do all that. The flap valve preserves the cellar against the backing up of the sewage in case the house drain becomes choked; that and nothing more is its mission, and a glance at the diagram published herewith will show that a man-hole is provided with movable cover, through means of which both sink and flap valve are reached. As regards the cellar floor if the plumber neglects to have the concrete man make provision for his subsoil drain he should not expect his work to be accepted. In the diagram A represents the sunken sink, toward which the floor is properly graded, B the flap valve set on the 2-inch pipe D, while C represents the man-hole fitted with removable cover (generally a slab) through which obstructions can be removed either from trap or valve. The furnishing of a water supply, which, however, is not shown, is, after all, the best feature of this system, as it insures a constant seal for the trap on which our correspondent depends, without troubling himself how the said trap could keep out sewer gas if there should happen to be no water on the cellar floor for any length of time.



Cellar Surface Drainage.

Plumbing Vent Pipes.

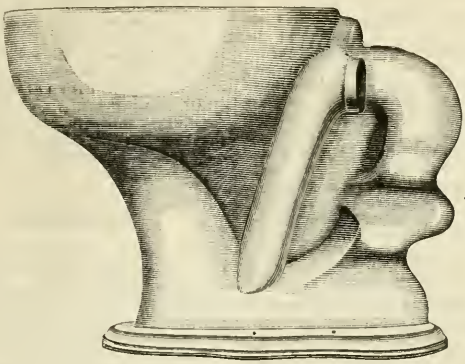
From A. B. C., *Watertown, N. Y.*—Please answer through *The Metal Worker* the following questions and oblige a constant reader of your paper: What is a local vent as applied to a plumbing job? What is meant by back-air vent as applied to plumbing?

Answer.—The term "local vent" is applied to a vent pipe which is intended to be carried from the bowl of an earthenware water closet into a heated duct or flue for the purpose of carrying away the odors from the closet bowl during its actual use and which would otherwise become diffused through the atmosphere of the room. Only a small proportion, however, of the total number of closets having this opening in the bowl is fitted with this pipe because of the difficulty of turning it to advantage. Some of the large office buildings of the period have the local vents so arranged that they branch into a horizontal pipe set above the closet and which connects with a vertical vent pipe carried upward in close proximity to a live steam pipe, in which cases the necessary ventilation is secured and the odors of the closet are carried away before the atmosphere of the water-closet apartment is vitiated. When the aperture is not used for local vent purposes the plumber plugs it with plaster of paris or other material suitable to the purpose. The term "back air" is a trade term for the vent pipe of traps—the function of which is so well under-

stood that no explanation is necessary. When a trap is said to be "back aired" it is then known to be vented in conformity with sanitary usage.

The D. & D. Syphon Jet Closet.

The D. & D. Syphon Jet Closet, of which an illustration is here presented, was brought out by the firm of Dale & Davis, Potters, Trenton, N. J., and has, we understand, already received favorable comments from the trade. The novelty of this closet consists in the shape of the syphoning duct or descending leg, the flattened portions of which are at right angles to each other, or alternately, and thus give a twisting motion to the descending water. Without lessening the



The D. & D. Syphon Jet Closet.

area of the bore this twisting motion gives the required retardation to the outflow, and the resulting advantages are that, with a minimum amount of water, the smallest size of flush pipe, and with a moderate hight of tank, a perfect syphonic action, it is claimed, is maintained till all the contents of the basin are expelled. The improvement was designed by Mr. Smith, the inventor of the syphon jet closet. It is neat in appearance, and can be obtained in plain white or ivory and it is also made embossed and decorated. The form of closet is controlled by a patent granted March 7, 1893, and assigned to Dale & Davis.

Wiping Stop and Waste Cocks.

From A. C. M.—Please inform me through the columns of *The Metal Worker* if, when wiping a stop and waste cock with plug out, it is better to put the cock in when the plug is hot or wait until it is cold. Please give reason for or against either practice.

Answer.—The practice of removing the plug or core of a stop cock was long ago condemned, and is no longer followed in good work. The object of the removal was to get the full effect of heat more readily, and, if still practiced anywhere, the cock should be allowed to cool before restoring the plug to its place, so as to allow the expansion and contraction to take place under the same circumstances. As already stated, however, good workmen wipe on stop and waste cocks without any dismemberment during the process, and it would apparently be the better plan for our correspondent to keep pace with the times and discard such methods as have been abandoned by the trade.

PECK BROS. & Co., New Haven, Conn., manufacturers of plumbers' brass goods and supplies, have opened an office and fitted up showrooms at 65 Oliver street, Boston, Mass., in charge of W. B. Hubbard.

TRAPS AND VENTS.

JOHN BYRNS, who is not only well-known in plumbing circles in New York, but also well known to all the prominent master plumbers of the country, through his connection with the National Association of Master Plumbers, has opened a new office at 1215 Lexington avenue, which he will run in addition to his old place at 425 Grand street, New York.

PRESIDENT J. SHEEHAN and TREASURER W. E. GOODMAN of the National Association of Master Plumbers were in Chicago Saturday, April 8, and while in the city were entertained by the officers of the Chicago Association.

A. L. BOGART, 22 Union Square, New York, an electrician of long practice, has invented and patented a large variety of electric appliances for gas lighting, call bells, annunciators and burglar alarms. One of the latest is a portable gas lighter and turnkey, to supplant the wax taper. It consists of a metallic handle of dark color, on a nickeled tube, with the turnkey at the end. A dynamo is concealed in the handle and operated by pressing the thumb on a lever, when sparks are emitted at the end ample to light any burner.

HENRY HUBER *et al.* against the Nelson Mfg. Company for infringement of a patent for improvement in water closets brought forth an opinion in the Supreme Court of the United States. Huber held the patents as assignee of two Scotchmen, who obtained English patents in 1874, and then allowed them to lapse at the expiration of seven years by neglecting to pay a fee of £100, which would have given the patents an extension of life for another seven years. The American patent contains on its face a declaration that it was issued by reason of the English patent. The American patent was not applied for until 1882, when there was no English patent in existence. The court holds that under Section 4887 Revised Statutes this American patent is void, having been applied for when there was no existing English patent. Justice Blatchford announced the opinion.

SEALED PROPOSALS will be received at the office of Supervising Architect, Washington, D. C., until May 5, 1893, for all the labor and materials required for the interior finish of the United States Post Office Building at Canton, Ohio, including plumbing, lathing, furring, plastering, wood stairs, marble work, joinery work, wood flooring, glass, hardware, painting, polishing, &c., in accordance with the drawings and specification, copies of which may be had at the office of the Supervising Architect, Washington, or the office of the Superintendent, at Canton, Ohio.

Southern Pig Iron Freights.

The Louisville & Nashville Railroad Company have issued a new tariff on pig iron from Southern furnaces to points north and west, the advances being effective April 13, and the reductions April 6. The rates are per ton of 2268 pounds, when in carload lots of not less than 17½ tons. The rates between some of the more important points are given below:

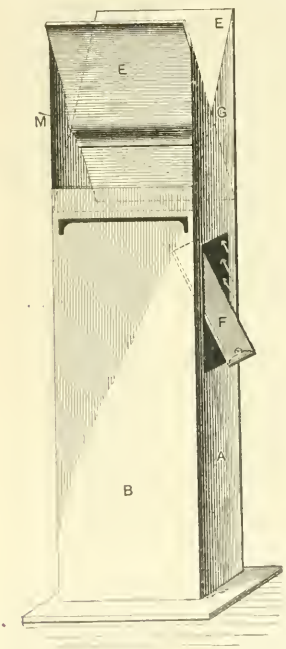
To	From— South Pittsburg, Tenn.	Chattanooga, Tenn.	Birmingham District.	Sheffield, Florence, Decatur, Ala., Rockdale, and Napier, Tenn.
Pittsburgh District, Pa.	$3.81	$3.90	$4.40	$4.15
Alliance, Ohio	3.26	3.35	3.85	3.60
Ashtabula, Ohio	3.36	3.45	3.95	3.70
Atchison, Kan.	4.87	5.00	5.00	4.55
Aurora, Ill.	3.47	3.60	3.85	3.60
Beaver Falls, Pa.	3.81	3.90	4.40	4.15
Belleville, Ill.	2.87	3.00	3.25	2.80
Bucyrus, Ohio	3.06	3.15	3.65	3.40
Buffalo, N. Y.	3.81	3.90	4.40	4.15
Burlington, Iowa	3.47	3.60	3.85	3.60
Charlestown, W. Va.	2.90	2.99	3.49	3.24
Chicago, Ill.	3.47	3 60	3.85	3.60
Cincinnati, Ohio	2.14	2.25	2.75	2.50
Cleveland, Ohio	3.26	3.35	3.85	3.60
Colorado Springs, Col.	6.93	7.06	7.06	6.61
Columbus, Ohio	2.76	2.85	3.35	3.10
Council Bluffs, Iowa	4.87	5.00	5.00	4.55
Davenport, Iowa	3.47	3.60	3.85	3.60
Dayton, Ohio	2.51	2.60	3.10	2.85
Defiance, Ohio	3.06	3.15	3.65	3.40
Dubuque, Iowa	3.87	4.00	4.25	4.00
Duluth, Minn.	5.01	5.14	5.39	5.14
East St. Louis, Ill.	2.87	3.00	3.25	2.80
Evansville, Ind.	2.33	2.50	2.75	2.50
Findlay, Ohio	3.06	3.15	3.65	3.40
Fort Wayne, Ind.	3.13	3.25	3.50	3.25
Grand Rapids, Mich.	3.73	3.85	4.10	3.85
Hamilton, Ohio	2.41	2.50	3.00	2.75
Hamilton, Ont.	4.01	4.10	4.60	4.35
Houghton, Mich.	5.01	5.14	5.39	5.14
Indianapolis, Ind.	2.88	3.00	3.25	3.00
Johnstown, Pa.	4.11	4.20	4.70	4.45
Joliet, Ill.	3.47	3.60	3.85	3.60
Kansas City, Mo.	4.87	5.00	5.00	4.55
Kingston, Ont.	5.06	5.15	5.65	5.40
Leavenworth, Kan.	4.87	5.00	5.00	4.55
Little Rock, Ark.	3.38	3.50	3.50	....
Martin's Ferry, Ohio	3.81	3.90	4.40	4.15
Memphis, Tenn.	1.88	2.00	2.00	....
Milwaukee, Wis. (All rail)	3.87	4.00	4.25	4.00
Milwaukee (Rail and water)	3.4	3.60	3.85	3.60
Minneapolis, Minn.	5.01	5.14	5.39	5.14
Montreal, P. Q.	5.26	5.35	5.85	5.60
Muncie, Ind	2.74	2.85	3.10	2.85
New Castle, Pa.	3.36	3.45	3.95	3.70
Niles, Ohio	3.36	3.45	3.95	3.70
Omaha, Neb.	4.87	5.00	5.00	4.55
Peoria, Ill	3.37	3.50	3.75	3.50
Pueblo, Col.	6 93	7.06	7.06	6.61
Richmond, Ind.	2.83	2.95	3.20	2.95
Salem, Ohio	3.36	3.45	3.95	3.70
Sioux City, Iowa	4.87	5.00	5.00	4.55
South Bend, Ind.	3.47	3.60	3.85	3.60
Springfield, Ohio	2.61	2.70	3.20	2 95
Springfield, Ill.	3.22	3 35	3.60	3.35
St. Louis, Mo.	2.87	3.00	3 25	2.80
St. Paul, Minn.	5.01	5.14	5.39	5.14
Steubenville, Ohio	3.81	3.90	4.40	4.15
Terra Haute, Ind.	2.77	2.90	3 15	2.90
Toledo, Ohio	3.06	3.15	3.65	3.40
Topeka, Kan.	7.29	7.42	7.42	6.97
Toronto, Ont.	4.01	4.10	4.60	4.35
West Superior, Wis.	5.01	5.14	5.39	5.14
Wheeling, W. Va.	3.81	3.90	4.40	4.15
Youngstown, Ohio	3.36	3.45	3.95	3.70
Zanesville, Ohio	3.16	3.25	3.75	3.50

The Nova Scotia coal mines produced last year 1,752,000 tons, of which only 14,000 tons were taken by the United States.

ROOFING AND CORNICE.

An English Chimney Top.

In the accompanying illustration we present a general view of a chimney top which has recently been brought to the attention of the building trades in England. It is so constructed as to prevent down drafts, while increasing the up drafts, and is offered as a remedy for smoky chimneys. It is rectangular in cross section, and the inventor states that by a slight alteration it can be used as a ventilator to carry off vitiated air or dangerous gases from pipes connecting with the basement of a building or with sewers. In the construction of the device here illustrated the top is provided with a metallic shutter or flap, marked E, which works on bear-



General View of an English Chimney Top.

ings, G M. It is arranged to oscillate from side to side, the base resting against either one side or the other, according to the direction of the wind. The lower end of the metallic flap E is less distant from the bearings G M than the upper end, so that the latter is tilted according to the direction from whence the wind is blowing. The added weight of the upper end retains the portion E in position until it is reversed by a current of air in the opposite direction. In either case, however, the shutter E prevents the air from entering the chimney in a downward direction, while facilitating up drafts. The metallic shutter F, shown in the side of the device, is deflected at times by the action of a passing current of air, as indicated in the engraving. This causes a strong upward draft, so as to carry off the smoke and increase the current of air that is flowing upward. The lower end of the flap E is weighted, so that when the pressure of the wind decreases the flap assumes a more vertical position.

Leaks in Tin Roof.

From E. W. F., *Astoria, Ill.*—There is a flat-seam tin roof of 20 squares in our place that was put on in 1867, a good quality of IX 20 x 28 tin being used. The roof has been kept well painted, and the tin is bright under the paint, but for the last two years it has been cracking at the seams and leaking badly. The broken seams have been soldered, but after the first snow or rain there will be more broken seams and more leaks, as the seams break open after they have been soldered. What method is the best to employ for repairing the roof?

Answer.—While the surface of the tin under the paint may be bright, as would be the case if the roof was well painted, it is possible the tin is rusting through from underneath. This can be caused by the condensed moisture from below or by the leaks our correspondent mentions. If such is the case, it will be difficult to repair the roof so as to make a durable job. If the tin is in good condition, and the broken seams are caused by the expansion and contraction of the metal, in place of soldering them in the usual manner the experiment could be tried of soldering strips of tin over the cracks. These strips can be about ¾ inch wide, and bent slightly through the center so as to prevent warping when being soldered.

Measuring Standing Seam Roofing.

From H. W., *Williamsport, Pa.*—In reply to "R.," Rhinebeck, N. Y., whose letter appears in *The Metal Worker* of April 1, regarding the measurement of standing seam roofs, would say that I have had many years experience in tin roofing, both in Pennsylvania and in New York State, as far east as Dutchess County, and as far west as Cattaragus County and intermediate places, but have not found it customary anywhere to measure the standing seam, the flat seam only being measured. I do know of one instance where a tinner tried to but was not successful, because the owner would not submit to it. I have been asked the question if it were practicable to do so, but my answer has been that I did not think it was, because what I lose in tin in a standing seam I more than compensate for in time required to put it on. In fact, I prefer to put on a standing seam roof to a flat seam roof, and in all cases where I can, if there is fall enough to warrant it, do so. And there is fall enough for a standing seam roof in 1 inch to the foot. If care is taken to make a good seam, a standing seam roof is much better than the flat seam, on account of contraction and expansion.

From A. B. C., *Indiana.*—In reply to a recent correspondent who makes inquiry about the measurement of standing seam roofs, I think it correct to not measure the standing seam. Measure the roof simply as if they were made flat. As hips and valleys require more work and waste of materials it is right to measure them double. Some tinners have one price per square for all kinds of roofs, and make no difference between the price for the roof of a barn or of a house. The one is usually without flashings, chimney fittings, gutters or valleys, and has long strips, while the other usually has all of these and short strips. Of course, the house requires more work, and a higher price per square should be charged. The pitch of a roof ought to have something to do in determining the price.

FLASHINGS.

The Fostoria Steel Roofing Company of Fostoria, Ohio, have issued from the press an illustrated catalogue and price-list of steel roofing, corrugated iron and other specialties with which they are prepared to promptly supply the trade. In issuing this catalogue special attention is called to the quality of roofing, siding and eave trough as manufactured by the company, who state that they employ the best material and have added to their plant new and improved machinery for the manufacture of roofing, spouting, &c. The goods covered in the publication before us include V crimp, clapboard siding, patent slip joint eave trough, steel hangers, corrugated patent conductor pipe, strainers, cut-offs, &c. Numerous illustrations are given showing the various lines of goods manufactured, while tables, rules for measurement and general directions will be found of interest to the members of the trades addressed.

Elisha Hawes of Sacramento, Cal., has patented a form of metallic lath so made as to hold the mortar in place while at the same time the thin metal sheets are stiffened. The lath consists of strips of sheet metal transversely overlapped and secured together by clinches at intermediate points. The overlapped parts of the strips are provided with edge folds and intermediate stiffening ribs. In each sheet are backwardly curved projections sufficiently numerous and close together to properly hold the mortar.

J. C. McFarland, manufacturer of cornices, skylights, &c., 2511 to 2519 State street, Chicago, has at present 150 men in his employ. Great efforts are being made to have the new depot of the Illinois Central Railroad at Twelfth street ready for occupancy by April 17. The men employed on the building are working until 11 o'clock at night by the aid of electric lights.

We are indebted to Scott & Company, 75 East Front street, Cincinnati, Ohio for a catalogue of 16 pages relating to roofing specialities. The matter contained within the colored paper covers in which the pamphlet is bound relates to iron and steel roofing, siding, ceiling, gutters, spouting, iron doors and shutters, graphite paint, &c. The illustrations are numerous and the letterpress carefully describes the special features of the goods made and the manner in which the work is applied

THE RETAIL STORE.

Stove and Tin Store.—V.

BY VETERAN.

A tin shop cannot be short of tools and machines without ultimate loss instead of gain. What can be more reasonable than to supply a shop with every tool or machine that will save labor when all the tools made for hand power combined do not cost as much as one year's labor of one man? The machines, if well-used, properly oiled and cleaned, will last at least 25 years, and even then possess some value. I do not think a number of workmen need any greater variety of machines than a single one, unless they are duplicates of those most frequently used, like the small turner, burring machines, square stake, mandrels and small tools. Suppose that $100 worth of useful tools and machines are dispensed with to save their cost, that amount can be saved when 40 days' time has been saved and the tools will then be possessed and in good order.

It is the same with benches. They may be put up for a song out of any cheap lumber, but it pays to have good, wide, heavy hardwood benches, securely fastened down, with cast-iron plates for the stakes and a strip of angle iron at the front edge for bending sheet metal. Each workman should have his small tools—like hand shears, chisels, punches, hammers, mallets and files—and be held responsible for them. If there are only two men in a shop one of them should be the foreman and the one to look to when things go wrong. The foreman should keep the time of the men, not only for their pay roll, but should note down when a man goes out on a job, the time of day, what he takes in stock, and the time when he returns, and what he brings back. It is too important to be all left to the workman. Perhaps he will report correctly when he knows his error would be detected; but experience shows that there is too much guess work when the ordinary workman is not looked after. This can be attended to by a clerk in the store if preferable.

There is profit and satisfaction to be gained, as well as a duty to be performed, in keeping up the supply of tinsmiths by having an apprentice in the shop. If a boy is carefully selected, with due regard to intelligence, mechanical taste, honesty and morality, he will be worth much more to his employer than just what his work amounts to. Unlike the workman, he is a fixture for a term of years, and should be treated as well as he would be in a school and made to act as a helper in the absence of the foreman in guarding his employer's interest. The writer has kept up a correspondence and friendly intercourse to the present day with some of his "boys," that are now gray-haired men, and his regard and friendship for his own "boss" only ended at his death.

Among the Stove Dealers of Western Connecticut.

Journeying through the Nutmeg State one may find at Stepheny Depot a quiet, unassuming dealer, John Benedict by name, who has been in business there since 1865, and judging from his surroundings, he has made a success of the tin and stove trade. Mr. Benedict makes a specialty of the Acorn and Andes stoves and ranges. Occasionally he puts in a furnace, and lately has been using the Howard furnace, which has attained considerable reputation in Central New York and elsewhere.

E. J. Hall carries on the stove and tin business at Sandy Hook with a considerable degree of success. He also has a branch at Newtown, 2 miles distant. Mr. Hall for the past few years has been selling the Garland stoves and ranges as his leading line, and he speaks very highly of the smooth casting of these goods. He also handles the Spicer Stove Company's Model Grand range.

High among the hills and beautifully situated lies the village of Ridgefield, where Peter McGlinn carries on the plumbing and tin business. Mr. McGlinn sells the Bay State and Manhattan stoves and ranges. He has been in business in that place since 1889, succeeding Frank Main.

Henry Foggerty is also here and makes a specialty of driving wells, besides representing the Richmond Stove Company of Norwich, Conn.

Probably no city of Connecticut has more enterprising stove and hardware dealers than Danbury. Situated on the main street will be found the large and beautiful stove and hardware house of C. S. Andrews. The building, a three story brick structure, was recently erected by the occupant and is especially adapted to his business. There are three large show windows, which are always tastily arranged Mr. Andrews carries a large stock of heavy and shelf hardware, crockery, china, glassware, also agricultural implements and harness supplies. He sells exclusively the Richmond stoves and ranges.

C. W. Hull & Co. also carry an extensive line of hardware, agricultural and mill supplies. For several years this house has made a specialty of the Bay State and Garland stoves and ranges, selling a few of the cheaper lines of other manufacturers. They now occupy their new store, which they recently erected on the old site, their former store having been destroyed by fire about two years ago. They do an extensive business. Mr. Young, who does the buying, is well liked by the traveling salesmen.

M. A. Duane, although not on the main street, has a large force of plumbers and tinners at work and makes a specialty of the Andes and Glenwood stoves and ranges, receiving in 1892 first premium at the Danbury fair for the finest display of goods.

The J. M. Ives Company, although a large furniture and crockery house, do considerable stove business as well. For several years they have made a specialty of the Acorn parlor stove and use the West Shore range as their leader.

Retail Hardware Dealers' Association.

The trade will be interested in the announcement that an association of retail dealers was organized at Titusville, Pa., March 30, the object being to promote the interests and secure the friendly co-operation of retail Hardware dealers. Another object closely connected with the general purpose of the organization will be to prevent as far as possible the practice of manufacturers and jobbers selling to consumers, which is so common in certain localities. This, it is hoped, will be accomplished by each member declining to patronize concerns which thus encroach upon the retailers' legitimate field. The entrance fee, including dues for the first year, has been fixed at $5. The officers elected are as follows:

President:
J. P. FRAZIER, Franklin, Pa.
First Vice-president:
H. W. PICKETT, Warren, Pa.
Second Vice-president:
C. J. KIRK, New Castle, Pa.
Secretary and Treasurer:
S. S. BRYAN, Titusville, Pa.
Directors:
M. H. CLARK, Jamestown, N. Y.
R. L. KERNOCHAN, Titusville, Pa.
F. N. CHAMBERS, Oil City, Pa.
D. C. WELLER, Erie, Pa.
JNO. S. LESLIE, Sharon, Pa.
D. ARTHUR GILL, Meadville, Pa.

In addition to the above gentlemen, the following are the original members of the association:

A. S. PINNEY, Erie, Pa.
MEHL & SAPPER, Erie, Pa.
C. FLECKINGER, Erie, Pa.
ZUCK HARDWARE COMPANY, Erie, Pa.
SCHNEIDER BROS., Erie, Pa.
MURPHY BROS., Erie, Pa.
J. PETER ROSTATTER, Erie, Pa.
GEO. MALONEY, Franklin, Pa.
H. SPITTER, Titusville, Pa.
P. B. CARY & CO., Dunkirk, N. Y.
BLOSS & WELNER, Dunkirk, N. Y.
JOHN PORTER, Meadville, Pa.
C. M. HOPKINS, Union City, Pa.
R. EDMONDS & SON, Warren, Pa.
RICHARDS & RICKARDS, Oil City, Pa.
HASLETT, SNYDER & SHAUER, Oil City, Pa
McKERROW & GRAHAM, Oil City, Pa.
CARSON & RIDER, Oil City, Pa.

Any reputable retail Hardware dealer is eligible for membership. The secretary, S. S. Bryan of Titusville, Pa., will be glad to receive applications for membership and will answer all inquiries promptly. Great enthusiasm has been manifested so far and a large increase in membership is looked for. The association is organized under very favorable auspices and the trade in all parts of the country will be interested in its success.

THE FIRM OF SPATES BROTHERS, dealers in stoves, tinware and general hardware, at Eastport, Me., has recently been dissolved by mutual consent. John W. Spates, the senior member of the firm, has taken a fine store in the Hayscale block, where he will do a stove and tinware business, while William T. Spates will occupy the old stand.

Housekeeping Devices.

August Kreamer, manufacturer of house furnishing goods, 17 to 23 South Third street, Brooklyn, N. Y., is continually adding to his line of desirable specialties, in addition to a full assortment of tin, sheet iron and copper pieced ware suitable mainly for fine trade.

The stove-blacking box, illustrated in Fig. 1, is designed to keep together and in one place the implements and materials used in blacking stoves, ranges, &c. Neat housekeepers often keep a pair of old gloves to slip on for this occasion and use

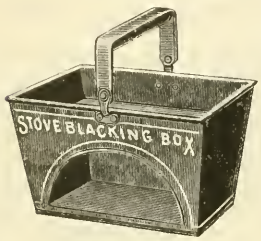


Fig. 1.—Blacking Box for Stoves, Ranges, &c.

cloths and brushes in applying the polish. The lower compartment is intended for cloths, gloves, &c. In the upper portion, the bottom being about 2 inches deep, may be kept polish, dauber and brushes. The article is made of heavy tin, being 11 inches long at the bottom, 13 inches at the top and 8 inches wide, with a substantial handle. It is brown japanned with bronze lettering. Fig. 2 represents a housemaid's pail, to be used in scrubbing, &c., constructed of stout material and all in one piece, the various parts being rigidly attached to each other. The pail is of ordinary size, 11½ inches at the top and 9 inches deep. The extreme width of basin is 16½ inches. At the left

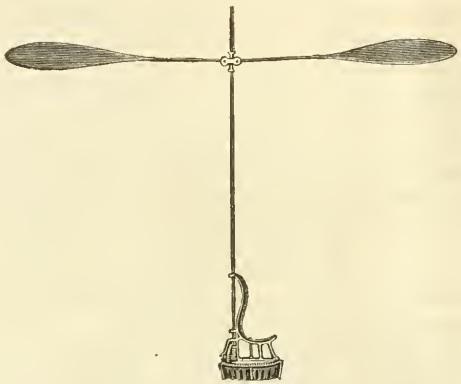
Fig. 2.—Housemaid's Pail.

is seen an attachment in which the brush may be placed after use, which both insures its being properly drained and found when next wanted. On the right is a receptacle with a perforated bottom for soap. The pails are painted a light blue or green tint inside and various colors on the outside. Another convenience, not illustrated, is a tin box for keeping the long narrow loaves familiarly known as French bread. It is of heavy tin, with a hinged cover and clasp and of the following dimensions: Length, 28 inches; hight, 12 inches; width, 10 inches. It is brown japanned with the words "French Bread Box" lettered in bronze. It has a capacity of ten or a dozen loaves.

BRADLEY & BRIGHAM, stove dealers and plumbers, at Marlboro, Mass., are about making some alterations in the interior of their store on Lincoln street. We understand that the front of the salesroom is to be built out to the street line, modern show windows substituted for those now in use and other changes made, which will give the firm additional facilities for conducting a steadily increasing business.

The Columbia Fly Fan.

Matthai, Ingram & Co., Baltimore, Md., and 42 Cliff street, New York, are introducing a keyless fly fan, as shown herewith. It is wound by holding the base in

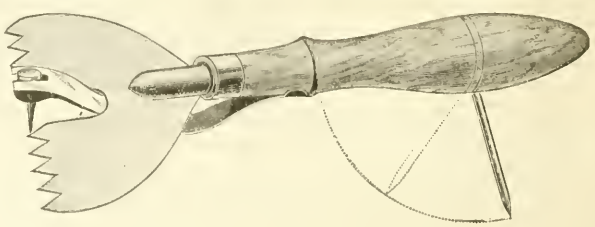


The Columbia Fly Fan.

one hand and turning the wing holder in the other. An automatic stop allows the wings to be stopped instantly, when the wing rod is lifted or taken off, and the wings revolve as soon as the wings and rod are replaced, the weight of the wings and rod releasing the stop. The manufacturers state that the fan will run effectively one hour after each winding. It is finished in nickel or antique bronze. The wing holder is referred to by the makers as resembling to some extent the outlines of a Columbus or a fifteenth century vessel, and the base and movement that of a modern propeller.

Combined Carpet Stretcher and Tack Holder.

The household tool illustrated herewith is being introduced by Wm. Vogel & Bros., 37-47 South Ninth street, Brooklyn, N. Y., as selling agents for H. Clayton & Co. The device consists of a polished steel plate, 3½ inches wide, with teeth, the plate being fastened into a substantial wood handle. A steel spring forming the tack holder is attached at one end to the lower side of the handle, the other end coming up through an opening in the blade. A steel pin is hung in the handle and folds into a groove when not in use. In stretching carpet a tack is placed in the



Combined Carpet Stretcher and Tack Holder.

holder, and the pin in the position indicated by the dotted lines. The carpet after being brought up to the base board is held in place by the pin until the tack is driven half way in by a blow of the hammer, when the stretcher is withdrawn and the tack driven home. The stretcher measures about 9 inches over all.

The Eli Washing Machine.

The Boss Washing Machine Company, Cincinnati, Ohio, are introducing the above washer, as illustrated herewith. The working parts of the machine are described as consisting of a corrugated cylinder for rubbing and turning the clothes, with the

The Eli Washing Machine.

handle for operating set back of the machine, turning loosely in the hand. The manufacturers claim that the machine cleanses the clothes more thoroughly than could possibly be done with an old-fashioned board; that the washer is so arranged that it is impossible to tear the clothes, and that it is so simple in operation that a child can work it without fatigue.

New Idea Double-Acting Spring Hinge.

The illustrations shown herewith represent a double acting spring hinge being introduced by the Stover Mfg. Company, Freeport, Ill. The hinge is made up of a jamb plate having ears, upon which is hung the leaf. It also has a stationary steel pintle to swing on, and it is impossible, it is stated, for the door to sag. As shown in Figs. 1 and 2, the hinge divides at the center (pintle line) by removing four screws. This arrangement, the makers remark, makes it easy to fit the leaves to the door, and to attach the jamb plate to the jamb. Attention is called to the fact that it is not necessary to round off the edge of the door, as the jamb plate and strip is concaved, allowing the corners of the door to pass through the circle of concave; also that the rear joint of the door is always covered, whether the door is partly or wholly open or closed. The working parts of the hinge are confined entirely within the jamb plate, Fig. 3, admitting, it is claimed, of its being taken apart and applied to the door with ease, and without danger of injury to the workman. Fig. 3 also shows the hinge as applied to the door, and gives a top and side view of the concave strip attached to the jamb. The hinges are made in japan and ornamental finishes, and in sizes for doors from ⅜ to 3 inches thick.

Fig. 1.—Hinge Divided at the Pintle.

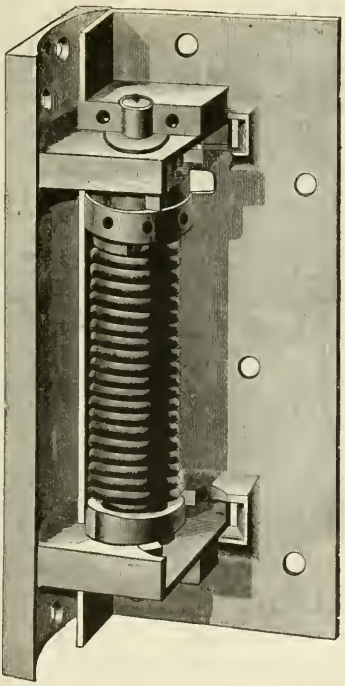


Fig. 2.—Leaf of Hinge in Position.

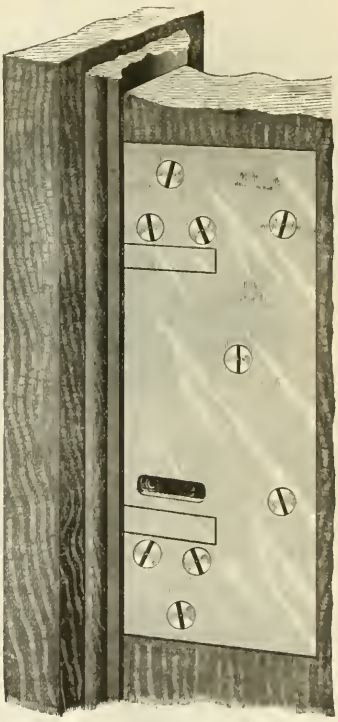


Fig. 3.—Double-Acting Spring Hinge Applied to Door.

The responsibility of retailers seems to be infinite. An English contemporary mentions a recent case in which judgment was entered against a London grocer for £50 in favor of a lady customer who slipped on a piece of bacon and fell on the floor of his store, injuring herself severly. The judge, in rendering his decision, said that whoever cared for the floor should be careful to keep it free from those substances that are dangerous to customers.

Suggestions as to Improvements in Putting Up Goods.

FIRST ARTICLE.

BY BERNARD B. NEAL.

I take it for granted that manufacturers understand very distinctly that the bulk of their goods are finally sold at retail in small quantities. Also, that it takes a great deal of time and labor to retail enough Hardware to amount to much in the way of money. Hence it is very important that they should study how to save time and labor to the retailer, and certainly the manufacturers have a good chance to save the retailer much time and also to increase sales by simply putting goods up in a good and attractive manner, and not letting a little extra cost stand in the way of doing so. To prove this I will mention some few things that occur to my mind, as follows:

First.—Paper boxes with metal corners should not be used, because after the cover is taken off it is hard to put it on again.

Second.—Good, strong thin paper should be used to wrap up articles that are packed in boxes of dozens, &c. Most of the paper now used is simply of no use whatever. For example, take a box of Locks, Bolts, &c.; take one out of its wrapper and show it to a customer; then try and put it back in its original shape, and you will find that you will have to get a good piece of paper in order to do so. I would suggest that good Japanese paper be adopted for this purpose, as it is thin, tough, and I believe cheap.

Third.—Manufacturers should refrain from putting printed advertisements with their name and address in goods. This is a feature that many of them have adopted, in fact they do up all articles with regular printed paper that informs a jobber's customer just where the goods are made, also that if he writes direct he can probably get a lower price; if this supposition is not a fair one, why do the manufacturers do it? The jobber has a hard enough time as it is to sell goods at any sort of a profit. So I say leave out the advertisements.

Fourth.—Labels should be printed in black letters on a light-colored paper, the numbers and name of articles in as large type as possible so that a person can read the name at a distance; it will often save running for a ladder to see if you have the article on shelf a few feet up. By all means let the old green and red labels go, and give us new, attractive and readable ones.

Fifth.—Labels should be put on in such a manner that none of the reading matter is hid. Sometimes we have goods labeled in such a manner that one must take off the cover of the box in order to read all of the labels.

Sixth.—This is an age of advancement and improvement, and the Hardware trade are quick to appreciate goods that

are put up in such a manner as to make their stores look pleasant to their customers, and I know of no line of goods that will make the same show as an attractive and clean stock of Hardware. The above remarks refer in a general manner to all Hardware. I will now mention some goods that I believe can be improved on, and in the method of putting up:

DOOR LOCKS

should be tied up with their respective Keys, Escutcheons and parts in a good manner. I sometimes hope that the day will come when each Lock will be done up in a paper box like Night Latches now are.

PADLOCKS

should have their respective Keys tied with good strong twine of suitable length to each lock.

CASTERS

are done up very poorly. Why not put them up in sets and then put them in a wooden box, instead of paper, which breaks and lets out the sockets?

WRENCHES

are very heavy, but most of the makers stick to paper, and very poor paper at that; and at the least handling the wrenches break through the paper and look very unsightly, thus time is lost in putting them in shape again. Let them be put in boxes.

THUMB LATCHES,

blind and gate hinges, blind fasts, &c., are very cheap, but I believe they would bring a better price if they were put up nicely. A clerk could sell one complete without losing so much time in finding all the parts. They should be put up in cheap boxes similar to the way the parts of Torrey's door spring are. In any case, have them so that a set can be sold complete without a clerk having to get a catalogue and studying how many pieces belong to a set.

HAND BELLS

would be much nicer in paper boxes instead of plain paper, as now. They are a nice line of goods and would stand being put up in a convenient and tasty manner.

DOOR BOLTS

should be put up better, so that the nosings and screws do not get lost.

BRACES

should be packed in wooden boxes containing ½ dozen, the better quality in nice paper boxes containing one only; a carpenter will think more of it.

SAWS

should be put up better; the good ones in nice strong paper, covering handle and all, so that the teeth cannot be damaged in handling; the outside boxes are about right.

WOODEN PLANES

are very poorly put up; better paper and nice labels would help a great deal.

AUGER BITS

should be wrapped separately and put in wooden boxes, so as to protect the points and thread.

HATCHETS

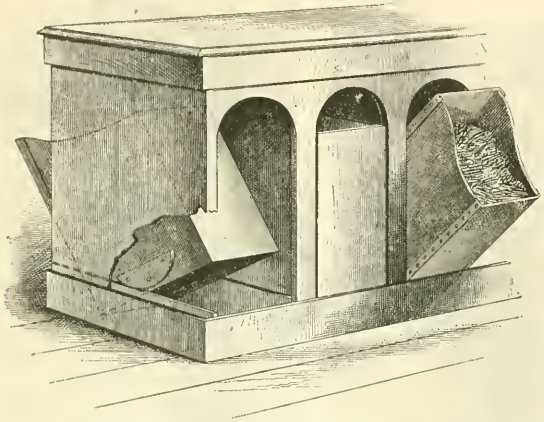
should be put in wooden boxes containing partition for each hatchet, each blade should be well done up in paper. The using of paper boxes in putting up hatchets has caused many a bad cut to the novice in hardware.

AXES,

unhandled, should be put up in paper boxes of one only, with the edge well protected, and the weights marked on each.

ARTICLES

put up in sets, such as chisels, &c., should have the size marked on the paper of each in a prominent manner, this will save time in finding out the size, &c. I could specify many more things, but think the above the most important, as they worry the retailer to a certain extent every day. The manufacturers may complain about the expense, &c., to them, but I believe they can and will in time do much more than I have named in the way of improvements in putting up hardware. I know that corkscrews are imported from Germany at 18 cents per dozen, put up in a real nice strong package, containing ½ dozen only, and we certainly can put up goods as neatly as any nation on earth.



Sheet-Iron Nail Pouches.

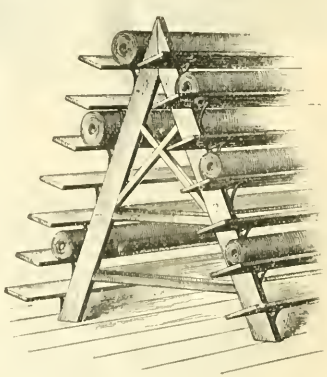
Sheet-Iron Nail Pouches.

We are indebted to H. S. Smith of Miller, Smith & Co., Chadwick, Ill., for a sketch and description of the Nail Pouches shown herewith. The Pouches are made of sheet iron 16 inches high, 16 inches deep and 10 inches wide, having a capacity of a little more than 100 pounds of Nails. They are so arranged that they are self-closing, and Nails can be taken from either side of the counter, or the Pouches can be used under the ledge. The point is made that the Pouches can easily be taken out, cleaned and filled and then be replaced; also that room is economized, as nearly the full hight of the counter is utilized for Nails, thus dispensing with wide bins. In using the old style of Nail bins the company experienced inconvenience from Nails becoming mixed in weighing and putting them back in the bins. This difficulty, they state, is entirely obviated by the use of the Pouches. Mr. Smith is prepared to name prices to any one desiring Pouches or Counters, as they can be put in any counter or under ledge at a limited expense.

Screen Wire Rack.

Wm. Kempf, 2814 Market street, St. Louis, Mo., has made a Screen Wire rack for his own use, as shown in the accompanying illustration.

The width of the roll of Wire is numbered on the front of each shelf and the rack is so arranged as to hold all the different sizes. At the bottom of the rack between the uprights are two shelves which may be utilized for odd lengths of Wire, or for other articles that require but little room. The lumber used in its construction was obtained from window-glass boxes, which of course cost nothing, and the labor was equally inexpensive, as the rack was made at times when there was nothing else requiring attention, so that the entire cost consisted of the nails and brackets, probably about 75 cents.



Screen Wire Rack.

Exhibit of Callahan & Douglas

Callahan & Douglas, Binghamton, N. Y., made an exhibit of goods in their line at the Industrial Fair held last fall in their city, a portion of which is illustrated herewith. The display board reached from the ceiling of the exhibition building to within about 3½ feet of the floor, and filled the entire width of the space at the back. A star of chain was the central figure, within which small tools were artistically arranged. Tools of larger size were grouped with good effect on the board outside the star, showing lines of the various articles. On the floor directly

Exhibit of Callahan & Douglas.

in front of the star was a square formed of gallon cans of mixed paints, in the center of which was a table. Fancy coffee and tea pots were shown on the table. The other goods exhibited in their space consisted of lawn mowers, carpet sweepers, wringers, granite ware, fine builders' Hardware, &c.

Tact in Selling.

In an article containing hints on selling, *Ironmongery* of London gives the following advice to Hardware salesmen, which may be perused with profit:

"It is very bad management to seek to force your opinions on a customer, such as, for instance, trying to get him to take Brown's make of Brushes when he explicitly asks for Smith's; or telling him that Jones' patent Ventilators are defective in principle when he asks for them, simply because what you happen to have in stock are of another make. Most people are inclined to suspect you are not acting honorably with them if you should seem to press them to take a different article to what they inquired for; much better is it to tell them candidly you do not stock Brown's brushes or Jones' Ventilator, but will procure them specially, at the same time showing what you do keep, without appearing to push them. But when a person does not specifically ask for a certain make of goods, you may unobtrusively influence him to take that of which you have a large stock, or which, for some other good reason, you would rather sell. It is much more satisfactory, both to your employer and your customer, that where you find you can use your influence over the latter you ought to get him to take a good reliable article rather than one of the description popularly known as "cheap and nasty." Many a purchaser will actually seek the advice or opinion of the assistant who is serving him as to the merits of the article he is buying, and rests quite satisfied with the answer. It has often occurred to me that to correctly reply to all the questions asked by those who patronize an ironmonger's shop an assistant must needs be a walking encyclopædia. How to fix a Gas Pipe or an Electric Bell, how to replace an old Sash Line with a new one, how to clean a Silver Teapot or a rusty Range, the best way to use a Plane or an Axe, a Digging Spade or Garden Shears; the most appropriate color of Tile to suit this Grate, or the most suitable Knocker for that door; these and many others are repeatedly asked, and the assistant who fails at any of them is placed rather awkwardly, as the customer is likely to lose faith in his ability if he betrays his ignorance of the matter under consideration. It were much better for an assistant to remain silent rather than talk on a subject in which he is not sufficiently informed, for it is not unlikely that the customer may be thoroughly conversant with it, and an attempt on the part of the former to describe that of which he is ignorant can only result in the latter setting him down for an ignoramus all round.

A correspondent of *Le Génie Civil* of Paris deals with the question of handling mortar in frosty weather. Having tried mixing alcohol and sea-salt with the water, he has now adopted common soda, which he finds gives the most satisfactory results in preventing the freezing of the mortar. One pound of soda is used to a gallon of the water with which the mortar is mixed, and the increased cost is reckoned to be about 18 cents per cubic yard of masonry, an outlay which it is often well worth incurring to avoid the loss and delay incident to stoppage of work in frosty weather. The use of the soda causes an efflorescence in the walls of the building, but the blotches thus arising are said to entirely disappear in the course of a short time.

Price-List and Circular Case.

The views shown in Figs. 1 and 2 represent case used by Geo. Krause & Co., Lebanon, Pa., for keeping small

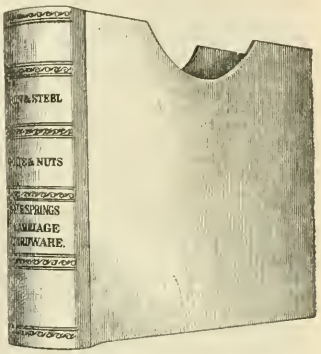


Fig. 1.—Price-List and Circular Case.

price-lists and loose circulars which it is desirable to preserve, and yet are difficult to keep in a convenient form for ready reference. The cases are bound in leather and cloth, of different colors, with lettering on the back describing the contents, which when put on a shelf side by side make a fine appearance, and re-

Fig. 2.—Appearance of Case on the Shelf.

semble to a marked degree a set of volumes. The most desirable size for these cases has been found to be 9½ inches high, 14 inches deep and 3 inches thick. F. W. Frost of Lebanon is the manufacturer, who has also made others for parties who have seen these at the above store.

STOVE TRADE NOTES.

Electric Heaters for Street Cars.

Tests have been made during the past winter by the Albany Railway, an electric line, says our Albany correspondent, which demonstrate the success of the electric heater manufactured by the Consolidated Car Heating Company of that city.

The inventor of the electric heater is James F. McElroy, consulting engineer of the Consolidated Car Heating Company. The method of transformation of electric energy into heat employed is by the passage of an electric current through a resisting conductor. In the construction of this heater the resisting conductor is divided into a number of parts, so that these parts may be assembled in different combinations, offering different resistances to the passage of the current, and thus obtain different intensities of heat. For convenience the resisting conductor on each car is divided into 12 equal parts, two of these parts being combined into one heater, so that six heaters are placed in each car. The resisting conductor wire is coiled in the form of a close and continuous spiral. A cylindrical glazed porcelain insulator is provided, mounted upon a ⅝-inch square iron rod. A spiral groove is formed upon the surface of this cylindrical porcelain insulator, and extends continuously from one end of the heater to the other. The resisting conductor is placed in the spiral grooves after being drawn out sufficiently to prevent neighboring coils of the spiral from coming in contact with each other.

At the end of each division of the heater a glazed porcelain plate is provided in which binding screws are placed, to which the ends of the spiral are connected. The two parts of the resisting conductor placed in each double heater are separated by a glazed porcelain plate so that the parts may be connected independently where the plan of wiring so requires. The spiral resisting conductors are placed on the porcelain insulator, which is supported by an iron rod, and carried at the ends of the heater upon two cast-iron supports. By these supports the heater is fastened to the floor of the car, and these supports also furnish the means of securely attaching the covering box of the heater itself. All parts of the apparatus are thoroughly insulated. A peculiar construction removes entirely the dangers of short-circuiting.

The heater is covered with an ornamental wooden box, which is lined throughout with asbestos mill board, in which is made a screened opening through which the circulation of air from the heater is maintained.

The heaters are so placed as to distribute the heat within the car as evenly as possible. The electric heater warms the car by indirect radiation; in other words, a free circulation of warm air is maintained in which the air flowing in at the bottom of the heater comes in contact with the heated wire spiral and with the porcelain insulators. It then passes up through the casing and out at the grated opening at the front of the heater. One of the most commendable features of this electric heater is its cleanliness.

As to the cost of heating a car with the electric heater, it is evident that the cost must be calculated by the quantity of current consumed. As this quantity varies with the variable electro motive force carried on most street car lines, it is evident that the actual electric energy consumed is a matter not readily determined. On most street-car lines the total cost of an ampère-hour on a 500-volt circuit is about ½ cent.

The electric heater is also made in a variety of forms especially adapted for house and office service and is so wound, if desired, that it can be used with any voltage and with either a direct or alternating current. The new heater is the result of six years' of practical experimenting by the inventor. The company expect to fill many orders for them during the coming summer.

Alaska Poker Patent Sustained.

The stove trade of the country will be interested in learning that the Troy Nickel Works of Troy, N. Y., have finally succeeded in securing their patent rights relative to the Alaska poker. The action by John E. Gaitly against Frederick W. Collins was brought in the United States Court to recover damages on account of infringement by the defendent of letters patent No. 381,356, issued to Mr. Gaitly on April 17, 1888, for certain improvements in fire pokers. A large amount of testimony was taken in the case and a great many old patents introduced in evidence. The case was heard before Judge Wallace on January 17 of the present year, at a regular term of the court held in Albany, and a decree entered declaring the validity of the said patent and ordering an injunction against the defendant, which was issued by the court named on January 20, 1893. As being of possible interest in this connection we present below a copy of the decree in full.

The President of the United States of America, to Frederick W. Collins, and to your agents, clerks, servants and workmen, Greeting:

Whereas, It has been represented to us in our Circuit Court of the United States for the second Circuit of Northern District of New York that letters patent of the United States were issued to John E. Gaitly in due form of law, on April 17, 1888, for improvements in fire pokers, said letters being known as No. 381,356, and that you the said Frederick W. Collins, have infringed said letters patent and upon the exclusive rights of the complainant under the same, contrary to the form of the statute in such case made and provided.

Now, therefore, we do strictly command and enjoin you, Frederick W. Collins, your agents, clerks, servants and workmen, under the pains and penalties which may fall upon you in case of disobedience, that you forthwith and forever desist from directly or indirectly making, constructing, using, and vending to others to be used, fire pokers containing or employing the invention described and patented in the said letters patent No. 381,356.

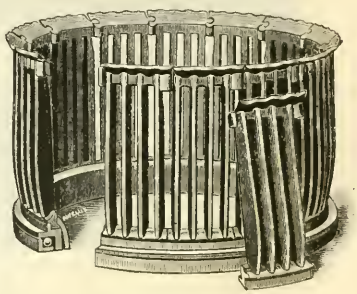
Witness, The Hon. Melville W. Fuller, Chief Justice of the Supreme Court of the United States at the City of Utica in said Northern District of New York, this Twentieth day of January, in the year of our Lord one thousand eight hundred and ninety-three, and of our independence the one hundred and seventeenth.

W. S. DOOLITTLE, Clerk.
By C. W. HIGGINSON, Deputy Clerk.

A True Copy, W. S. DOOLITTLE, Clerk.
By C. W. HIGGINSON, Deputy.
[SEAL.]

The Ridgway Revolving Open Fire Pot.

One of the interesting features in connection with the construction of the Ridgway heater, manufactured by the Ridgway Furnace Company, Boston, Mass., is a revolving open fire pot, a view of which is presented in the accompanying illustration. This fire pot is claimed by the makers to embrace improvements which overcome the defects of both the cast iron and brick-lined pots, maintaining and excelling the advantages of the two. It is made in sections and put together in such a manner as to allow for expansion and contraction, besides facilitating handling in shipment and setting up. It is revolved on balls about 1 inch in diameter, bearing on perfectly flat surfaces, resulting in the least possible friction. The construction is such that any of the working



The Ridgway Revolving Open Fire Pot.

parts can be removed or replaced without taking the furnace down or disturbing the hot-air pipes. The manufacturers state that "with the use of this revolving open fire pot the entire surface of the radiator is utilized by the direct radiation from the sides of the burning fuel, as well as from the top, for the products of combustion not only pass upward but outwardly through the open spaces in the sides, burning the gases near the radiator as fast as generated, thereby utilizing them to the greatest extent and preventing explosions, which are likely to occur in furnaces constructed with the ordinary fire pots." Reference is also made to the advantages of this pot in running a continuous low fire, for, being surrounded by a plate iron radiator, it permits of direct radiation from the sides of the fire, while preventing the cold air from coming in contact with the sides of the pot and thus chilling the fire. The fire pot is revolved by means of a crank placed at convenient hight, so that there is no necessity of stooping over to shake the grate. The contents of the pot adhere to the sides, turning with it, and as the grate remains stationary it scrapes the ashes from the fire without packing the coals, as is frequently the case when shaking the grate. This plan, the makers state, allows the operator to graduate to a nicety the amount of ashes to be cleared, according to the heat required. Provision is made to remove any ashes which may fall through the sides of the fire pot by means of a plow

or scraper placed in front, and which clears the bed plate on which the fire pot rests every time it is revolved.

The Ridgway heater, in connection with which this open fire pot is employed, has a radiator or dome made of the best refined plate iron, strongly riveted. From this the products of combustion are carried down to a return base flue, through two heavy sheet iron oval pipes, one on either side, and from thence upward through a similar pipe at the back of the radiator and discharged to the smoke flue. One of the special features to which attention is invited in connection with this heater is that the return base flue is separate from the ash pit, allowing the air to circulate between it and the main body of the furnace as well as to pass its outer surface, which, it is claimed, supplements the heating qualities of the furnace. The return base flue is suspended from elbows at the top of the radiator by means of heavy iron rods. By this means the base flue rises and falls with the radiator as the latter expands or contracts and without disturbing the joints where the perpendicular flues enter. Another interesting feature of the Ridgway heater is the direct draft damper, which is so constructed that there is no connection between it and the hot air chamber. The arrangement is such that by a simple device the damper opens and closes automatically each time the feed door is opened or closed.

New Trade-Mark.

The Detroit Stove Works have adopted a new trade-mark, which is herewith illustrated. This is the outcome of the numerous designs for a trade-mark submitted to the company in response to their advertise-

New Trade-Mark of the Detroit Stove Works.

ments last fall, in which they offered a prize for the best. The successful competitor has certainly produced a very effective piece of work for a trade-mark. It is distinctive, pleasing and simple. The outlines are of such a character that the trade-mark can easily be reproduced in any manner—printed, stamped, embossed or molded. Wherever seen it will be recognized as the peculiar emblem of this company. Being in the form of a crown, jewels are naturally suggested, and therein comes the special connection with the Jewel line of stoves and ranges manufactured by the Detroit Stove Works. The scroll at the bottom marks a departure from the custom in vogue of making it the place for an extravagant claim, the words inserted being: "The Original Detroit Stoves," forming a legend which is at once truthful, dignified and historical.

At the Philadelphia house of Yeager & Hunter of Spring City, Pa., Elwood Yeager shows samples of the Queen New Era, the new range which will be the leader of their cooking line for this year. Its beauty and quality are too striking to require a great deal from the genial manager to convince the trade that it is indeed a Queen.

Care of Vapor Stoves.

A little pamphlet of 12 pages has just been issued by the National Vapor Stove & Mfg. Company, in which is given a number of directions for the care of vapor stoves. The matter is of such a character that it cannot fail to interest many of our readers, and we therefore present copious extracts herewith:

Our aim in printing this little book is to give such information to the users of our stoves as will enable them to understand any peculiarity that may arise at any time in its workings. A vapor stove is not a very complicated piece of workmanship, nor does it require any unusual amount of brains to understand, but it is positively necessary that when in use its working parts must be kept clean and free from soot. This is the root of all trouble with gasoline stoves. The users will allow soot and dirt to accumulate on the burners, thereby making them work very indifferently, if not positively stopping the operation of the entire stove. A broken part on a stove must be repaired or replaced by a mechanic, but there is no good reason why the cleaning of a stove cannot be done by any person.

The burner is the main feature on a stove, as this part does all the work; the rest of the stove has nothing to do with the generation of gasoline, but merely takes care of the gas after it is generated.

A hard coal base burner is all right when the fire pot and drafts are in good condition, but if these two very necessary things are out of whack, the stove is of no account, no matter how nicely it may be nickel plated.

The same thing applies to a gasoline stove. Burnishing up the top and nickel-plated parts does not make the stove work if you do not clean the generator.

We make these few remarks on the care of a gasoline stove, knowing that the troubles arising from these stoves are not from any parts wearing out, but generally on account of users allowing the generators to get dirty and interfere with the workings of the generator.

Where a stove is used in a city it does not matter very much whether the stove does occasionally get out of order, as a man to repair same can be had at a moment's notice, but where these stoves are used in the country, or where they are the only cooking stove in the house, and we might add that gasoline stoves are fast becoming the only cooking stove where families have the kitchen heated by a furnace, it then becomes a hardship to have the stove give out just as you are depending on it as the only factor for cooking your meals.

The average user of a gasoline stove is supremely contented as long as the stove works nicely and does good cooking and baking, but as soon as some little obstacle arises to mar the smooth operation of the stove they become disgruntled and are prone to find fault with the stove, but never for a minute do they believe it may be possible that the trouble can be traced to their own carelessness. But such a thing is the case nine times out of ten. Carelessness in the care of a stove is the paramount cause of 90 per cent. of the dissatisfaction arising from the poor workings of any stove.

NOTE THE FOLLOWING.

Use only the best grade of gasoline; 74° test is the proper kind to use.

If you use bad gasoline your burners will soon become coated with soot.

Always fill the reservoir in the morning, and not too full. Never attempt to fill reservoir near an open fire or light, as the gas is liable to catch.

Never use a funnel or measure that has been used for coal oil, or any other oil; use a measure or vessel for that purpose only. The least trace of oil in gasoline is enough to make the burners smoke. Avoid allowing water to be mixed with gasoline, and never attempt to clean out the pipes with water or oil. When you have water in the pipes of your stove it may or may not be noticeable, as it would all depend on the quantity as to whether it would affect the workings of the burner. Should there be any quantity the burner would go out while you were using it, without any apparent cause, and could not be lighted again until all the water was taken out. To do this unscrew the plug at bottom of burner and drain the pipes, then put in pure gasoline.

Should the valve leak at the stuffing box tighten with a wrench. It is expected that every stove will leak at this packing nut after it has been used awhile and the packing has become hard. It is impossible to tighten it sufficiently at first to keep it from leaking after it has been used; but as it only takes one-half minute to tighten it up it should not be called a defect. If by tightening the stuffing box does not stop the leak repack stuffing box with some packing, for it becomes worn out around valve with constant use and hardens with heat—so hard that it will not close around valve without repacking.

KEEP THE BURNERS CLEAN.

This is the one great crying necessity on a gasoline stove. It must be done or you have trouble. Cleaning a burner takes so little time each week that there can be no excuse for any one so misusing a stove as to cause any trouble from this quarter.

Soot accumulates on the under side of the generator from repeated lighting up of the burner, and this soot adhering to the brass prevents the flame from heating the burner quickly, and sometimes you will have to fill the cup two or three times before you get the burner hot enough. Now all that is necessary is to take the end of a match and scrape the soot off. Some people use an old whisk broom or the wing of a fowl especially for this purpose.

Soot also forms on the needle point from the same cause as described above, and the stove will then burn a very yellow fire when only one or two burners are being used, but when more than two burners are being used the flames are entirely blue, as if nothing ailed the stove. This point is very easily explained, as the soot forms on the end of the needle, and when you open the valve sufficiently for one burner this mass of dirt partially closes the opening and the fire is yellow and lazy; but as you turn on more vapor this accumulation on the needle recedes into the burner and leaves the opening clear, so that it works as if nothing were wrong with it.

When generator fire burns yellow or has yellow points darting up through the flame, you will know that the needle valve needs cleaning. To clean the needle is but a very short task, and if done occasionally will give as large and perfect flame as when the stove was first used. The manner of cleaning the needle is to first close valve on gasoline tank, so that the fluid will not flow, then unscrew packing nut, then unscrew needle valve, take the needle valve out through the hole in name plate, using care to not dull or bend the needle point, then clean the point carefully and replace as before, and you will find in nearly every case that this is all that is required to make a perfect flame again.

CLOSING VALVES.

In shutting off the burner avoid at all times closing valve too tight, as through expansion of the brass you are liable to

enlarge the orifice at needle point and thereby cause burner to leak the next time it is shut off.

There is no need in using force in closing off the valves on any one of our stoves, as you do not make matters any better by jamming the needle through the orifice every time you shut off the burner so as to be sure that it will not leak, for that is the very way to start a leak. Use ordinary common sense in shutting off a valve, for when the supply is shut off an extra twist on the valve is not going to help matters or make anything more secure.

LEAKS.

A leak at the needle point is remedied by taking out needle valve and setting check nut back just a little, so as to let the valve seat itself a little deeper. Where the check nut is exposed, as it is on Junior and some individual burner stoves, take a wrench and set it back without taking valve out of the burner.

A leak at the swivel joint, where tank turns down to be filled, can be remedied by loosening the set screw and tightening nut with a monkey wrench. A leak at the thread, at any part of the stove, can be stopped by taking out the parts and rubbing common brown soap on the thread and replacing as tight as you can. Gasoline does not affect common soap.

GASOLINE.

There is an unwarranted prejudice and fear existing against the use of gasoline that is entirely unfounded and which cannot be truthfully sustained by facts and evidence. The common theory advanced is that gasoline is explosive and consequently dangerous; but this is not the case. It will not explode; it never did explode, and no one can explode it, let them try it ever so long. It is, like so many other things, perfectly safe in safe hands, but more or less dangerous in dangerous, ignorant or careless hands. People who use it should inform themselves of its character, so that they will know how to handle it safely and know wherein its safety or danger lies. The liquid, in a can, tank, barrel, or, in fact, any form, is positively non-explosive, and the vapor escaping from a can with the screw top off, in an ordinary closet or living room, can positively do no harm; but, when agitated in drawing or filling a can or reservoir, considerable vapor escapes, and this vapor is capable of taking fire a little distance away from the vessel, and this is where the dangerous part comes in. It should never be handled near a fire or light, as the vapor is heavier than air and always descends. Never fill a stove when burning, nor fill it full to overflowing before lighting.

Where a gasoline stove is only used in the summer time, it ought to be stored in a dry place, as dampness will rust the working parts of the burner and render them unfit for use.

The little lid between the twin burners, on the New Idea stove, is simply to assist the user. If at any time sediment should accumulate on the point of the needle, it can be lifted up and cleaned off.

STORING GASOLINE.

Keep the can or barrel of gasoline where there is a good circulation of air—never in a cellar.

Gasoline vapor is heavier than air, so much so that it descends to the lowest point and there accumulates.

The above thoroughly explains the cause of all of the accidents that ever befell a user of a gasoline stove.

Gasoline never freezes, and will give off a vapor at zero.

Years ago, when the old style stationary tank was the only kind of reservoir used on a stove accidents were numerous, caused by the utter disregard of the printed instructions on the reservoir—(Do not fill while burning)—but in spite of this warning, people would attempt to fill the reservoir without putting out the fire, should they find that the gasoline in the tank was giving out and the meal only half cooked.

A gasoline stove explosion would be recorded in the daily papers the next day, when, in fact, the material only caught fire. The saddest part of these affairs was that generally the user would get burned, in many cases fatally.

The stoves for the past few years have been made with a safety device in the shape of a drop tank. By the use of this tank the fires must be put out, for the reservoir cannot be filled until it is laid down on its side, and this very act puts out all burners.

These stoves are manufactured and sold at the rate of 250,000 a year, attesting to their utility as a labor saving utensil.

BURNERS PUFFING.

Should your burners puff or oscillate it shows that the gasoline is being fed too fast, and if you will regulate the flow with the valve at the reservoir or with the pug valve in the T underneath the burner it will affect the operation.

When the needle valve is first opened if the gasoline does not flow at once give it a little time, as there may be air in the pipes.

When the stove is first started in the spring and all the gasoline has evaporated out of the reservoir and pipes this trouble will be experienced, and the quickest way to get gasoline to run to burner is to unscrew reservoir and allow gasoline to trickle down in the pipe by turning on the valve at bottom reservoir.

The burner must be allowed to become thoroughly hot before using. If this is done and the general rules on direction cards sent with each stove are observed we guarantee perfect success.

It is always better to give a burner plenty of time to heat than too little.

BURNER CAPS.

It often happens that the slots of the burner caps are closed up by stuff boiling over on the burner while cooking. Should anything like this happen to your stove you should take a small wire, hammered flat at one end to fit slots, or a piece of tin of right thickness, and clean the slots. In fact, it would be a good idea to have a small wire handy and clean the slots every week.

CLEANING STOVE.

A gasoline stove should be cleaned in the spring without a doubt. It may run for several seasons without absolutely demanding a cleaning, but to insure a freedom from annoyance it ought to be cleaned in the spring, and then it will be in shape for use all summer.

If you do not use your gasoline stove during the winter months it should be stored in a dry place, so that the valves will not rust.

There are some parts on a gasoline stove that are as finely made as a sewing machine, and no one would think of putting the sewing machine out in a shed.

In the spring, when you are ready to use your stove, you should take it out in the open air and take out all the plugs, especially the plug that covers the end of pipe, then let about a gallon of gasoline flow through and wash out any sediment that may have accumulated in the pipes from the previous summer.

You should throw away the gasoline you use in cleaning and do not attempt to use it in the stove.

Our stoves are all tested for leakages or imperfections before shipment.

The full power of a burner is seldom required. Good results and better economy are secured by the flame being turned down a little. In preparing for baking it is necessary to heat your oven for about 15 minutes before you place the baking in it.

If there is any need to take the pipes or burner apart rub common hard brown soap on the threads before screwing them together.

If a gasoline stove is kept clean, it should never cause any trouble.

Never close the tank valve while the generator is hot, as the pressure from the generator is apt to force a leak in burner joints or pipes.

The slots of the caps on the stoves are sawed by the same sized cutters, and where the iron is of even quality the slots are of uniform size; but, in cutting, if the saws should strike a hard spot in the cap it would heat them and make them cut a larger slot than usual. We inspect these caps before they are put on the stoves, but despite this precaution a large slotted one will find its way on a stove. The slots of these caps must be of a certain thickness to give the required flame. If too small, a dull fire is the result; if too large, the flame will catch back inside the cap when it has got superheated. When this occurs, it blows out all the burners and flame slows at needle point. A perfect cap is the only remedy.

ODD PLATES.

The Wrought Iron Range Company, St. Louis, have secured the contract from the Epworth Hotel, Chicago, Ill., for one of their Home Comfort ranges, which will be 30 feet long. In addition to the range they will also supply all the culinary apparatus used in this hotel kitchen, which, as a glance at the size of the range will denote, will prove considerable.

Notice is issued to the trade, under date of April 6, by the Standard Pattern Works, Cleveland, Ohio, William Battensby, proprietor, that he has sold out his business to William M. Gobeille, the sale including tools, stock, business, good will and friendly services. Mr. Gobeille will remove everything to his four story building on West Center street.

Charles J. Ridgway, secretary of the Ridgway Furnace Company, Boston, is making a Western trip, showing the latest pattern of Ridgway furnace, which was recently awarded a gold medal at the exhibition of the Massachusetts Charitable Mechanics' Association. The latest agencies for the sale of these furnaces are the Isothermal & Plumbing Company, Philadelphia, Pa.; M. E Rowe & Co., Chicago, Ill.; B. A. Weber, Rockford, Ill.; Ramsay & Lerdall, Madison, Wis.; and F. Shriver, Sr., Grand Rapids, Mich.

Uzal Cory & Co., 210 Water street, New York, were lately the recipients of two curious orders for goods of their manufacture; one destined for the North of Ireland and the other for northern China. J. Galt Smith, a native of the green isle, divides his time about equally between New York and Larne, a town in the County of Antrim, situated on Larne Lough, an arm of the North Channel. Having lately inherited Kilwaughter Castle, located at Larne, he concluded to import an Excelsior Gas-Tight furnace to supplement the heat now furnished by open fire places in the various rooms. The main hall of the castle is 70 feet long by 30 feet high and the same in width. From this hall there is a broad staircase branching right and left to galleries leading to suites of apartments on upper floors. It is not known how long this structure has existed, but two or three centuries ago it was used as a monastery. Its foundation walls are said to be 17 feet thick, diminishing to 8 feet higher up. The cellar division walls are 4 feet through. The building is surrounded by the usual moat and crossed by a drawbridge. The shipment

aggregated nine boxes, being shipped to Belfast via Liverpool by the Cunarder "Servia," sailing April 8. The necessary pipes and registers, together with working plans to assist in the proper setting of the apparatus, accompanied the shipment. The heat will be thrown from four large pipes on the lower floor only, and is merely intended to supplement the present facilities. An interesting feature in connection with the castle is the capacity of the chimney or smoke flue, which, owing to the large use of soft coal, requires cleaning at least once a year. This flue starts from the cellar and after rising about 20 feet makes a turn at right angles between the ceiling of one room and the floor of that above, traversing a distance of 15 feet, when it again rises. An old retainer has for many years had the privilege of cleaning this flue, receiving the resultant fee, while more recently the work has been done by the son and grandson, though the fee has been retained by the old gentleman. The other shipment is for W. R. Faries, M. D., Wei Hein, Chefoo, China, not far from Pekin. This is a similar furnace of a smaller size, making seven boxes, including the necessary pipes, registers, &c., and is intended to heat a ten-room modern house recently built.

THE CENTURY STOVE COMPANY, Dighton, Mass., are pushing the Century range, for which they claim several points of superiority and the additional attraction of a moderate price. George L. Walker, treasurer, has just returned from a Western trip in the interest of this range.

WALKER & PRATT MFG COMPANY are now re-established at 31–35 Union street, Boston, from which location they were driven out by fire a short time since.

THE SAN MARCO FLATS, which have recently been erected on the southeast corner of Madisonville and Woodburn avenues, East Walnut Hills, Cincinnati, Ohio, are being furnished with Burton's Favorite gas ranges. These stoves, as our readers are aware, are manufactured by the Cincinnati Steel Range & Furnace Company of 158 West Fifth street, Cincinnati, Ohio.

FAITH, BELSON & Co. are preparing to keep pace with the demands made upon them by patrons who appreciate good service. They are having alterations made at 229 Market street, Philadelphia, to suit their needs, and will have a greatly increased space, as the building runs through to Church street, near their warehouse. Every effort is being made to fill orders as they are presented previous to their removal to their more convenient quarters, which will be about June 1.

DURING the four years the Kelsey corrugated warm air furnace has been on the market the manufacturers, the Kelsey Furnace Company of Syracuse, N. Y., state that it has been subjected to crucial tests, which in every case it has stood with entire satisfaction. A feature of this furnace is the fire pot, which is of such a durable character that the company state they have had occasion to replace only a portion of a single fire pot which proved defective, and that clearly was in no sense a fault in the construction of the furnace. This is a record of which the makers feel justly proud, more especially since severe criticisms have been made respecting this essential feature of their furnace.

A FLYING VISIT to Philadelphia has just been made by W. McK. Barbour, the treasurer of the Boston Furnace Company of Boston, Mass., who is preparing to meet the demands of the stove trade in New England with satisfaction in every particular.

THE ILLUSTRATED DESCRIPTION of an old heating stove which appeared in these columns April 8 has called out a letter from G. L. Morrison of the J. L. Mott Iron Works of this city, who states that the stove was made by his grandfather, John Morrison of Troy, N. Y., who owned and built the Green Island Foundry, sold some years ago to M. L. Filley.

THE KEELEY STOVE COMPANY of Columbia, Pa., have issued a catalogue for 1893, illustrating their stoves, ranges and furnaces. In addition to the line of goods so well known to the trade, the company illustrate their new portable horizontal boiler range, Columbian Newport, six holes, high and low closets, with ash sifter and open bottom for the dropping of ashes into the cellar when desired, and large swelled oven door with patent opener; also their new range, Columbian Charm, a six hole range of very handsome design constructed on the double-heater principle, with feet and skirting, reservoir, and cosy high closet. As a novelty they introduce the Columbian Chime double heater fire-place stove, which they claim to be particularly applicable for use in a library, sitting room or parlor. In design it is highly ornamental and would no doubt prove to be a very economical combination with furnace and hot air heating. A few seasonable remarks on their general line, a few words to customers on the subject of repairs for stoves and some valuable rules regarding sales help to make it a most interesting book. It appears in a handsome lithographed cover, and is printed in plain type on good paper.

THE WROUGHT IRON RANGE COMPANY, St. Louis, Mo., will increase their capital stock from $500,000 to $1,000,000.

HARRY MCDOWELL has just returned from one of his spring trips for the Leibrandt & McDowell Stove Company of Philadelphia. He reports some good sales of gasoline stoves and an outlook for regular goods later on that evidently is pleasing.

THE CHICAGO & ERIE STOVE COMPANY, Erie, Pa., favor us with circulars of their Superb Helper hotel range, which has just been placed upon the market. It is a heavy construction lined with asbestos and having both front and end draft slides. There are also provided heavy brick linings for hard coal and cast linings for soft coal. An interesting feature of construction is the patent cast braces and asbestos heat reflectors under the oven, the advantages of which are obvious to the trade. The grate is plain and heavy, the arrangement of parts being such that a poker can be inserted through the drop door in front and be passed over the grate bars, while a hooked poker can be inserted under the grate and between the bars therein. By this means the grate can be easily cleaned above or below. The size of the top plate is 4 feet 8 inches long by 31 inches wide, while the eight boiler holes are each 9 inches in diameter. The oven measures 29 inches long by 22 inches deep and 16 inches high. The range is an attractive one and the manufacturers are confident it will meet with a large sale.

FROM THE ABRAM COX STOVE COMPANY of Philadelphia is received a 16-page pamphlet of fine typographical display, in two colors. On the first cover, on a white ground surrounded by a buff tint, the Ideal Novelty, in bright red, greets the eye and introduces their new line of hot air furnaces and combination heaters, while the back cover is occupied by their familiar trade-mark. From the opening paragraphs it is learned that this line is the culmination of the experience of a half century and is indeed an "Ideal" line, comprising six styles and 28 distinct furnaces. Then follow illustrations showing the portable and brick-set styles and a view of the grate and fire pot, an interior view of the combination heater and the hot-water section, which is cast in one piece, so that leaks are impossible and its lasting qualities insured. One form of furnace has their arrangement of steel drums adapted for either hard or soft coal, while of another, in crimson display, they say, "We recommend this for soft coal," and illustrate an all cast iron furnace. The description is brief, terse and comprehensive, well displayed, and from it it is learned that the parts are widely interchangeable, so that the cast-iron radiating section for soft coal can be substituted for the steel dome or the hot-water section in either the portable or brick set form. Their claims for efficiency and durability are followed by "approximate ratings," which are based on experience and safely correct. Some sensible suggestions are given in an observation here that "a furnace too large is infinitely preferable to a furnace too small," and that "a furnace too small burns more fuel, wears out sooner, and requires more attention than a furnace too large."

THE NEW YORK GAS STOVE COMPANY of 242 Sixth avenue, New York City, have just gotten out a catalogue of 16 pages relating to the Economy gas cook stoves, manufactured by the American Meter Company of New York and Philadelphia. These goods are shown in several varieties, a new design of stove having a closed top, while the baking and roasting ovens are fitted with new and powerful burners. The hot plate is 31 inches wide and 22 inches deep, and has five boiling burners, together with a central pot hole for keeping vessels warm with the heat from the roasting oven or the boiling burners. The openings on top are fitted with rings, which may be removed to increase the size of the opening. Some of the cuts show the stoves with the doors open, thus exposing the interior of the ovens. Wire gauze ovens are illustrated, as well as Economy table stoves, ranging from one to three burners. The last page of the pamphlet carries a number of directions for using the Economy stoves.

WILLIAM THOMSON, the affable manager of the Philadelphia house of Orr, Painter & Co. of Reading, Pa., is making a trip among his friends in New Jersey, apprising them of things that will appear later on, which will continue the Sunshine season into the early winter.

THE STOVE FOUNDRY of Z. Hunt, Hudson, N. Y., resumed operations on the last day of March, after having been shut down for some time. Mr. Hunt anticipates, we understand, a busy season, and will give employment to a large force of hands.

THE PHILLIPS & CLARK STOVE COMPANY of Geneva and Troy, N. Y., have added to their force of traveling salesmen Frank Powers, who will represent the company in Northern New York, Vermont and Massachusetts. The manufacturers state that the quality of the Andes stoves and ranges will be fully sustained the coming season and the assortment increased by the addition of several new and improved patterns.

IN AN INTERVIEW with a representative of the *Journal*, published at Lewiston, Maine, Superintendent McFadden of the Auburn Stove Foundry Company of Auburn, Maine, states that they are manufacturing 140 different sizes and styles of ranges and stoves, the Royal Falmouth taking the lead. The company are said to have about 250 agents in the New England States. In some of the cities the agents carry a full line showing the different styles and are meeting with good sales, the latter being the largest where the goods are the best known. Mr. McFadden is represented to have expressed himself as follows: "Some agents have a few goods made by several different

manufacturers and sell very few of each kind. It is natural for the manufacturers to be anxious to sell as many goods as possible in the place where they are manufactured, and when unable to find local dealers who will put in a full line, it is for the manufacturers to open a store where all their particular make of gooda can be shown to advantage. In such cases it is intended that the store be used for wholesale and retail purposes, and that the city in which this store is located is the only store in which the company carry on a retail business. This plan is followed in many New England cities and towns where manufactories are located."

F. SABIN, 146 North Second street, Philadelphia, displays a handsome photograph of the French Fortune range made by the Thomas-Roberts-Stevenson Company of Philadelphia, which is one of the new additions to their excellent line of kitcheners. It affords all of the facilities of a French range at an attractive cost. The range shown has a double oven, a low closet and a planished steel hot closet. The top is finished in French style and has three square plates with covers and rings of varying diameter. One of these plates can be removed and others can be made to slide along on the frame of the top when required.

A PUBLIC EXHIBITION was recently made in London of the practical application of electricity for cooking purposes. The stove provided very much resembled an ordinary gas-burning construction, with various patented appliances for broiling, baking, &c. The heat was produced by sending an alternating current through a network of fine resistance wires embedded out of sight in the side of the stove. It was stated that a small stove required about 12 ampères of current per hour, but that larger sizes were more economical. The demonstration was made before an assembly of ladies who had gathered to listen to a discourse on "nelected points of domestic hygiene."

THE J. F. PEASE FURNACE COMPANY state that their store at 75 Union street, Boston, Mass., will be hereafter used as a depot from which the New England trade will be supplied on short notice with Economy furnaces and heaters. The company have decided on account of the rapidly increasing business to dispose of their retail stores in New York and Boston and to offer the plants in these cities for sale. The wholesale trade, however, will be cared for as heretofore and the store in Boston will be devoted to the purposes noted above.

A VISIT to the Builders' Exchange on Seventh street, between Market and Chestnut streets, Philadelphia, affords the stove dealer an excellent opportunity for contrasting the merits of many hot-air furnaces and kitchen ranges, which are here grouped and shown to the best advantage.

A. WEISKITTEL & SON of Baltimore, Md., are distributing a neat catalogue of something over 30 pages relating to their Fire King stoves. The goods shown include ranges, heaters and ovens in great variety, and are illustrated and described in a manner likely to interest the trade. Among the novelties to which special attention is invited may be mentioned the company's patented burner, which is constructed of two heavy pieces of cast iron, held together by their own weight. The arrangement is so simple, it is claimed, that any child can lift the top off and clean the burner. The company's gas ranges are provided with oven lighters, by means of which the oven burners may be lighted without opening the oven doors. The ranges also have a pedal attached to the front, by which any of the oven doors can be opened by the simple pressure of the foot. The catalogue is printed in two colors, and is bound in paper covers, the front one carrying a picture of the Fire King gas ranges in operation.

A BURNER for oil heating or cooking stoves forms the basis of a patent granted to E. M. Wright, Buffalo, N. Y. The feature claimed in this invention is a combined steam and flame spreader, consisting of two shells so secured together as to leave open spaces between them. The circumference of the upper shell projects beyond the edge of the lower shell, while around the periphery of the latter is a series of openings. Projecting downward from the lower shell is a tubular portion for the purpose of connecting with the water wick tube. The wick is inclosed with a wick tube, which surrounds a water vessel, and connected with an oil reservoir. The arrangement of parts is such that the flame of the burner is directed toward the spreader, and the steam rising from the wick tube is conducted from the water wick tube to the steam and flame spreader and superheated, and from thence is carried into the flame. There is also provided a copper rod which extends down through the water wick for the purpose of conducting heat thereto.

INCREASING POPULARITY is reported by Geo. L. Flick of 141 North Front street, Philadelphia, for his ship stoves, the Ocean Gem and Caboose No. 2, since the recent changes in their tops. Round holes can now be furnished, permitting the use of cooking utensils such as can be procured in any port.

IN HIS VISITS to the gas stove trade, J. Slatterly, representing Luther & Lederhos, 30 Cliff street, New York, finds a pleasant interest in the different gas stoves and appliances manufactured by them.

W. G. BISSELL, representing Geo. M. Clark & Co. of Chicago, announces his visit to the trade in the East by a postal card, saying: "I will call on you next week in the interest of the Jewel gas stoves. Our line is most complete."

IT WOULD be hard to find a place where more business is done with as little confusion and with greater satisfaction to the trade than at the house of F. M. Borden & Bro. of Philadelphia. Just now all attention is given to the Challenge Iceberg refrigerators, the New Process gasoline stove and the Globe line of gasoline goods which bears their name.

THE CHICAGO & ERIE STOVE COMPANY of Erie, Pa., are enjoying a gratifying business in steel ranges, the demand emanating from various sections of the country. Instead of selling direct to the hotels for which these ranges are specially adapted, the makers are placing them in the hands of dealers, thus giving them the benefit of the retail profits. The company are distributing a circular giving a number of testimonial letters from those who have introduced their steel hotel ranges, the letters showing in a striking manner the satisfaction which these goods have given.

IN STOVE ORNAMENTATION this year urns will supersede the images or figures so prominent last season. Tile work effects will still be in use, but it is expected that there will be considerably less metal ornamentation used than formerly. At least this is the impression derived from a tour among the stove men of Eastern Pennsylvania.

THE GRANDER STOVE COMPANY of Royersford, Pa., will have on the market this season a low-priced square heater. It will be known as the Mars, and will be made in single and double form, with full reversible and direct drafts. It will have an extra large fire pot and a commodious ash pit, a dust damper to check draft, duplex and rotary grate, nickeled feet and skirting, foot rails, tile panels, top ring and swing cover. Surmounted by a handsome urn, it should find many admirers in the trade.

THE BUCKWALTER STOVE COMPANY of Royersford, Pa., will be in the market this season with a new square heater and a new soft coal heating stove. They will also remodel their Eclipse Duplex furnace.

THE BRIDGE & BEACH MFG. COMPANY, St. Louis, Mo., are distributing a four-page circular, in which is set forth the merits of the Superior Air-Tight oak stove, intended for burning coal or wood. The manufacturers state that while the 1891 pattern, with round base, gave general satisfaction to the trade, there was an objection in that an ash pan could not be employed, the ashes having to be taken out at the base with a shovel and placed in the ash pan, causing dust and dirt, in addition to great inconvenience. In the new series of Superior Air-Tight stove, with square base, the company have overcome this objection and have brought out what they consider the finest oak stove ever placed on the market. It is claimed to hold fire from 18 to 24 hours, and is so made that when necessary the outside fire pot can be quickly replaced by simply unscrewing the bolts which connect it with the steel body. The ash pan is large and the grate of the cone-center type for coal and draw-center style for wood. The grate shank for shaking and dumping is inside the fire box, thus avoiding all danger of fire and ashes falling out on the floor. The pipe collars are extra large and a drop smoke door is provided, to obviate any possible complaint of smoking when the stove is connected with a slow flue. The ornamentation of the Superior Air-Tight is neat and effective, and the stove is offered in four sizes, two of which are provided with double sections.

THE FIRESIDE is one of the new things this season announced by the Abram Cox Stove Company of Philadelphia, by means of a circular that is novel in arrangement as well as attractive in style, the outside being printed in deep violet over a design in buff on white paper. Inside it is sufficiently shaded off black to blue to be very rich in effect. The Fireside is an open-fire grate of handsome and attractive appearance, finished in eight styles in nickel, bronze and tile. Comfort and convenience are pleasantly combined with its beauty, as it is so constructed that it can be set to heat an upper room, and when the blower is not in use it sets in front of the ash pit, affecting the eye as pleasantly as when in place. The heater is adapted for hard or soft coal, coke and gas, and in addition to an efficient dust flue it has those provisions for cleanliness so desirable with open fires. The illustrations show it with a large and small square frame and a circular frame, while the description gives full dimensions.

THE J. F. PEASE FURNACE COMPANY, Syracuse, N. Y., inform us that over a year ago they put in their application for over 800 square feet of floor space in the Building of Manufactures and Liberal Arts at the World's Fair. They have been awarded a space amounting to 600 square feet, which they consider very generous treatment by the Commission, in view of the large number of exhibitors who wish to show their products in the section devoted to heating apparatus. Their space is 20 x 30 feet, the latter dimension being frontage on one of the main aisles.

BUCK'S STOVE & RANGE COMPANY, St. Louis, Mo., have just completed an addition to their already extensive works, consisting of a four-story building, which has been erected immediately over their foundry. This building will be used principally for warehouse purposes.

George M. Clark & Co. of Chicago report that they recently took the largest single order ever given directly by a consumer for gas ranges. The order was from Mr. McLennan, owner of the McLennan flats at South Park avenue and Thirty first street, Chicago, and was for 128 gas ranges with water heaters and 97 gas ranges without water heaters, or a total of 225.

Our thanks are due to Frederic W. Gardner, Western manager of the Michigan Stove Company, Chicago, for a very fine black leather pocket book. It contains several divisions for the systematic arrangement of such papers or other articles as are usually carried in receptacles of this character. Stamped on the interior are the company's Garland trade-mark and Mr. Gardner's compliments.

Lyman F. Wilder, Rochester, N. Y., is the patentee of an oil stove of simple and convenient construction, and having adjustable or removable drum, which is employed in connection with a grate supported above the burner.

The Peninsular Stove Company.

Visitors to the Chicago branch of the Peninsular Stove Company, 79 and 81 Wabash avenue, will be pleased to see the transformation recently effected under the supervision of Manager J. B. Copp, ably assisted by the head salesman, Adam Schmitt. The street front has been remodeled, and the entrance is now through double doors at the north. This leaves a broad unbroken front for display windows. A platform, with an ornamental hardwood floor, has been arranged on a level with the windows. On it are shown several of the most artistic stoves made by the company. Back of this platform stands a row of cherry desks for the use of salesmen. The counting house has been removed to the third floor of the building and the space formely appropriated for this purpose has been given over to samples. On one side of the salesroom are two compartments inclosed by ornamental partitions, one of which is a handsomely furnished reception parlor and the other is Manager Copp's private office. The walls of the salesroom as well as the ceiling have been tastefully repspered with a paper of light tint, with a rich frieze of unusual depth extending round the walls. Below the frieze are elegantly framed portraits and pictures, the former being striking likenesses of the officers of the company, while the latter are composed of various subjects selected for their artistic merit. The samples of the company's products shown on the floor present a magnificent array of heating and cooking goods, well worthy of their æsthetic surroundings. Scattered through the room in odd nooks are leather-covered sofas for the entertainment of visitors. The shipping room in the rear has been rearranged for the greater dispatch of business. The shipping clerk's office is in a gallery, which leaves the floor free for handling stoves, which are brought from the upper stories by an elevator and loaded on wagons but a short distance away. The floor of the shipping room is on a level with the floor of a wagon. A larger platform, of a capacity to hold a carload of stoves, runs along the rear of the building in the alley.

The completion of the new arrangements was formally celebrated on the evening of the 7th inst. Invitations were issued to a large circle of business acquaintances by Manager Copp, and they gathered in force to admire the taste displayed. The rooms were illuminated by both arc and incandescent lights, and compliments were freely lavished on the enterprising manager. A collation was served for the further delectation of the guests.

SCRAP.

John Dunlap Company, Pittsburgh, Pa., are distributing samples of Dunlap's double dipped American made roofing plate. This plate, they say, will receive two separate coatings, hand dipping, by the palm-oil process, and each box will contain a guarantee of quality. The firm also make a rolled plate which they describe as a little better in grade than the Lily or Worcester. The sample received is stamped with the words "Dunlap's Double Dipped," and is of IX gauge.

Leyshon & Son have decided to start a tin-plate works in the buildings of Disston & Sons, Front and Laurel streets, Philadelphia, Pa. We understand that they have already two machines erected, one for brights and one for ternes, which they will start up snortly. Their tin house is 120 x 40 feet, well ventilated, and they say their plant is adapted for eight more machines. George Leyshon, Sr., we are informed, will devote his entire time to the work.

James B. Scott & Co., Pittsburgh, Pa., send us circulars in which they say that when the manufacture of Scott's Extra Coated guaranteed roofing plate was begun in this country over a year ago, the Patent Office registered the brand name "Scott's Extra Coated" as a trade-mark, thus protecting the American manufacturer.

The sheet-mill department of the new tin plant recently erected at Niles, Ohio, by the Falcon Iron & Nail Company, was started Tuesday, and the entire industry will be put in full operation in a few days. The buildings are of iron and brick, and the equipments of the latest improved design. The plant will give employment to from 350 to 400 persons and will be a valuable acquisition to the Mahoning Valley.

The Youngstown Tin Plate Company, recently organized at Yougstown, Ohio, and now fitting up the old malleable iron works in that city for the manufacture of tin and terne plate, have made application for a charter of incorporation. It is stated that the machinery for the new plant has been purchased, and the manufacture of tin and terne plates will be commenced in a short time.

James A. Coe & Co., Newark, N. J., are distributing to the trade samples of the Staple terne American roofing plate, which is an article to which we drew attention some time ago. The samples show a well-coated plate that will no doubt commend itself to roofers. In a circular accompanying the samples Messrs. Coe & Co. say that their customers have found their Staple terne to have a uniform gauge and coating and to be easily worked. These plates are furnished 14 x 20 and 20 x 28 IC. The same firm also quote prices on quantity lots of galvanized iron, cold-rolled steel, common black iron, corrugated sheets, &c.

A struggle between the two express companies, the United States and American, to control the New England business, results in a temporary injunction by Judge Barrett restraining the New York and New England Railroad and the United States Express Company from interfering with the privileges of the five-year contract of the American Express Company of December 5, 1892.

Americans are not going to Europe in large numbers this season, judging from the number of empty berths on outgoing steamships. The explanation is supposed to be the rival attractions of the Chicago fair and fear of cholera in Europe and possible difficulty in returning home.

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TRADE REPORT.

The Iron Market.

Taken as a whole the Iron and Steel trades are in fairly satisfactory condition. A prominent manufacturer recently remarked: "There is nothing to brag about, and on the other hand, nothing to cry about." The volume of business is large in the aggregate, and indications favor a heavy consumption of material right along, but manufacturers say there is no margin for profit. Notwithstanding this, competition continues keen and prices are as low as ever. As regards the outlook, there are no new features whatever. There is an enormous amount of work under contract and a still larger amount in prospect, the immediate drawback being, that there is more or less scarcity of work actually in hand. The orders are there, but the specifications are not, which is almost as bad as to be without orders altogether. Then the exceedingly fine outlook is in a measure offset by the unsatisfactory financial situation It matters very little to a firm how much work they may have the chance of getting four or six months hence, if in the meanwhile they are harassed for money to get out what they already have in hand, and that is precisely what's the matter with more than one large concern. Under these circumstances, and with due regard to facts, it is not entirely safe to report very confidently in regard to business. As compared with last week, there is probably a slightly firmer tone to prices, and with a more settled and easier money market, things are in good shape for improvement, while trimming down has been done to such an extent that it is hardly likely any one would be found unprepared—even if there were another little flurry.

At Chicago the strike season is now being felt, and more or less disturbance to business is apprehended. Architectural Iron workers went out the past week, workmen at the World's Fair were out for a day or two and the boilermakers and molders are uneasy.

Pig Iron.—Buying in the New York market has been light during the past week, but prices, so far as standard brands are concerned, are steady. We quote Northern brands at $14 50 @ $15.25 for No. 1; $13 75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14.25 @ $14 50 for No. 1; $13 @ $13.75 for No. 2 and No. 1 Soft.

The "blowing out" of so many furnaces in Virginia and other districts in close proximity to the Philadelphia market, is gradually manifesting itself in a scarcity of good Irons of all grades. Deliveries are called for with much urgency, and unless the conditions change, there will soon be a veritable scarcity. Buying is not particularly active for the reason that there is very little Iron for sale, so that in the meantime all the efforts are to get quick deliveries, hoping that in a week or two, or some time in the near future, orders can be duplicated at the old prices. Those who have Iron for sale are willing to accommodate their customers, but as a rule makers are not quoting, having sold their entire product up to midsummer, and in some cases still further ahead. Second qualities and some of the newer brands are therefore drawn upon to supplement the more favorite brands; and while prices of these are comparatively low and irregular, they are not as heavy a drag on the market as they were a few weeks ago. Taking everything into account, the chances appear to be favorable for continued improvement, by which it should be understood that if there is no falling off in the demand and no increase in production, sellers will soon gain the upper hand in the market. Under present conditions prices are likely to improve; if conditions change the market will change accordingly. Meanwhile the general asking prices are as follows for Philadelphia and equivalent deliveries, with 25¢ @ 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X	$16 00	@	$16 50
American Scotch, No. 2X	15 00	@	15.50

The prospect of a molders' strike at Chicago, which is now looming up, operates both ways. Some consumers want shipments hurried, while others ask to have deliveries deferred until considerably later in the season. A fair volume of business is being done in local Coke, although the trade is by no means so heavy as it has been. Prices are very steady, but the makers are not looking for an advance, being apparently quite satisfied if they can hold them where they are. Southern Coke is not in general demand, but special trades are being quietly made, some of which run up to very respectable proportions. While our quotations present the prices asked by the most important Southern companies they are cut 25¢ or more by smaller concerns or on desirable orders. Lake Superior Charcoal has not shown any sympathy here with the better movement reported in other markets. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	$16.50	@	$17.00
Local Coke Foundry, No. 1	13.75	@	14.25
Local Coke Foundry, No. 2	13.00	@	13.25
Local Coke Foundry, No. 3	12.75	@	13.00

There has been no essential change in the Southern markets for Pig Iron during the week. There were no large sales, but a fair run of small orders that were from one to five carloads as a rule, and there were several sales of 500 tons, and in exceptional cases 1000 to 2000 ton lots. The aggregate is of fair proportions for a slow and easy market. Factors here look for an improvement in prices by the middle of summer, and are not disposed to contract for long delivery, but buyers see no inducement to buy much beyond their immediate necessities, as their experience for the last year or two has been that each subsequent purchase has been made at lower than previous prices. There is undoubtedly a liberal melting of Iron for general purposes, and if the consumption is not in excess of current production it is keeping closely up to it. A considerable part of the sales of Southern Iron at Cincinnati is destined for the East, but the jobbing foundries in that district are busy, and apparently using more than the usual quantity of Iron. We hear less of exceptionally low prices, and the market may be called a steady one, the demand running mainly on No. 2 Foundry and No. 2 Soft, and on Gray Forge Iron. Quotations are as follows:

Foundry.

Southern Coke, No. 1	$13 25	@	$13.50
Southern Coke, No. 2	11.75	@	12.00
Southern Coke, No. 3	11 00	@	11.25
Ohio Soft Stone Coal, No. 1	16.00	@	16.25
Ohio Soft Stone Coal, No. 2	15.00	@	15.25
Mahoning and Shenango Valley	14.75	@	15.00
Hanging Rock Charcoal, No. 1	19.00	@	19.25
Hanging Rock Charcoal, No. 2	18.00	@	18.50
Tennessee and Alabama Charcoal, No. 1	15.50	@	15.75
Tennessee and Alabama Charcoal, No. 2	14.50	@	14.75

Metal Market.

Copper.—There has been no change, certainly none for the better, in the condition of the market for this metal. Orders come this way slowly, and are invariably for comparatively small quantities, while inquiries afford no indication of realization of the prophesied lively spring season movement of stock into the channels of consumption. To all accounts the output of the mines, although under restraint, is still excessive, affording sufficient surplus to keep values rather weak. Lake Superior Ingot has been openly offered at 11½¢, regular terms, without stimulating interest on the part of consumers, and offers of futures up to and including December, made on the Metal Exchange, have been quite as futile in attracting speculation. Casting Copper has not fared a great deal better, as far as movement is concerned, and prices are weaker, with anything above 10⅝¢ strictly the exception on ordinary quantities, and 10½¢ apparently a price at which orders for round lots would not be passed. A fair business has been effected in this variety of product, but, like the trade in Lake Superior Cop-

per, the movement is still somewhat behind late calculations. At the close of the week some few small parcels of Lake Superior Ingot were sold at 11⅞¢ for prompt delivery, and on the Metal Exchange there were offers to sell at 11¼¢ for July to September delivery, inclusive.

Pig Tin.—Directly after our review of last week there was a break in prices to 20.45¢ for spot and current month deliveries. Distant futures went to a corresponding point, or say, 20.80¢ for July delivery, and the market presented a rather sickly appearance. The recognized leaders who are supposed to be the heaviest holders, came to the rescue on Saturday, however, taking several hundred tons at from 20.60¢ up to 20 80¢ for May delivery. Following this were smaller purchases for that month at 20.85¢ and for June at as high as 21.05¢, while spot prices were bid up to 20¾¢. This movement, in the face of heavy arrivals and large stock afloat, to say nothing of the unusually liberal spot supply, was rather surprising. It was forcibly illustrated, however, that the bull interest is still in the field and working heroically against seemingly overwhelming odds. Since the first of April, no less than 1830 tons have arrived at this port. Over 1000 tons are due to arrive in a few weeks from London direct, and the chances are that the spot stock at the end of the month will not be far from 5000 tons, the value of which is at least $2.000,000 at present market prices. Additional lots are on the way from the Straits on shipments made during the latter part of the last month, and it is an open secret that the April shipments from the East will be fully up to the average. Upon the whole, it looks as though the leading operators have a heavy burden to carry pending the fate of the McKinley tariff law. At the close of the week prices advanced to 20.80¢ for prompt and current month delivery and 20.85¢ for May, at which figures about 150 tons changed hands. Bids were made on the Exchange of 21¢ for June, 21.10¢ for July, 21.20¢ for August, 21 40¢ for September, and 21½¢ for October delivery.

Pig Lead.—There has been quite a heavy movement and prices have advanced sharply, leaving the market in strong position at the close, with 4.15¢ @ 4.17½¢ apparently inside figures for either spot stock or near future shipments. Transactions involving at least 1800 tons at 4.10¢ @ 4.15¢ can be traced, and there are indications that entirely distinct business, involving a considerable quantity of Lead, has been put through about which no particulars are divulged. Information comes from reliable quarters to the effect that consumption is running ahead of the production at present. It is also stated that some purchases have been made recently by local operators who sold "short" a few weeks ago at prices considerably below those ruling at the present time, on the mistaken idea that the output was largely excessive.

Spelter.—Eastern consumers have purchased very indifferently in this market, and the demand here is slow at the present time. Negotiation has revealed the fact that supplies at primary sources are lighter than has been generally estimated and that consumption is of considerable volume despite the indifferent character of buyers' operations. It is not as easy to buy prime Western at 4 30¢ at the present time as it was a week ago. In fact, that price has been refused during the past few days for several brands, and 4.35¢ is generally asked.

Antimony.—Demand is of routine type, and prices have undergone hardly any change. Spot prices remain at about 10½¢ for Hallett's, 10⅝¢ @ 10¾¢ for L.X. and 10¼¢ @ 10⅝¢ for Cookson's.

Tin Plate.—Arrivals have been heavy, and coupled with slow demand, serve to soften prices for spot goods. Prices are not positively lower, however, holders being encouraged somewhat by advices from the foreign market. In future deliveries business has been slow. From the consumer's point of view, the condition of Tin Plate remains unchanged. A moderate amount of orders is being received for both imported and American Plates at ruling prices.

Coal.

The Anthracite Coal trade continues weak and irregular, as there is only a nominal agreement as to prices; but the companies endeavor to act in unison, at the same time exercising more or less discretion as circumstances seem to warrant. Actual prices for Stove as a basis are about $3.95 ℔ ton, which is a shade under the circulars. Another indication is the price circular of the Finance Company, which makes Free Burning White Ash f.o.b., at New York, Broken and Egg $3.65, Stove and Chestnut $3.90. Both of the small steam sizes, Chestnut and Buckwheat, are scarce and firm. With the exceptions noted, there is no lack of Coal, and while an advance is out of the question, operators affirm that Coal will be no lower. At the same time, the large reserves of the Reading Company are a menace to the market, the supposition being that financial securities may govern sales throughout the year.

Bituminous Coal is considered very cheap, viewed from the basis of the Long Island Railroad and other contracts lately closed on private terms, and respecting which all concerned are discreetly reticent. There is no lack of Coal. Prices in New York harbor $3.10 @ $3 15.

The Philadelphia *Press* says: "The contracts with individual Coal operators are a most expensive luxury for which there is no longer any necessity, inasmuch as the Reading is not now engaged in an effort to control the Anthracite trade. These contracts cost the Reading Company from 20 to 50 cents ℔ ton. The contract with the Finance Company through which it handles the Coal output is also said to be booked for abrogation on the score of economy. Other expensive improvements which came in during the McLeod *regime* are no longer in keeping with the reduced situation financially in which the company finds itself A long epoch of economy and rigor, sackcloth and ashes and plodding is ahead of the company's executive." It is now tacitly understood among the individual Coal operators that their tonnage contracts with the Reading are to be revised and those located along the Lehigh Valley Railroad are to be made out directly in the name of that company.

Production for the week ending April 1 808.000, an increase of 94,000 over the corresponding week last year.

The contract for Pea Coal during 1893, for the Philadelphia Traction Company, has been secured by the Philadelphia & Reading Coal and Iron Company. The contract is for 20,000 to 30,000 tons.

The Lehigh & Wilkes-Barre Coal Company have secured the contract for Pea Coal for the Providence & Stonington Steamship Company. The amount will be in the neighborhood of 40,000 tons.

Coal cutting machines are being successfully introduced in the Monongahela region. A plant of two machines, equal to 200 tons per day, costs $6000.

The Reading Company are making an earnest effort to extinguish the fire long burning on the 3 mile stretch between Newcastle and Glen Carbon, which formerly contained three large colleries.

Application has been made in Nova Scotia for the incorporation of a third large American Coal company.

Financial.

The only cloud hanging over the markets to occasion uneasiness is the renewal of gold exports—$3,500,000 having gone out on Wednesday, and more to follow—coupled with trade and currency conditions that make this movement not only possible but natural. It is well understood that the Austrian Government, operating through the Rothchilds, is providing a metallic basis for its currency, so that in response to the European demand for more gold, America proves to be the most available source of supply, as the yellow metal is not only being displaced here by the continued issue of paper, but diminished exports and augmenting imports make an adverse balance of trade to be adjusted. The foreign commerce of New York for March clearly indicates the general tendency. The imports last month exceeded $63,000,000, exclusive of specie, being nearly $10,000,000 over the same month last year, and larger than for any previous March in the history of the port. The principal items were coffee, sugar and rubber, all free goods. For the first three-quarters of the current fiscal year the merchandise imports are $57,-000,000 over any former year. On the other hand, shipments were comparatively meager, and for three months the total, exclusive of specie, was $23,000,000 below the corresponding total for last year. The recent advance in the price of wheat prevents a free outward movement of grain, but a favorable point is the reviving foreign demand for cotton, and moreover foreigners are again inclined to invest in American securities. As a fur-

ther check to the drain of gold, a round amount of bonds issued by various corporations may be placed in Europe. Then, too, while Americans will this summer disburse much less money abroad, the expenditures of foreigners here will be largely increased. Prospects are supposed to be much better now that no labor troubles will arise to mar the Columbian Fair. One ground for this assurance is found in the decisions by the United States Courts at Toledo, and New Orleans, which hold it a violation of the Interstate Commerce Act for railroad employees to combine and refuse to handle the traffic of connecting lines, and that a combination which stops the wheels of trade and commerce is illegal. Another assuring circumstance bearing upon our credit abroad and upon confidence in the general situation, arises from the fact that the Administration has no expectation of issuing bonds for the procurement of gold before the meeting of Congress, though it is conceded that the Treasury is liable meanwhile to be considerably depleted.

The Government report on the condition of winter wheat strengthened the upward tendency of prices previously observed, so that the net advance was something like 3¢ ℔ bushel. Spring seeding in Illinois is somewhat ahead of last year. South of the Ohio River prospects were never better. In Oregon and Washington the acreage will be increased. Cotton fluctuated under speculative influences. Altogether prices in the merchandise market average better than a year ago, and it does not appear that uneasiness in financial circles has had much effect outside, nor has tariff agitation.

Chicago Report.

Scrap.—Country dealers have latterly rushed in their stocks too rapidly and the supply is now in excess of the demand. Cast Scrap especially has become a drug and is lower in price, which will soon affect the buying price. Dealers' buying prices are as follows:

	Per net ton.	Per ℔
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	7.00	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12.00	....
Old Gas-Pipe and Boiler Tubes	9.00	..
Cast Borings	5.00	....
Turnings	6.00	....
Horseshoes	12.50	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	3 ¢

Anthracite.—Local dealers do not anticipate any change in prices until toward the close of this month. Carload lots of 12 net tons are quoted as follows:

	Egg, Sto. Grate.	and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubnque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

CONDITION OF THE

Hardware Trade.

TRADE continues in very gratifying volume, and there is a general activity throughout the country, manufacturers, jobbers and retailers doing a very satisfactory business. While there is an excellent demand for nearly all kinds of Hardware, there is a special activity in seasonable goods. Builders' Hardware is moving in large quantities, with a good demand also for Heavy Hardware. In several lines there is difficulty in obtaining goods as fast as called for, and the market in some branches shows an improvement in tone, with slight advances in quotations. There is still some complaint in regard to collections. The outlook for future business is regarded as very gratifying.

Advices from Chicago.—Jobbers have advanced Wire Cloth to $1.50, as was foreshadowed last week; it is now very scarce, as, despite the increased output by the factories, the demand has exceeded all anticipation and stocks here have been run off rapidly. The general demand for Hardware has greatly improved since our last report and jobbers are now very busy. Roofing Plates are in good demand. Heavy Hardware has improved as well as Shelf, and orders are large in every department.

Notes on Prices.

Cut Nails.—Large quantities of Nails are moving, and in the matter of volume the market is in a very satisfactory condition. Prices are substantially as at our last report, the general quotation being $1.20 for carload lots at mill, a figure which is, however, shaded in some cases under pressure. The new card is referred to almost uniformly as working satisfactorily and the understanding in regard to averages is well carried out. New York quotations are $1.40 for carload lots on dock and $1.60 from store.

Advices from Chicago.—In Steel Cut Nails the situation is not satisfactory to manufacturers. Low offers are being made here by outside concerns that are again using Chicago as a dumping ground for accumulated stocks. The prices made to move such stocks are emergency prices and are not recognized in the trade as regular rates, which are continued at $1.35 for usual deliveries, on customary terms. Jobbers quote $1.50 for small lots from stock.

Wire Nails.—The Wire Nail market is in excellent condition with a large demand and firm tone. The advance in the card rate to $1.55 f.o.b. at mill, with Cleveland as the point of equalization for the West and Pittsburgh for the East, is well maintained, with some possibility of a further advance in the near future. Small lots from store in New York are quoted at $1.80 to $1.85.

Advices from Chicago.—Wire Nails are selling more freely from jobbers' stocks than from factory. Manufacturers are now busy shipping to jobbers on old orders, and the last advance may also have checked new business for the time being. The factory price is firm at $1.67 Chicago, while small lots from stock are held at $1.75, and carloads $1.70.

Barb Wire.—There is a heavy demand for Barb Wire and shipments are with difficulty made by manufacturers as promptly as desired by their customers. The market in the matter of price has an excellent tone and the quotation of $2.45 to $2.50 for Four Point Galvanized in carload lots at mill is well maintained. In New York the price is $2.65 to $2.70 for carload lots on dock.

Advices from Chicago.—A heavy trade is now in progress, and the hight of the season has not yet been reached. Local manufacturers are making unusually prompt shipments under the circumstances, having had very heavy stocks in their warehouses when trade opened, which enabled them to keep up with the demands on them. Should trade continue to increase, they will also fall behind with their colleagues in other sections. Prices are firm but unchanged at $2.20 for Painted and $2.60 for Galvanized from factory and 10 cents per 100 advance from store.

Holland's Hose Reel.—This Reel is manufactured by the Hollands Mfg. Company, Erie, Pa. It is sold at $4 f.o.b. Erie, subject to a discount of 30 per cent.

Bright Wire Goods.—The market continues in substantially the same condition as noted last week, but there are indications of a reaction from some of the low prices quoted by some of the manufacturers, a few of the extreme prices having been withdrawn.

Bolts.—The condition of the Bolt market on the whole is more satisfactory than for some time past. The manufacturers, as a rule, are very full of orders, and in several lines are unable to turn out goods as promptly as desired by their customers, some of whom experience considerable difficulty in getting enough to meet their requirements. Prices in some lines, such as Common Carriage Bolts and Machine Bolts, are firmer although not quotably higher. Notwithstanding the fact that the market is an open one, it is regarded as in better condition than for a long time.

Blocks.—The Block market continues demoralized. Manufacturers are apparently vieing with one another to see who can name the lowest prices, notwithstanding the fact, which is generally conceded, that at current quotations Blocks are selling below cost.

Rope.—In sympathy with the condition of the Hemp market prices for Manila and Sisal Rope are slightly lower, notwithstanding the fact that no formal announcement has been made by the manufacturers. The market for round lots is represented by the following base prices, f.o.b., New York, which are subject only to a discount of 1½ per cent. for cash:

	Per pound. Cents.
Manila	8¾ to 9
Sisal	7¼ to 7½
New Zealand	6¾ to 7

Wrought Iron Pipe.—There is a heavy demand for Wrought Iron Pipe and most of the mills are occupied on orders. Prices do not show material change, but are perhaps a shade firmer than a week or two ago. Some of the manufacturers, however, are making quotations slightly lower than have previously ruled and the market is thus characterized by some unevenness. On the whole there is apparently a better tone, the downward tendency having been in a good measure checked.

Queen Washing Machine.—Buckeye Churn Company, Sidney, Ohio, are manufacturing this article. The machine is sold to the trade at $30 per dozen, 60 days, 2 per cent. off for cash in 10 days.

Leather-Capped Chisel Handles.—These Handles are put on the market by F. C. Copeland, Worcester, Mass. They are sold from the following list, which is subject to a discount of 25 per cent.:

Tang Firmer Leather-Capped Handles.

Polished and Heavy Cast Brass Ferrules.

No.	Per gross.
0 ⅜ to 1¼ inches, assorted, one dozen in a box	$11.33
1 ½ to 2 inches, assorted, one dozen in a box	12.00
2 ½ to 2 inches, (medium) one dozen in a box	12.32
3 1 to 2½ inches, (large) one dozen in a box	12.64

Socket Firmer Leather-Capped Handles.

No.	Per gross.
4 four sizes, one dozen in a box	$10.00
5 three " " " " "	10.00
6 two " (large) one dozen in a box	10.33

Socket Framing Leather-Capped Handles.

No.	Per gross.
7 three sizes, one dozen in a box	$10.00
8 three " (large) one dozen in a box	10.33

Housewives' Delight Can Opener.—This Can Opener is manufactured by F. E. Kohler & Co., Canton, Ohio, and sold to the trade at $10.80 per gross.

Weed Destroyer.—This article is put on the market by Shaw & Clancy, Racine, Wis. It is sold to the trade at $12 per dozen, with 5 per cent. off for cash in ten days.

Buckeye Churn.—This Churn is manufactured by the Buckeye Churn Company, Sidney, Ohio, and is sold from the following list, terms 50 per cent. off 60 days, 2 per cent. for cash in ten days.

No.	9	churns	1 to 4	gallons		$6.00
"	10	"	2 " 6	"		7.00
"	11	"	2 " 8	"		8.00
"	12	"	4 " 12	"		9.00
"	14	"	8 " 15	"		14.00
"	16	"	10 " 20	"		16.00
"	18	"	15 " 20	"		20.00

Terne Plates.—John Dunlap Company, Pittsburgh, Pa., are manufacturing Terne Plates, under the brand of Dunlap's Double Dipped, in each box of which is a printed guarantee, which they state insures the purchaser that every box will be up to standard. These plates are quoted, f.o.b. Pittsburgh, as follows:

Dunlap's Double Dipped.

I.C. 14 x 20	$ 8.25
IC. 20 x 28	16.50
IX. 14 x 20	9.50
IX. 20 x 28	19.00

They also make a rolled plate, which is sold at the following prices, f.o.b. Pittsburgh:

Dunlap's Domestic.

IC. 20 x 28	$12.00
IX. 20 x 28	15.00

Glass.—The condition of the Glass market is unchanged, as trade continues quiet, with no change in prices. While some local jobbers see a slight improvement in orders received, it is generally acknowledged that so far this month business has not been so large in volume as it was for the corresponding time in March. The subject of greatest interest in Glass circles during the past week has been the visitation of the Eastern cities by the National Window Glass Committee. The committee visited Eastern manufacturers, importers and jobbers, to endeavor to secure their co-operation, and if possible to bring them into the association. The committee visited Philadelphia, Baltimore, New York and Boston. While, perhaps, nothing definite was accomplished during the trip, the result of the various conferences is spoken of as having been satisfactory. It is understood that the committee received assurances that the New Jersey manufacturers would join the association and that the New York jobbers would also become members. The associations of the New York and Boston importers have been trying for some time to agree upon prices applicable to both cities, but have been unable to do so, although the members of each association have come to a satisfactory understanding among themselves. Under these circumstances it is not unexpected that the New York and Boston importers are yet undecided whether they will co operate with the National Association. The National Plate Glass Company, with a capital of $8,000,000, is the latest addition to Glass associations. This company was incorporated at Springfield, Ill., having, it is understood, a plan of forfeitures, &c., similar to that of the Window-Glass men, but whether jobbers will be admitted to membership has not been announced. This company is supposed to include in its membership all the Plate Glass factories in the United States, who are now distributing their product through a general agent at Pittsburgh Prices are as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	....	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	....	@	.03
Large Hose, ℔ ton	....	@	9.00
Wringer Rolls, ℔ lb	....	@	.04½
Wringer Wire Rolls, ℔ lb	.01	@	.02
Syringes, ℔ lb	....	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb	9½¢
Light and Tinned Copper	℔ lb	8½¢
Heavy Brass	℔ lb	7¢
Light Brass	℔ lb	6¢
Lead	℔ lb	3½¢
Tea Lead	℔ lb	3½¢
Zinc	℔ lb	2½¢
No. 1 Pewter	℔ lb	14¢
No. 2 Pewter	℔ lb	7¢
Wrought Scrap Iron	℔ gross ton,	$13.00
Heavy Cast Scrap	℔ gross ton,	9.00
Stove Plate Scrap	℔ gross ton,	6.00
Burnt Iron	℔ gross ton,	4.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags	℔ lb	4 ¢
No. 2 White Rags	℔ lb	3 ¢
Mixed Rags	℔ lb	1½ @ 1¾¢
Blues and 3ds	℔ lb	1¾ @ 2 ¢
Hard Sized White Shavings	℔ lb	2¾ @ 3 ¢
No. 1 White Book Shavings	℔ lb	2¼ @ 2⅝¢
No. 2 White Book Shavings	℔ lb	1½ @ 1¾¢
Light Book Shavings	℔ lb	⅞ @ 1 ¢
No. 1 Mixed Shavings	℔ lb	1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @ ⅞¢
No. 1 Printed Books	℔ lb	1⅜ @ 1½¢
Ordinary Mixed Books	℔ lb	¾ @ ⅞¢
Newspapers	℔ lb	½¢
No. 1 Manila Paper	℔ lb	1⅜ @ 1¾¢
No. 2 Manila Paper	℔ lb	⅞ @ 1 ¢
Bogus Paper	℔ lb	⅝ @ ¾¢
Common Paper	℔ lb	⅝ @ ¾¢
Straw Chips	℔ lb	⅜ @ ½¢
Binders' Clippings	℔ lb	⅜ @ ½¢
Jute Butts	℔ lb	⅝¢
No. 1 Jute Bagging	℔ lb	1¼¢
Mixed Bagging	℔ lb	1¼ @ 1⅜¢
No. 2 Bagging	℔ lb	1 ¢
Hemp Twine	℔ lb	⅞¢
Manila Rope	℔ lb	2½¢
Jute Rope	℔ lb	2¼¢
Mixed Rope	℔ lb	1¾ @ 2 ¢
	℔ lb	¾ @ ⅞¢

Trade Notes.

The American Consolidated Mica Company of Minneapolis, Minn., have recently been incorporated with a capital of $600,000. The incorporators are James H. Bishop, Thomas E. Bishop, Emery F. Dodson and Charles F. Brown of Minneapolis, and Joseph B. Dickover of Hot Springs, N. Dak.

L. D. Berger, 224 Arch street, Philadelphia, Pa., issues a neat little illustrated catalogue and price-list descriptive of the extensive line of goods which he manufactures and handles. These include Tinners' Hardware, Plumbers' and Roofers' Supplies and other articles. The pamphlet of 60 odd pages begins with Tinners' Trimmings, Stove Pipe Elbows, Dampers, Knobs, Stove Bolts, &c. Attention is then given to Conductor Fasteners, Hooks, including Gas Pipe Hooks, Eave Trough Hangers, Conductor Pipe and various other articles. Later on attention is directed to Tiles, Crestings, Finials, &c. Toward the close of the publication notice is made of Speaking Tubes, Registers, Coal Hods and Tinners' Tools. An alphabetical index at the close facilitates reference.

William Vogel & Bros., 37-47 South Ninth street, Brooklyn, refer to business as excellent, having done more in amount last month than for any corresponding time since their establishment in 1863. They produce largely of Oilers, Sheet

Metal Screws, Seamless Boxes, Paint Cans, Oil Stoves and a large variety of specialties, frequently receiving orders for goods that require much special machinery and the employment of a large force, sometimes covering a year's time to execute. They build their own special machinery, own their nickel plating plant and lithographing outfit for the decoration of tinware, &c., all of which is operated on the premises. A new brick building 60 x 100 feet, connecting with their existing factory, has recently been completed, which faces on Kent avenue. It has all the latest improvements, including automatic sprinklers, and is six stories high. Quite recently they have assumed the manufacture of many patented specialties brought out by H. Clayton & Co., and for which they are selling agents.

THE WESTERN ZINC COMPANY, with a capital stock of $500,000, have recently been organized at Joplin, Mo. Among those interested in the enterprise may be mentioned Wendell Goodwin, George H. Wirth and A. E. Walradt of New York; George H. Andrew and Ed. Cunningham of St. Louis and Arthur E. Spencer of Joplin.

THE ALUMINUM ALLOY METAL COMPANY, Hampton, Iowa, inform us that the prospects of business for the coming season are exceedingly flattering, and trade is likely to be very much in excess of last year. The general agents for the company are the La Rue Hardware Company, Kansas City, Mo., and the Prusia Hardware Company, Fort Dodge, Iowa.

READERS will be interested in a line of dairy supplies illustrated and noted in the prominent announcement elsewhere of the Geuder & Paeschke Mfg. Company, Milwaukee, Wis. A very large assortment of goods in this line is made by the company referred to, and those wishing to inform themselves on the subject will do well to write for the full catalogue published by the firm.

AT 9 West Fourteenth street, the New York office of W. E. Beveridge of Baltimore, E. D. Luxton, the manager, announces that the quality of the Beveridge Automatic Cooker has been improved by the use of a superior tin plate and high-grade workmanship. Arrangements have been completed by which orders can be filled promptly, notwithstanding the annoyance of a fire at the factory in Baltimore a short time ago.

AN ADVERTISING POSTAL CARD, issued by the Broad Gauge Iron Stall Works, 53 Elm street, Boston, Mass., directs attention to Worthley's Slow Feed Manger, the Popular Wrought-Steel Rack and other stable fittings, besides giving price-lists.

THE STARK MACHINE & TOOL COMPANY, Buffalo, N. Y., report great activity in their manufacturing department, having booked during the past week orders for two heavy 10-foot Power Shears, 15 No. 1 Stark's Process Retorts, two No. 340 Power Presses, and four outfits of Tinners' Machines.

THE AMERICAN STAMPING COMPANY inform the trade that the opening of an office, sample room and warehouse at 104 John street, New York, has been followed by excellent results, as it enables their patrons in the city, as well as those visiting New York, to select their goods by sample, instead of relying entirely upon catalogues. They issue a general invitation to the trade to call and inspect their goods.

PRICE-LIST No. 3, issued by the Parr Register & Mfg. Company, Buffalo, N. Y., illustrates and describes a full line of Hot-Air Registers and Ventilators which they manufacture. In presenting this catalogue to the trade they call attention to the particular care that they give to fitting so as to make a smooth working register. They also mention other points of advantage. The articles described include Vertical Wheel Registers, hot air Registers and Ventilators, Hot-Air Registers and Border Frames, Register Faces, Convex Registers, Circular Top Registers, &c. Numerous illustrations are presented and full tables of sizes and prices are given.

RIEHLE BROTHERS TESTING MACHINE COMPANY of Philadelphia, Pa., are meeting with an active demand for their machines, and among recent orders may be named the following: A 30,000 pound vertical screw-power testing machine for the American Telephone & Telegraph Company, New York City; a U. S. Standard 1000-pound cement testing machine for the Syracuse Water Board, Syracuse, N. Y.; a 20,000-pound vertical screw power testing machine with indicator for the Leland Stanford, Jr., University, Palo Alto, Cal.; a 60,000 pound machine for the Maine State College, Orono, Maine; a 20,000-pound horizontal screw power testing machine for the Ewart Mfg. Company, Indianapolis, Ind.; a marble basin hole cutter for L. Hilgartner & Son, Baltimore, Md.; a 5000 pound transverse testing machine with indicator for testing specimens 48 inches long for the Gillett-Hertzog Mfg. Company, Minneapolis, Minn., as well as many others.

THE NEW PLANT of the Ellwood Steel Company, at Ellwood City, Pa., manufacturers of sheet steel, has been put in operation, and is expected to be running in all departments about the 15th inst. The product of the new concern will consist of sheets, light sheet and fire bed, either pickled or cold rolled, or both. The officers of the Ellwood Steel Company are: David A. Dangler, president; H. H. Simpers, secretary and manager, and John Sherwin, treasurer.

W. W. PRYOR & CO. have recently commenced business at 81 Chambers street, New York, as manufacturers' agents and jobbers in Hardware and House Furnishing Goods and specialties. W. W. Pryor has for some years been connected with the Metropolitan Hardware Company, of which his father, R. W. Pryor, was the head, their business being at 32 Vesey and 26 Barclay streets. For a portion of his time with that house he served them as buyer. One of the features of the new concern will be to secure buying agencies for Hardware houses out of town who may be desirious of having a resident agent here. Another will be to purchase goods from manufacturers who are overstocked and wish to unload goods for cash, without disturbing the channels of their regular trade.

JOHN P. LOVELL ARMS COMPANY, Boston, Mass., are putting on the market Small's Fire Escape, which is described as being self-regulating and reversible acting. It is made of rolled pressed steel, nickel plated, and weighs, without the rope, 7 ounces, and is warranted to hold 1000 pounds. One or two persons may use it at a time. The device consists of a hook to be firmly screwed into the woodwork inside the room. To this is attached best quality rope of sufficient length to reach the ground. The rope is run through a V-shaped piece of metal to which is molded a ring through which a strong band is passed. This band is placed over the head and under the arms and forms a perfect sling in which a person may descend and at the same time have both hands free to grasp the V-shaped pulley and regulate with ease and surety the speed of his descent.

DIETHER & BARROWS, Fort Wayne, Ind., have engaged C. M. Avery, who is widely known to the trade, as their direct representative. They advise us that at the present time they are in receipt of liberally increased orders for their Weisell Washing Machine, and that usual orders for their line of standard patterns are given prompt attention. They are now building extensions to their new factory, which they state will enable them to insure prompt deliveries.

AMONG the shipments of the Parr Register & Mfg. Company, 96 to 100 Georgia street, Buffalo, N. Y., during March were two carloads of Registers to St. Louis, one carload to Kansas City and two carloads to Chicago.

THE LUDLOW-SAYLOR WIRE COMPANY, St. Louis, Mo., report a brisk trade in their Art Metal Department. They are now finishing an elevator inclosure for a local clothing concern. This inclosure is oxidized copper plated, of attractive design, and will be a work of art when completed. They also furnished to the same concern a quantity of nickel plated show window fixtures. They are also at work on an elevator inclosure of ornamental iron for the new High School building, St. Louis.

Composition of Smoke.

From an English exchange we extract the following:

In a paper before the Russian Technical Society, by P. Laktine, on "The Composition of Smoke," the author observes that all the efforts made to suppress smoke have been unsuccessful because its elements have not been sufficiently studied, the gaseous portion having always been analyzed, while the solid and liquid constituents have remained but little known. It is, however, to the latter that smoke owes its injurious qualities, which are especially manifest in large towns. When substances, such as coal, peat, lignite and wood, containing a large proportion of hydrogen, are burnt, light products of decomposition, especially those containing hydrogen and carbon, are disengaged under the influence of heat; and their disengagement is complete or partial, so that the solid carbides, which contain less hydrogen and carbon, and which are present in a state of incomplete combustion, are drawn along by the light products. It is in this case that carbonic acid, nitrogen and the remainder of the oxygen unite, not only with carbonic oxide, but also with the substances not burnt, consisting of carbon, hydrogen, oxygen and a little nitrogen, while pure carbon is disengaged in the state of fine powder. All the above substances form a mass of light gray, yellowish gray or dark gray color, called smoke. The greater disengagement of smoke when a fresh quantity of fuel is thrown on a fire grate is explained by the difficulty which air has in reaching the furnace across the coal, thus causing a cooling down. The following are the conclusions arrived at by the author: 1. The formation of smoke is inevitable, even with the most perfect stoking, if the fuel contains ash and water. 2 Suppression of smoke by means of complete combusion is impossible. 3. A small portion of the fuel is always lost through becoming volatilized with the smoke or combining with the ash. 4. The ordinary methods of analyzing ash by direct calcination are incorrect, and should be superseded by others.

The London General Omnibus Company have recently fitted electric lamps to 140 of their omnibuses. The battery is placed under one of the seats and a lamp of special design is suspended in the center of the roof, giving a most satisfactory light. The installation is said to have been very successful. The ticket inspectors of the company also use an electric light, consisting of a pocket accumulator and a button hole lamp. This system has been in use for a year and is said to give complete satisfaction.

THE METAL WORKER

NEW YORK AND CHICAGO.

Saturday, April 22, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....220 South Fourth Street
BOSTON.....146 Franklin Street
PITTSBURGH.....Room 509 Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....312 The Cuyahoga

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Where Patience Is Expensive.

Patience is not always a virtue. When a water back has accumulated so much sediment that no ordinary fire will heat the water and the patient servant or house-wife is too careful of complaining, thinking there is no remedy for it but to pile in the coal and burn double the quantity needed for cooking, then it would be better to complain. The roof has a small leak, so small that only a little spot is seen in the ceiling of some chamber room where it cannot do very much damage and no complaint is made because it is so disagreeable to tell abont things that require an expenditure of money. After a while a driving storm comes on, lasting several days, and the little leak has let water down on a frescoed ceiling, and then the complaint comes too late. It is the same with business men. They don't like to complain, but feel conscious that things are not going right. It may be the clerks in the store are not as attentive as they should be to the interests of their employer, but he is kind hearted and does not want to complain; his patience is far from a virtue. The men in the tin shop have got into a way of running things their own style and have come to think that the workman knows it all and cannot be told anything by one who never served an apprenticeship to the trade, and make it tiresome for the boss to remonstrate; and if he gives in to little delinquencies he may be sure that big ones will follow and his patience will be expensive. This might be carried to large interests where the volume of trade was unsatisfactory and for which a remedy might be found, but through a disposition to be patient the opportunity for relief is not embraced and patience has worked irreparable injury.

Pay Attention to Details.

"Genius" has been defined by a great, though somewhat cynical modern philosopher as "an infinite capacity for taking pains." We may similarly define the culty which makes a man a master of his craft, as an infinite capacity for mastering and assimilating small details, many of them apparently trifling and insignificant, but all going in the aggregate toward making the solid foundation of knowledge and experience necessary to the attainment and retention of success in almost any line of business. This, with indomitable persistence and a spirit which defies discouragement, is the passkey which has, as a rule, unlocked the doors of fame, wealth or influence to those men who, not having inherited any of these things, have risen out of the crowded ranks of labor and stand to-day among the leading engineers, manufacturers and captains of industry in the United States, men, many of them without advantages of education, or even of a trade training to push them upwards. Self-helped and self-improved they have gone along patiently, picking up practical knowledge at the bench or forge, or in the mill, paying attention to every trifling detail of their craft or business, and storing up the knowledge gained until they find themselves in possession of a fund upon which they can draw at will, and which stands them in good stead in any eventuality. They have, as it were, saturated themselves with the details of their craft, keeping a single eye on the mastery of it.

A Solid Foundation.

Such are the men who are bound to rise. And, fortunately for the youth of this country, similar success is open to each and all provided they possess the necessary ability to secure advancement, and the solid qualities which hold success when grasped. But among these qualities stands prominent that faculty for mastering and absorbing trifling details of which we have spoken. No shallow knowledge will ever make and keep a man foremost in his trade or profession. There must be a thorough, conglomerate-rock foundation of details upon which alone his knowledge and experience may be built and stand. Big blocks of knowledge are very necessary to the building, but it is the every day experience in little scraps which serves to bind them together and so make a stable edifice. We do not think this fact can be too strongly impressed upon the minds of the younger men and boys who have the ambition to rise out of the rank and file. Now is the time for them to gather in the materials on the lines we have sketched out, and there need be no limit to their ambition or to their attainments.

Can Tin Plate Be Too Good.

The charge is now made that American tin plate is too good. But a short time since the objectors to the American tin-plate industry asserted that tin plate could not be made here, that there was something peculiar about it which had enabled the Welsh to monopolize the trade, and that they would always retain control of it. When a few works were started on this side of the Atlantic their product was very critically inspected and the tin plate pronounced fairly good, but much inferier to imported tin plate. Roofing plates first began to earn some commendation for themselves, but the question was then asked, How about bright plates? For a time it really looked as though bright plates were too hard for any but a very few firms to attempt to make. Now, however, American bright plates are becoming quite well known in the trade, and the profonnd criticism is heard that they are too good. It is stated by experts who represent foreign manufacturers that the American bright plates turned out by our best-known makers are too carefully made, being especially too thickly coated with tin. The change thus wrought in the tone of the criticisms is too marked to be allowed to pass without comment. The American tin-plate industry has won the first great point of advantage in the fight for American markets.

Light Welsh Plates.

It is curious that this point has been overlooked by our foreign competitors. They seemed to take the matter for granted that cheapness was the sole end and aim. They believed that the price per box governed everything. They evidently had the impression that American consumers would buy the merest semblance to tin plate if it were offered at an extremely low price. Setting to work to achieve this result, they rolled their sheets thinner to make their boxes weigh less; accomplishing a double purpose in this respect, as they then paid less duty at our ports of entrance. With marvelous skill in shaving items of cost they succeeded in reducing the cost of tin on bright plates even when it was thought by able and most expert tin-plate makers that the limit in this respect had been reached years since. Confident that raw American practice could not approach such scientific skimping, they, metaphorically speaking, rubbed their hands and cried. "Aha," pointed to their 90-pound boxes with a trace of tin on the steel and defied all America to produce their equal. It will be some time before Americans who have any regard for their reputations will attempt such a feat. This was evidently the brilliant method for holding trade which some of the British journals had in view after the McKinley bill was passed, when they declared that the increased duties would be nullified by the further cheapening of the cost of producing tin plates.

American Bright Plates.

There is no country in the world in which a consumer is so willing to pay a fair price for a good article as in the United States. Buyers are shrewd, and if possible they would be glad to get more than the worth of their money. But cases are very rare indeed in which a manufacturer deliberately purchases inferior material. Consumers of tin plate have for years been finding increasing

fault with the tin plate shipped them from abroad, and have vainly asked for a reform in makers' methods, threatening to engage in the business themselves if this were not done. Better and not worse tin plate has been the demand of the American trade generally. It is now to be had, and in increasing quantity every month, and those who say that American tin plate is too good do not understand the temper of the people. We have been informed by a very large manufacturer of tinware that the goods which he is now making up from American stock will last ten times as long as those made from imported plate of what professes to be the same character. His testimony is without prejudice, as he is not interested in the manufacture of tin plate, but buys in the open market to the best advantage. The comparison so strongly made in favor of American tin plate may be an over-statement; but that is the best evidence of the high standing in the trade which American bright plates have won for themselves.

Heating Vehicles.

There are those living who can well remember when many country churches were either not heated at all in winter, or so imperfectly warmed that they might nearly as well have been left entirely cold. The foot-stove, as it was then called, exists no longer, except perhaps as a relic of a past order of things. Not one in 10,000 of the younger generation has ever seen this contrivance. It usually consisted of a sheet brass or tin case, perforated in fancy patterns and having a receptacle for live coals of wood in the interior. Air entered to support combustion, and gases of combustion found egress through the holes in the case. This foot-stove was placed under the feet to keep them warm in church, while the good minister, as was his wont in those days, devoted much of his eloquence to what under the circumstances was almost an alluring description of unquenchable fire. People were then also in the habit of using these foot-stoves to keep the feet warm in vehicles in cold weather. Heated blocks of wood wrapped in a woolen blanket, hot bricks or jugs of hot water, corked and wrapped in the same manner, were common makeshifts, used as substitutes for the foot-stove. Since the advent of railroads attention has been given to the warming of large vehicles; cars on steam railways and later cars drawn by horses on street railways have been rendered quite comfortable by artificial heating. There is still room for improvement in methods. Within a very few years the substitution of steam and hot water heating appliances for stoves in cars has been made the subject of numerous patents, and some of these have gone into extensive use. There seems no reason why smaller vehicles cannot be practically warmed, and at the same time ventilated without the discomfort of opening windows in cold windy weather.

A Brougham Heated by Warmed Air.

At least this idea has been thought feasible in Germany. A patent for an apparatus for heating vehicles has been issued in that country and a recent trial of the invention in Berlin is said to have given satisfactory results. The application was made to that kind of a carriage known as a brougham, the body of which is quite low, so that it is easy to step into it from the ground. The fuel used by the German patentee is petroleum oil, carried in a small cistern on the roof of the carriage, and a sort of lamp placed under the seat between the hind wheels is fed by a tube from the reservoir. The descriptions of the apparatus yet seen do not set forth the manner in which air, after being heated, is introduced into the carriage without also carrying in the smoke of the burner; and, altogether, the contrivance does not seem to be an arrangement that a Yankee would be particularly proud of. Notwithstanding its crude character, it contains a hint of a want in this country and in all cold climates; and it points to the most convenient fuel for supplying the want. Country physicians often suffer much from cold during their long rides in winter, and a cheap practical method of heating covered vehicles would be appreciated by many other people as well.

"Wanted! Good All Around Men."

BY J. O. T.

Assuming that there is an increasing demand for skilled workmen which is in excess of the supply, with the further claim—which some may dispute—that the standard of excellence rules lower now than formerly, or rather that the average mechanic of to-day is content with a limited knowledge of his trade, it may be well for all interested to consider the matter, seeking the causes and, perhaps, suggesting remedies which may alleviate if not cure, the confessed evil We may say without fear of contradiction that no man can become a reader without first learning the alphabet, nor can he hope to become familiar with the polysylables of a trade without a mastery of the A B C thereof. From this acknowledged necessary foundation the education of head and hand may be carried to prominence or suffered to remain on a low plane, and it almost seems as if a majority of workmen were content to deserve the opprobrious name of "mudsills," if their apparent willingness to stay down be taken in evidence. Perhaps, it should rather be said that there is not a general desire to thoroughly learn the trades whereby we expect to gain a livelihood because of the necessity or inclination to make said trades profitable before time is spent to mature them, which is like gathering fruit blossoms for their beauty and fragrance and getting a present minor satisfaction at the expense of future loss.

Here we may possibly find why the graduates of trade schools are, as a rule, likely to become better workmen than those who are obliged to gain their technical knowledge in the old way. The word "obliged" is used deliberately for there is little doubt that intending mechanics would prefer a trade school to a workshop if they could afford it. In the one case they pay a present price for learning a trade, and in the other they learn a trade for present pay. Let us take two boys of equal capacity, and put ting one in a modern mechanical school and the other in an average shop; see how they are likely to turn out. We will call them for our present purpose the student and the apprentice.

Student—if we are not misinformed—does not labor for immediate pecuniary profit either to himself or others, but is sowing seed for a future harvest. It would be poor economy for a farmer to eat his seed corn, but we may conceive of circumstances which would compel him to do so. Apprentice must, perhaps, in like manner sacrifice future advantage to present need, being entirely self dependent for personal wants, and he is likely to set himself up as a jour for the sake of increased wages and a possible social advance before his mechanical attainments would justify the move. If he has—notwithstanding the hindrances which may be mentioned later—succeeded in mastering the rudiments so as to do a common easy job, he offers himself at some new place and stays there until some work outside of his experience is to be done, when the boss either cuts him down or compels him to move on to repeat the operation in other places. We can imagine a trade picked up in this way as a rolling snow ball increases by motion, but at best it would be a pieced-up matter. Student on the other hand, having present living provided for, could afford to remain under instruction for a time not contingent upon the market value of his services.

Employers are responsible also for the lack of complete workmen, because of their special devotion to self interest manifested in keeping the apprentice in a position and at work which is most profitable to the boss, even though such work may seem to have no connection with the trade proposed to be learned. In the old time when a boy was "bound apprentice" and compelled to serve the term of his indenture, there was a corresponding obligation on the part of the employer to keep and teach him the "art and mystery" of a trade. Nowadays it is a mystery if a boy fully acquires the art he commences.

Another point to be noticed is the composite nature of the modern sheet metal business obliging employers to hire "all around" men as the "want column" puts it. The average "tinner" (an elastic title) has such a variety of work now considered legitimate that he seeks for a condensation of several artisans under one man's hat, like one of those tools for all uses.

Doubtless there are many mechanics who can turn their hands to any job required of them, but as a rule life is too short for a man to become first-class in every one of the lines and it is not strange if the "Jacks of all Trades," &c., &c., multiply on the face of the earth. However that style of do-everything-you-want work has come to stay and workmen must adapt themselves to it. Fortunately trade publications, if not trade schools are in reach of all, so that the progressing mechanic, if he will, may learn the theory. Whether he becomes practical depends somewhat on matters noted above, but largely on himself.

THE LETTER BOX.

Warming a Church.

From J. R., *Cincinnati, Ohio.*—Seeing the church plan of "W. D.," Oxford, N.S., and your comments on it in *The Metal Worker* of April 15, I thought I would like to give my opinion and learn what I could from the Letter Box criticisms on it. The plan seems to give all required dimensions except the hight of the ceiling in the audience room, the depth of the cellar and the hight of the furnace. From the plan it is fair to assume that the church in question is not exactly modern, consequently an average hight of ceiling would be about 18 feet and the cellar not over 6½ feet, and the furnace at least 5½ feet, to the top of the brick casing. These have seemed to me to be near enough correct to adopt in forming an opinion. As the entrance of the church is at the coldest end and where the air pressure is greatest, the furnace should be located at least 10 feet further that way. The length of a hot-air pipe to be practicable depends on the sharpness of the pitch it has, and if my conclusion as to the depth of cellar is correct, the pipes would have to be taken out of the side of the furnace to get a rise of 1 foot in 25 feet, which is not enough, as it should be at least an inch to the foot in runs of half that length and twice as much in runs of this length. To run a pipe at so little pitch due north or west such a distance, means that the air will move so slowly that it will cool to the extent of inefficiency before it arrives at the register. To run a pipe to the extreme south or east wall is unnecessary, for as soon as the air gets through the register it will move to that part of the building at once. So it seems to me that the intentions, which are to distribute the air, are killed by the manner in which they are carried out.

All of the cold-air ducts are too small; those from the church should have a capacity equal to the heat pipes and that from out of doors equal to three-fourths of their capacity. If the furnace burns well and heats up promptly the smoke pipe is not open to criticism, though many might wish it covered. I think the hot-air pipes should be made 14 inches in diameter, with registers whose faces have an area one-third greater than that of the pipe. The registers should be moved so as to shorten the pipes, and if still placed in the side aisles those at the front should be brought 10 feet back from where they now are and those at the other end be brought at least 20 feet further toward the front. If the pipes are shortened in this way and the expense of enlarging them is to be avoided, the pipe that is left after shortening them should be used to run to additional registers in the middle aisle; the pipe leading toward the front should not be over 10 feet long and the pipe running in the opposite direction 15 or 18 feet long. The cold-air duct coming from the side of so long a building will generally have a current of air blowing across its mouth and air may at times be drawn out, while seldom forcing directly in, so that the furnace will not be properly supplied with air. To overcome this, at the mouth of the duct a board should be set up opposite to it and 2 feet away, and the space at the top covered from it to the building. To the outer upright board should be loosely hinged a valve long enough to swing and reach either side of the opening of the duct. This would prevent the air passing the air duct without entering, no matter how the wind blew, and would prevent the wind blowing directly into it.

Air supply, location of furnace, length of heat pipes, their lack of pitch and the wrong location of registers are all open to criticism in my opinion, and I hold myself open to criticism.

From F. H. J., *Rochester, N. Y.*—In answer to "W. D.," Oxford. N. S., whose letter about heating a church appeared in *The Metal Worker* of April 15, I would advise him to dispense entirely with all hot-air pipes in the cellar and take the heat direct from the top of the furnace through a large round register. He will find he can heat the church without any trouble by this method. The hot-air pipes are altogether too long as shown in his plan, for by the time the hot air travels through their length it gets considerably cooled. I heated a church in a country town some five years ago, the size of the building being 30 x 80 feet and 14 feet high. I put a good solid cast-iron furnace with 25-inch fire pot in the cellar so all the heat came out of the top of the furnace in the center of the middle aisle. I did not use a cold-air box, but set up the furnace about 6 inches from the cellar bottom. That furnace gave the very best results, besides costing considerably less. Not far from this same church is a brick church, which has four leaders from the furnace, but it never gave satisfaction. The trustees are now contemplating having it changed and the heat taken from the top of the furnace.

Retinning Sap Buckets.

From Q., *St. Johnsbury, Vt.*—I would like to inquire of the readers of *The Metal Worker* if it would be practicable in a country tin shop, in the manufacture of tin sap buckets for maple sugar making, to make the buckets all but the soldering, and then have a tinning pot to immerse the buckets in, thereby filling the seams with tin and at the same time joining the metal turned over the wire. Thus the "soldering" would all be done at one operation, in place of doing it by the usual method with the soldering coppers.

Note.—If the operation of retinning the sap buckets was skillfully performed, it is probable the result would be satisfactory as far as the quality of work was concerned, but it is doubtful if the articles can be retinned as cheaply as they can be soldered in the usual manner.

Crucibles for Melting Brass.

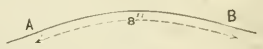
From R. A. R., *Hiawatha, Kan.*—Can I be informed through the columns of *The Metal Worker* how to make crucibles for melting brass without the use of fire clay?

Answer.—It would be difficult for our correspondent to make crucibles without fire clay, as the latter is used to a certain extent in their manufacture. Even "black-lead" crucibles are said to be composed in part of fire clay. If our correspondent desires to melt brass it would be best for him to buy the crucibles ready made.

Bending Heavy Plate Steel to Arc of a Circle.

From L. R., *Whitinsville, Mass.*—Please inform me through *The Metal Worker* how to form up a steel plate of No. 10 gauge, 8 inches wide and 40 inches long, to an arc of a circle 52 inches in diameter. I want to form the plate through power rolls, which are 6 inches in diameter, without leaving flat parts at the edges of the plate at the points A or B of the sketch, Fig. 1.

Answer.—Fig. 1 is reproduced from the sketch sent by our correspondent, the points A and B of the edges showing the



Bending Heavy Plate Steel to Arc of a Circle.
Fig. 1.—Showing Curve with Flat Ends.

flat parts usually present when heavy plates are passed through rollers of large size, if the edges are not first turned to the sweep of the circle desired by using a heavy wooden maul for the purpose. It is almost impossible to make a perfect curve by this method, even if done by skillful workmen. A method by which to accomplish the result desired, without the use of a maul or other treatment of the plate before it is formed in the rollers,

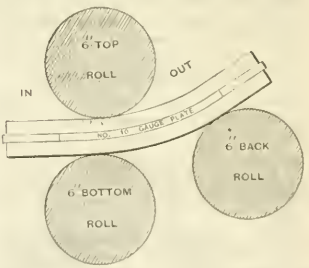


Fig. 2.—Manner of Rolling the Plate to Circular Shape.

is as follows: Place the 8-inch by 40-inch steel plate between two plates of a heavier gauge in the manner shown in Fig. 2. The three plates are shown in the position they bear to each other during the process of forming. The heavier plates must be of the length of the No. 10 gauge plate to be formed and of sufficient width to project beyond the side edges of it a distance somewhat greater than from the points A and B of the plate shown in Fig. 1 to the edges. When rolling the plates, the outside or heavier plates only will be flattened at the start and finish, while the center or lighter plate will form up perfect to the sweep to which the rolls are set.

Quality of Water from Radiator.

From BROOMELL, SCHMIDT & COMPANY, LIMITED, *York, Pa.*—We note the inquiry from "C. R.," Utica, N. Y., in *The Metal Worker* of April 15, in regard to heating bathroom from kitchen range, &c. We have for the last three years been installing our Heatencook range, to which we attach as high as nine radiators, heating the entire house in many cases, and it has been our custom universally to draw all hot water for the house from the heating system. We have never had a single complaint with regard to the water, and we are confident that it will never stain linen, or give any other unpleasant result. We do not, of course, recommend this water for use in cooking, and we do not think water from an ordinary range is ever employed for this purpose.

Sliding Damper Wanted.

From J. C. F., *Williamsburg, Ohio.*—I have a large round stove which is located 28 feet from the chimney. Wishing to secure a good draft when the fire was started or fresh fuel put on, the pipe collar on stove was closed by means of a cap and the 8-inch pipe used connected with an opening of similar size in the top of stove. A common damper was placed in the pipe for regulating the draft, but an objection to its use is that it does not remain in the desired position, being liable to turn. Some years ago I saw a damper that would appear to answer my purpose. It was for a round 8-inch pipe, made box like and provided with slides which could be drawn out as desired. Will the readers of *The Metal Worker* inform me where such a damper can be procured.

Note.—We have seen a damper of the character our correspondent describes, but do not know who makes it. The Richardson & Boynton Company, New York and Chicago, manufacture a sliding damper which is provided with two slides, and is intended for elliptical pipe 6 x 11½ inches, the area being about that of an 8-inch pipe. While our correspondent wishes a damper intended for a round pipe, the above may be made to answer providing he is unable to secure the kind desired.

Pump for Driven Well.

From H. A. C., *Bainbridge, N. Y.*—Do you know of any pump made that will work easily on a driven well with about 25 feet of 1¼-inch pipe? We have a No. 4 common pitcher pump and some of a smaller size, but they all work so hard that they cannot be used except by a very strong man.

Answer.—The lift is somewhat above the practical limit for ordinary pumps, and those of the pitcher variety are hardly qualified for the work. Specially constructed and proportioned pumps, with a powerful leverage greatly in excess of that of the style of pump mentioned, and made for driven wells, can be supplied by any of the large pump houses.

Lining a Tank.

From H. and S., *Marietta, Ohio.*—We have a 60-barrel water tank to line. Which would be the best material to use—copper or lead? What thickness should we use, and how is such work usually done?

Answer.—Either material, in our opinion, would make a good lining for a tank. Sheet lead is more generally used for lining tanks than sheet copper. It is considerable cheaper as to first cost, and is equally as durable under many circumstances, and can be readily worked. These considerations, and also the fact that sheet lead can be procured in sheets of any size, ranging from 3 feet square to sheets about 10 feet wide by 20 feet in length, of any gauge from $\frac{8}{64}$ to $\frac{1}{8}$ inch in thickness, may in this instance recommend it to our correspondent's preference. Sheets either $\frac{1}{16}$ or $\frac{1}{16}$ inch in thickness, weighing 3½ and 4 pounds per square foot, respectively, will be ample for the purpose. Have as few seams as possible, and make the seams or laps tight by the method usually termed lead burning.

Cleaning Solder.

From A. J. T., *Alexandria Bay, N. Y.*—I would like to be informed through the columns of *The Metal Worker* how to clean wiping solder after it becomes foul by wiping on galvanized iron pipe. The solder becomes chalky and brittle, the tin and lead appear to separate, making it difficult to use.

Answer.—The usual method for cleaning solder that contains zinc is to burn sulphur on the surface of the melted solder, stirring it constantly that the zinc in the solder may be brought in contact with the burning sulphur. The resulting dross is to be removed by means of a skimmer. If any of our readers know of a better method we would be glad to hear from them.

The Best Heating System.

From F. S., *Chester, Vt.*—I have read with much interest the different articles on house heating as they have appeared from week to week in *The Metal Worker*, but, as I have little knowledge on the subject, I should like to hear the ideas of practical men as to the best way to heat an ordinary dwelling house. Expense and other things taken into consideration, which is the most desirable way of heating—hot air, hot water or steam? Please ask the question and call for the views of some of our wiser ones for the benefit of one who is ignorant.

Note.—The question propounded by our correspondent is a simple one, but so broad in its bearings that an answer may seem impossible. Nevertheless it is a question that is often asked, and it is one that a man who puts in heating apparatus is called upon to answer very frequently. The generality of house owners have little knowledge of heating apparatus, and are not in a position to compare the several advantages of the three systems mentioned. The dealer who is prepared to put in an apparatus of either kind has, therefore, to supply the information and persuade his customer that one or another is best suited to his purpose. It would be interesting as well as instructive if those who are particularly devoted to each of the different systems will furnish in a brief way the reasons for their preferences. Let the advocate of the hot-air furnace tell why he prefers this older method of heating, pointing out its economy, the supply of fresh air it gives, simplicity, &c. Let the steam man tell what perfect control his apparatus affords, and how it is proof against the cold of the most rigorous winters. He can also explain that the apparatus does not require the attention of an engineer, and otherwise point out its merits. Finally, the hot-water advocate has an excellent opportunity to explain the merits of his pet system. He can show how economical it is in the use of fuel and how, in the opinion of many, it is superior to any form of heating apparatus. He can also tell how easy the regulation of temperature is in the mild weather of spring and fall by the circulation of water at a low temperature. We will be glad to have our readers take advantage of this opportunity and each try, as it were, to persuade our correspondent at Chester, Vt., that the system he advocates is the best.

Trouble with Galvanized Iron Smoke Stacks.

From C. H. H., *Valparaiso, Neb.*—As galvanized iron does not give very good satisfaction when used for smoke stacks on chimneys in this part of the country, I would like to know if there is anything better for the purpose which is not too expensive. The acid from the smoke seems to corrode the galvanized iron, and from one to three years is the usual time they will last.

Note.—We know of no material of equal cost which would be better for smoke stacks on chimneys than galvanized iron provided a heavier gauge is used than is ordinarily put in such stacks. In most instances they are made too light; No. 27 iron is used where No. 20 or even iron of a heavier gauge should be used to give reasonable satisfaction. Heavy black iron coated with coal tar will under some conditions give good results.

Adjustable Pot Covers.

From J. T. T., *Joliet, Ill.*—In reply to the inquiry of "T. E. S.," Bay City, Mich., that appeared in *The Metal Worker* of April 1, I would advise him to write to Topliff & Ely, Elyria, Ohio.

Mechanics' and Traders' Exchange.

The formal opening of the new rooms of the Mechanics' and Traders' Exchange of this city occurred on the afternoon of Monday, April 10, with appropriate ceremonies. The new quarters are located at 289 Fourth avenue, in the Kennedy Building, and consist of an exchange room, consulting rooms, secretary's office and library, all of which are finished in oak and handsomely furnished. The work of fitting up has been in charge of Stephen M. Wright, the genial secretary of the exchange. At the opening ceremonies a large number of representative builders and dealers in building materials, as well as those connected with allied industries, were present. Addresses were made by Ira G. Hersey, president of National Association of Builders; William H. Sayward, secretary of the same association; J. S. Stevens, ex-president of the Philadelphia Builders' Exchange; John H. Tucker, president of the Building Trades Club; Isaac A. Hopper, Andrew J. Campbell and William C. Smith.

In the evening of the same day the Building Trades Club tendered at their handsome clubhouse, 117 East Twenty-third street, a reception to the president and secretary of the National Association of Builders. The programme consisted of music by Young's Orchestra, followed by a number of special features, including character and humorous songs, recitations and legerdemain. Following the musical and literary features, refreshments were served in the rooms on the main floor of the building. The entertainment was carried out in the same liberal spirit which has characterized the affairs of the Building Trades Club since its organization.

WORLD'S FAIR NOTES.

Pushing Preparatory Work.

According to the closest possible estimates, 15,000 men went to work at Jackson Park last week—an increase of more than 1100 over the strongest force that has been inside the gates since dedication. Director of Works Burnham was in a very comfortable frame of mind over the settlement of labor troubles and the subsequent increased activity in all the construction and installation forces. "We have a full force in the department of works," he said in answer to a query, "and are moving along all right. I should say we had 3000 men of our own besides the labor employed by contractors on Exposition work. That includes the landscape, installation, color and carpentry divisions. The contractors have all their old men back and a good many more besides. It would be hard to say without an actual count just how many men are at work inside the fence and on the Plaisance, but it is enough to make things move along at a lively pace." Mr. Burnham's cheerful view of the situation was shared by the contractors and the returned strikers as well. One of the union employers made an estimate that showed a complement of nearly 15,000 men in all grades of labor, both union and non-union.

Exhibits Received Until April 30.

Director General Davis has issued the following general order :

"Notice is hereby given transportation companies and exhibitors in the World's Columbian Exposition that all exhibits for which permits for space have been issued and which can be delivered and placed in position and the exhibitor's work completed on or before April 30, 1893, will be admitted, and the regulation fixing April 10, 1893, as the last day on which exhibits will be received is hereby modified to that extent."

The original regulation modified by this extension, provided for the forfeiture of all space not occupied by the holder of the allotment by April 10. It has been apparent for some time that some of the exhibitors, notably in those departments where installation has been delayed by leaking roofs, would have to be given that time or else suffer injustice by forfeiture of the apportionment. The time fixed for installation, April 10, was made early enough to provide for the emergency that has arisen. "The order," said the Director-General, "is only a formal permission for an extension that everybody knew would come during the last weeks of installation. It has been so at every exposition and we expected it here. It does not mean that the exhibits are unexpectedly slow in arriving, as some might construe it, for we are considerably in advance of the stage they had reached at Paris or the Centennial 20 days before the opening. We did not want any exhibitor to feel that he would be barred from participation because he had been delayed beyond the time set for him to be here. So far as may be judged this far before the opening, the work of installation is very well advanced and is progressing well. In manufactures alone 15,000 packages have been received and placed in the proper space, and that is perhaps the best test of progress, because the exhibitors of the department were comparatively late getting their official allotments. In agriculture, mines, electricity, transportation, fine arts, floriculture and horticulture exhibits are coming in very fast, and we see no reason to qualify anything we have said as to our readiness on opening day."

The Mineral Wealth of Iowa to be Illustrated.

Any one who believes Iowa not to be rich in minerals has only to view the exhibit now being erected by that State in the Mines and Mining Building to change his opinion.

The Hawkeye country will occupy 526 square feet of floor space under the stairway at the south end of the building. Although the location will not admit of any ornamental structure, the Iowans are equal to the occasion and propose to fill the space allotted them in a manner highly original and picturesque. The exhibit is divided into three sections: Coal, the technical display and miniature scenes from mines and quarries. The exhibit is being prepared by T. W. Meers of Centerville, and is constructed to satisfy geologists and to please disinterested spectators as well. In the center of the space will be shown an interior of a coal mine. This will contain a loaded coal car and several life-size figures of miners at work. Although the space is only 25 feet deep the perspective is arranged to make the mine appear to extend back several hundred feet. Over the entrance of the "pit" will be the word "Iron" worked out in coal and other minerals. The mouth of the "pit" will be built up of blocks of coal so that the entrance will appear to be through a solid block of bitumen.

On the right of the coal exhibit will be the technical display, including fine specimens of every mineral found in the State. A great store is set by the exhibit of Trenton rock and lead, which took the first medal at New Orleans. On the left will be a reproduction of the Ottumwa mineral palace set upon a pedestal of coal. The pedestal will be divided into squares and each square will contain the name of a mineral county in letters of gold. In this division there will also be a model of an exterior coal mining scene. This is built of black walnut lumber and was contributed by the ladies of Centerville, who were patriotic enough to have engraved upon the model "Iowa" instead of Centerville. A solid block of coal weighing 5000 pounds will be set up in this section, upon which will be printed in gold the Iowa mineral statistics. The ladies of Dubuque have built a grotto out of stalactites and spar, which will be erected at the extreme left of the Hawkeye space. This grotto is also arranged by means of lookingglasses to appear deeper than its actual size warrants, and it is a beautiful creation from a decoration standpoint. It will be fitted up with electric lights and will form one of the features of the exhibit. The different clays, glass, sands, and kaolins will be shown in glass jars. A special exhibit of vitrified brick will be made. Among the counties contributing to the exhibit are Alamakee, Dubuque, Jasper, Sergeant, Red Oak, Webster, Clayton, Eldora and Appanoose. Appanoose has 80 coal mines in operation and furnishes the greater part of the coal used in the exhibit. Many minerals will be shown, including red jasper, Galena limestone, magnesia limestone, iron oxide for manufacturing mineral paint, silica, zinc ore, black jack, and clay for vitrified brick.

Minnesota's Mineral Exhibit.

A feature of the natural wealth of Minnesota which is not fully appreciated will be illustrated by means of a fine display in the department of mines and mining. This exhibit will be under the direction of L. P. Hunt, general superintendent of all the exhibits, and H. B. Moore. These gentlemen have secured specimens of all varieties of ore mined in the State, and each mine that is in operation will have a distinct exhibit. The mineral interests of the State are as yet comparatively little developed, and the gentlemen who have charge of this branch of the exhibit feel that there is an excellent chance in their department to do good work. The iron ore interests of the Vermillion and the Mesabi ranges will constitute the principal features of the display.

An interesting feature of this exhibit will be a miniature mine in full operation, sent from Tower City. This model is about 6 feet high and 4 feet wide, and its object is to demonstrate the method of mining iron ore, showing all the various levels, apparatus pertaining to a mine, and even the miners with their lamps on their heads.

In arranging the exhibit in the Mines and Mining Building the stone work that was necessary was constructed of Minnesota stone, each block being labeled, showing from what quarry it was taken. Good granite and sandstone are plentiful in that State, and with samples from each quarry of prominence placed in practical use the merits of the different grades can easily be seen.

Nicaragua Canal Model.

The great model of the Nicaragua Canal is unpacked and nearly ready for exhibition. It is about 35 feet long and 5 wide, and gives a bird's-eye view of the oceans, mountains, jungles, rivers, lake and harbors, showing the advantages of this route for interoceanic communication.

In order that nothing may be left for the imagination the model is so constructed that water will cover the oceans and lake and fill the canal and river. Standing by the model one may study the formation of the harbor at Greytown, on the Atlantic coast, then follow the canal traversing the swamp lands at sea for ten miles, until it reaches the foot of the coast range. Here it climbs up the hills 100 feet by three locks, entering a series of lagoons on the Limpio and San Francisco rivers, which form natural channels to the great San Juan, the Ohio of Central America.

At this point the Ocho dam will raise the waters of the great river to a level with its source, Lake Nicaragua, giving slack water navigation to the inland sea.

From the lake to the Pacific Ocean the distance is only 12 miles, and the highest pass only 45 feet above the lake level. The canal passes about 4 miles south of the city of Rivas, where Gil Gonzales de Avila first met the natives of Nicaro in 1525, and kept his Spanish soldiers busy for a week baptizing the simple Indians at the edge of the "sweet water sea." About half way to the ocean the ships will enter the artificial lake of Tolo, then go down 110 feet by three locks into the quiet waters of the Pacific at the harbor of Brito.

In the Manufactures Building.

On the mammoth floor of Manufactures Building are collected 34 large groups, or subdivisions, of the department. These are divided into more than 200 classes of leading industries. These figures are given to show the scope of the department, which embraces the entire product of modern machinery and the skillful handiwork of man in every design and form. In finish, and especially in the patient, laborious processes of manual labor, it is conceded that the foreign exhibitors may excel at the World's Fair. But in variety and in originality it is just as certain that the United States exhibit will surpass those of foreign countries. Keen rivalry has led to many competitive exhibits from the leading manufacturers of the United States. The department officials have insisted that each exhibit from domestic houses shall typify some special industry, and that there shall be no huge displays which depend for merit on the amount of space occupied.

Encircling the vast building on all four sides are spaces devoted to offices, restaurants, concessions and the various appliances for public comfort. There are continuous promenades outside in the covered loggia. Every known public convenience, including seats along these promenades,

will be arranged. In the center of the building, along Columbia avenue, there will be a series of elevators to carry passengers to the outside of the main roof, where a promenade balcony will extend on all four sides of the building.

The lighting of the interior at night has been planned on a scale that will astonish even those familiar with modern electric lighting methods. Along Columbia avenue there will be monster chandeliers suspended from the roof trusses. Each of these chandeliers contains a cluster of arc lights. The hight above the floor —about 140 feet—will enable them to throw a brilliant light over all the gallery space and the main part of the lower floor. On the latter, along the various streets and avenues, are a series of arc lights, mainly suspended from the galleries, which will light up all parts of the ground floor. The exhibitors pay for the special lighting of their pavilions and, in many instances, they attain superb artistic effects by a liberal use of the incandescent system.

Most of the exhibits are housed in exquisite pavilions. In some groups this interior architecture observes a prevailing key throughout. Thus in the German exhibit the prevailing style in all the minor booths, as well as the grand façade in front, is the Renaissance of architecture, the rococo decoration being profuse and frequently gorgeous. In the French exhibit, on the section diagonally opposite the German exhibit, the style of architecture is severely classic throughout. The arches and columns in every portion of the French section show a uniformity of design and great *finesse* in execution. In the English section and also the United States section this uniformity of design in the pavilions is lacking, although there are many individual structures of great beauty.

The Germans and French have built their structures under direct governmental supervision and with government moneys. The United States exhibitors, on the other hand, have had no concert of action, and there is little uniformity of design in the installation of exhibits, except in so far as the exposition officials could prevail upon individual exhibitors to build pavilions and install exhibits in a compact and striking way. The foreign commissioners subordinate individual exhibitors to a general plan, but the Americans have yet to learn this method of installation and the necessity of providing money to carry it out successfully.

The quadrangle formed by the American, German, French and British sections on the ground floor has a central point, where all four meet. This point is exactly in the center of the building. Between the various façades which form the initial point for entering each of these sections there is a central court. Within this court rises the crowning spectacular exhibit of the entire building. This is a highly ornamental tower of staff work, built by Nelson Brothers and designed by Sanier for the exposition authorities. Near the top of this tower will be placed the master clock of the exposition, which is an exhibit by the Self-Winding Electric Clock Company of New York. There will also be a chime of bells, which will ring out the hours.

The northeast section of this central court is occupied by the most pretentious structure containing a United States exhibit. This is built by three New York firms—Tiffany & Co., the Gorham Mfg. Company and the Tiffany Glass & Decorating Company. The architecture is Doric, the color being white, with gold ornamentation. There is a curved façade, and the building itself is about 25 feet high. From the center of the front there rises a Doric column, surmounted by a globe and crowned by an eagle 100 feet above the floor. There are two lesser columns 40 feet high on either side, and wide arches between the columns which span the entrances to the interior exhibits of jewels, gold and silverware. At the base of the main shaft is a pedestal with an inscription which declares that this section of the building is devoted to United States exhibits. The ornamentation and symbolism are all emblematic of America.

The pavilions erected by the Hindostanese and the Ceylonese are the admiration of all who see them. No such specimens of wood carving were ever before seen in this country. Delicate tracery and carving in satin woods and ebony are profusely used to ornament the columns and arches. The wood carvings which will be shown in the interior exhibits from these countries are the products of the most skilled native workmen in either country, and therefore the finest exhibits of their kind in the world.

When the visitor enters the United States section one of the first impressions will be the wondrous variety and comprehensiveness of the manufacturers' exhibit. Before examining the details of the several exhibits the visitor will be well repaid for a study of the exterior ornamentation of the several booths and pavilions. Perhaps the most exquisite of all the American pavilions, from an artistic point of view, are those of the Pairpoot Mfg. Company and the Meriden Britannia Company, both being exhibitors of silverware. The Pairpoint pavilion is a miniature Grecian temple, pure white in color, its splendid proportions being a model of classic architecture. The Meriden pavilion is circular in shape and constructed entirely of rosewood. Other very handsome pavilions in the American sections are those of Edward Jansen, who exhibits toys in the gallery, and Mermod & Jackquard, who exhibit jewelry, also in the gallery. These are gems in the Renaissance style of architecture. There are many Byzantine kiosks and other miniatures of ancient structures in various portions of the American sections.

There are also several collective exhibits in the department of manufactures. Among the more striking of these may be mentioned the exhibits of the National Association of Woolen Manufacturers, the Association of Silk Manufacturers of the United States, the National Pottery Association, the Wall Paper Manufacturers, the Merchant Tailors' Association and the Shoe and Leather Association. The two last mentioned exhibits are outside of Manufactures Building in special structures. The merchant tailors' exhibit is in an artistic building between the Art Galleries and the Illinois State Buildings, and faces the northwest lagoon. The interior decoration of the Merchant Tailors' Building is magnificent. There are panels with water color paintings by distinguished artists, typifying six stages of dress from the time of Adam to the present day. The other overflow exhibit—shoe and leather—is in the southeast portion of the grounds. This building is 570 feet long by 150 feet wide, and cost more than $100,000. It will contain the domestic exhibits of leather, boots and shoes, rubber boots and shoes and the allied trades, besides the exhibits of leather from foreign countries.

House of Many Woods.

Oregon has adopted a unique and practical method of displaying the woods produced in that State. At Jackson Park there is now being erected a house constructed entirely of Oregon woods. It is to be 10 feet square and 19 feet high, and will be surmounted by an open cupola. The body of the structure will be of yellow pine. The roof, which will be of red cedar shingles, will be supported by four Doric columns. The columns are of maple and are very richly carved. The roof of the cupola will also be supported by four small Doric columns of carved oak. The exterior will be furnished with panel work containing about all the woods of the State, among which are manzanita, madrone, yew, laurel, myrtle, ash, maple, oak, spruce, balm, fir, sugar pine, bird's-eye pine, cherry, curly maple and alder. The house will form the Oregon pavilion in the Forestry Building.

Honoring Mr. Dredge.

At the session of the Board of Directors on the 13th inst. the following preamble and resolutions were adopted :

Whereas, James Dredge, Esq , of London, England, has, from the inauguration of the work of preparation for holding the World's Columbian Exposition, rendered invaluable service, both in Great Britain and on the Continent, in making known its plan and scope, with which he was at pains to make himself thoroughly familiar, giving to the enterprise the influence of his eminent professional knowledge and experience as an engineer and journalist, thus aiding substantially in securing the participation in said International Exposition by the governments and peoples of Europe ; therefore, in testimony of our high appreciation of the services so rendered, be it

Resolved, That the thanks of this body are due and are hereby tendered to James Dredge, Esq., for his able and continued efforts in promoting the interests of the World's Columbian Exposition ; be it further

Resolved, That an engrossed copy of the foregoing preamble and resolutions, duly authenticated, be forwarded to Mr. Dredge.

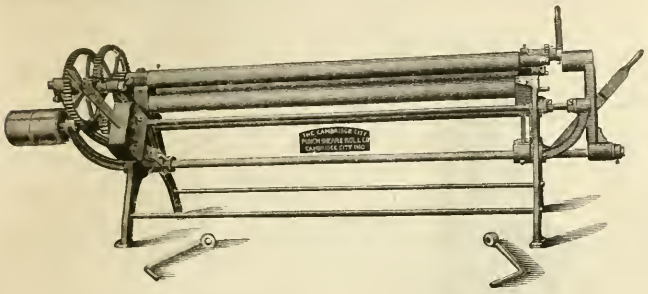
Oil Lamps and Stoves in England.

At a meeting of the Edinburgh Association of Science and Arts, held on March 21, John Laing of London read an interesting paper on "The Burning of Oils in Lamps and Stoves with Safety." As reported by an English paper he said that when gas was of so bad a quality and so high a price, the public generally ought to know that oil was cheaper, and produced a purer atmosphere than gas. Every nation seemed to be alive to public safety but Britain. Americans laughed at the British, and sent over the oils that were unfit for use, and that they would not use themselves. He then showed how the dangers from oil-lamps could be reduced to a minimum. He was strongly of opinion that the present legal flash point was far too low, and thought that 100° should be the minimum flash point of all oils used in the United Kingdom. It was the duty of the Government, he contended, to see that the general public had the same margin of safety as they claimed for the War Office and for lighthouse purposes. Mr. Laing recommended that all oil-fonts and burning lamps should be surrounded by an outer vessel containing cold water. The water could be changed at any time by a simple arrangement without disturbing the lamp. He believed that the majority of lamp accidents were not due to explosions, but the over-turning of lamps and the oil catching fire from the burning wick. If an efficient extinguisher had been attached to the overturned lamp there would have been no danger.

The fleet of vessels wintering in Chicago which have loaded cargoes of grain or which will do so is larger than that of any previous year. Capacity for nearly 9,000,000 bushels of grain has been chartered and when loads for many large steamers which have wintered in Milwaukee and which are almost daily arriving have been taken, the total will not be far from 10,000,000 bushels.

Quick Adjustable Slip-Forming Rolls.

The accompanying illustrations show the new quick-adjustable slip-forming rolls which have just been brought out by the Cambridge City Punch, Shear & Roll Company, Cambridge City, Ind. They are made in all sizes for hand or power. Fig. 1 shows the machine with the roll open, while Fig. 2 shows it with the roll closed. The manufacturers refer to the special advantages of this machine, and in describing it say that the top rolls remain stationary, giving a full bearing box at either end, as well as full bearing gearing. The lower roll works automatically with the weight and lever. By raising the weight the roll is dropped, as shown in



Quick Adjustable Slip Forming Rolls.—Fig. 1.—Machine with Roll Open.

Fig. 1, so that the metal can be easily removed. The rolls are always ready to receive any thickness of metal which permits the rolling of a lap without changing the machine. To remove the metal raise the lever with the weight, pull off post box with lever, turn to one side, and the metal being perfectly loose when the lever is raised can be easily removed. The rear or bending roll is provided with a segmental arm at each end, the arm being hinged at a point below and connected with small gears on the shaft above. The shaft is rotated by a lever, and the roll can

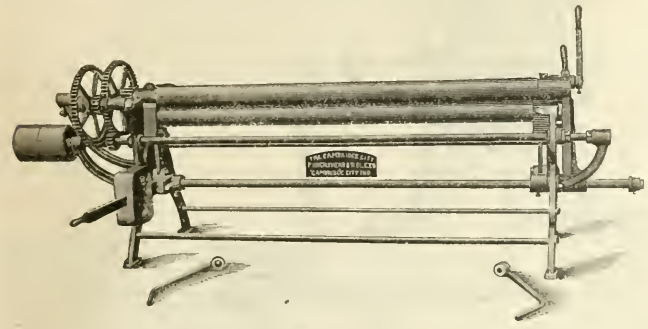


Fig. 2.—Machine with Roll Closed.

be thus moved to roll metal to any circle wanted without the adjustment of any screws. The roll is provided with single or double back gear, and can, it is pointed out, be easily turned by hand. The manufacturers make all sizes and lengths for hand or power.

Instructions to customs officers concerning the collection of statistics of domestic exports to Mexico and Canada have been issued by the Treasury Department. The manifest of the owner or of his agent will be transmitted and delivered to the Collector of Customs at the last port in the United States through which such commodities pass into foreign territory, in such manner as the exporter may elect; but to obviate delay at the frontier port, it is recommended that the manifest be intrusted to the railway or transportation company, to be carried along with the goods.

NEW PUBLICATIONS.

History of the Master Builders' Exchange of the City of Philadelphia, from its organization in the year 1886 to 1893. Compiled for the Historical Committee of the Exchange by Clem. H. Congden. Philadelphia: Sunshine Publishing Company, 1893.

A sumptuous volume of 500 pages, enriched with numerous illustrations and portraits by William W. Morgan, contains an exhaustive history of the Master Builders' Exchange of Philadelphia, an institution which stands as one of the foremost of its kind in the United States and which has made for itself during the seven years of its existence a very prominent position in the business community of the Quaker City. The work is dedicated to Col. Richard T. Auchmuty of New York "in recognition of his generosity and practical interest in the Master Builders' Mechanical Trade Schools of Philadelphia;" a compliment which does honor to the body which offers it as well as to the recipient. The Philadelphia Master Builders' Exchange was the outcome of an idea conceived by Charles H. Reeves, a prominent member of the Master Plasterers' Company of Philadelphia, who in 1886, at a time when the building interests of the city were endangered by labor troubles and excessive competition, presented a plan of organization for those engaged in the building trades to that association for consideration. The scheme met with great encouragement, and in 1887 a charter for the Master Builders' Exchange of Philadelphia was granted. Since then the progress of the institution has been one constant success. A building was acquired in South Seventh street, Philadelphia, which was enlarged and altered to suit the requirements of the Exchange, until it now forms a spacious and handsome structure embracing a permanent builders' exhibition, exchange rooms, offices, café, and every modern feature of convenience and utility for its members. In 1888 a notable feature in connection with the Exchange was the establishment of a mechanical trade school for the manual training of apprentices in crafts connected with the building trades. This departure received substantial support from Colonel Auchmuty, the well-known founder of the New York Trade School, and, next to that institution, it is now the most flourishing and prominent manual training establishment of its kind in the United States. Under the energetic superintendence of W. A. H. Allen, the Philadelphia mechanical trade schools are yearly turning out from their evening classes trained youths whose services are in great request by employers of labor in Philadelphia and its vicinity. The volume just issued gives a full account of this and all the other interests connected with the Builders' Exchange. It is, moreover, as we have said, enriched with a profusion of excellent illustrations, including portraits—with accompanying biographies—of prominent members of the Exchange, views exterior and interior of the building, and a beautiful series of reproductions of the habitations of men from prehistoric times down to the present, taken from the specimens exhibited at the Paris Exposition of 1889. The book is altogether one which will be an ornament to any library.

University of Pennsylvania. Catalogue and Announcements, 1892-93. Philadelphia, 1893.

The growth and progress of that remarkable aggregation of educational interests and institutions known as the University of Pennsylvania is well shown in the 350-page year book just issued. The departments of study which can be entered upon by the students are very numerous, including the regular college department, which comprises courses in arts, science, architecture, natural history, finance and economy and music. In addition to these are the separate departments of medicine, law, dentistry, philosophy, veterinary medicine, physical education, archæology, hygiene, anatomy and biology, as well as the graduate department for women. These entail a professorial staff of 255; the students in 1892-93 numbering 2055, of whom more than half were in the departments of medicine and dentistry. The University appears to be in a highly flourishing condition.

A Big Photograph.

A photograph representing a whole line of railroad is something new. European exchanges tell us that Doctor Piassetzky has intimated to the Geographical Society of Paris his intention to shortly visit France, bringing with him a photograph of the Transcaspian Railway 433 feet long, which he took during his travels between Ouzun-Ada and Samarcand. This unique specimen of the photographer's art is, it is stated, a vivid reproduction of the whole country between the Caspian Sea and the ancient capital of Tamerlane. The only difficulty is to find a building large enough to display the monster picture.

The German Patent Office received last year 13,126 applications and granted 5900 patents, as against 12 919 applications and 5550 patents in 1891. Thus 55 per cent. of all the applications, on which fees had been paid, were rejected.

TIN PLATES.

The Mesta Patent Automatic Pickling Machine.

The first machine of thia type was designed by Geo. Mesta of the Leechburg Foundry & Machine Company over a year ago, and was patented on October 18, 1892. The original machine, which was built by the above company, was placed in the tin plate works of Wallace, Banfield & Co., Limited, over a year ago, and has been in successful operation ever since, pickling about 30 tons of plate per day. Recently the same company gave an order for another machine of thia type, and with the two machines they are now pickling the total product of their extensive sheet-mill plant at Irondale, Ohio.

During the past year these machines have been placed in many of the latest American tin-plate works. The largest improved machine is illustrated in the accompanying illustration, in which A represents a vertical cylinder supported by the base B, C the plunger or piston supporting the arms D, to which the crates are attached for carrying the plates to be pickled. G is a vat built up of pine strips 1 inch thick by 6 inches wide, to contain the acid pickling fluid. H is a vat constructed in the same way containing water to wash the plates after they come out of the pickling fluid. K is a piston valve through which steam is transmitted to operate the plunger C in the cylinder A. When the machine is in the position shown in the elevation, the plunger which carries the cross arms and crates can be given a vertical automatic motion of about 10 to 12 inches, thus giving the crates which contain the plates to be pickled and washed a vertical motion in and out of the washing fluids at the rate of from 40 to 50 strokes per minute. After being agitated in this manner from five to ten minutes, the plates in the acid vat are thoroughly pickled and the plates in the water vat are thoroughly washed. By

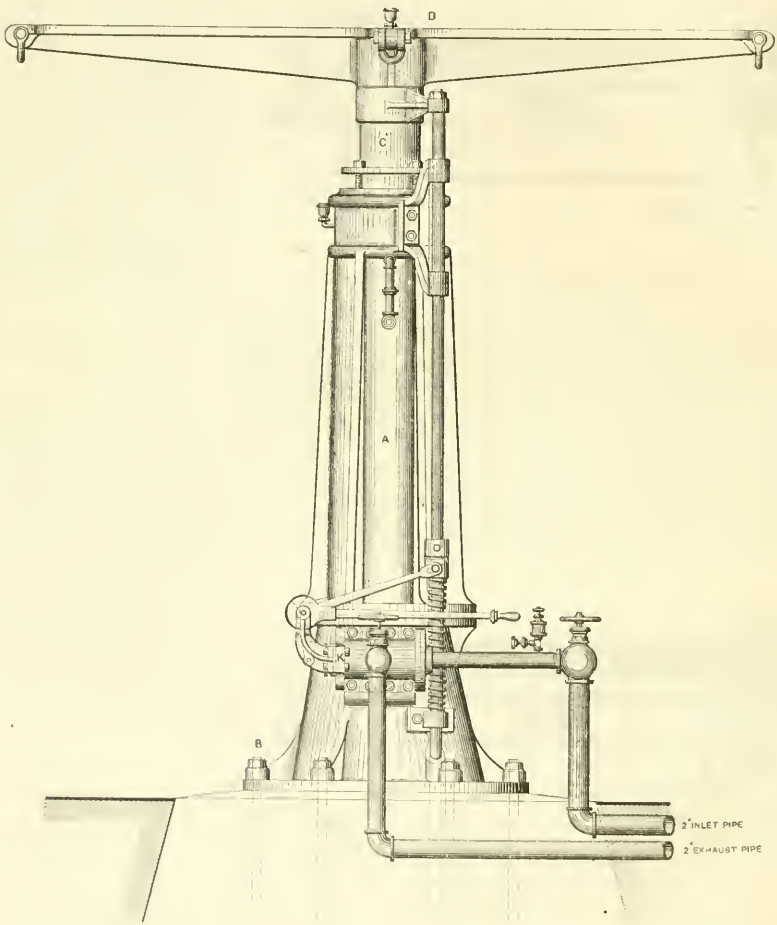


Fig. 1.—Elevation.

THE MESTA PATENT AUTOMATIC PICKLING MACHINE.

means of the hand lever shown on the valve, the plunger can be changed from a short automatic stroke to the long stroke, the full length of the cylinder, which is about 54 inches, thus raising the crates containing the plates out of the washing fluids and above the sides of the vats. Before this is done, however, a third crate is attached to the empty arm, containing a new lot of plates to be pickled; then by revolving the plunger, which can easily be done by hand, as it is revolved on steam which is holding it up in its position, thus reducing the friction to a minimum, the crates, cross arms and plunger are revolved to such a position that the third crate is directly over the acid vat; the crate which was in the acid vat would then be directly over the water vat, and the crate which be dropped from the crate by removing the pin in the lever. The lever can be swung down into almost a horizontal position, thus opening up the bottom of the crate and allowing the plates to drop through.

The advantage of this machine is that the entire machine is supported by one base, which is bolted to a foundation and needs no other attachments to buildings or supports; it is simple in construction and effective in its work, as by no other motion can plates be so thoroughly pickled and washed as by quick vertical motion, dipping the plates in and out of the washing liquids.

The main difficulty at first found with these machines was to get a valve to regulate the flow of steam to the cylinder, and burgh office is in the Germania Bank Building. The Eastern selling agents are H. R. De Milt & Co., 235 Water street, New York; Charles Millar & Son, Utica, N. Y., and Brown, McClure & Wales, Boston, Mass. The circular gives particulars of sizes and gauges of Laufman's Apollo hand redipped and resquared guaranteed plate; also the Tip Top and Allegheny brands, while two pages are devoted to extracts from testimonial letters.

To meet the increased demand for their tin and terne plates, the Phillips Tin Plate Company of Philadelphia have about decided upon a site to which they will shortly remove their plant and enlarge it by the addition of an extra Jenkins Patent tin set and a terne set. These addi-

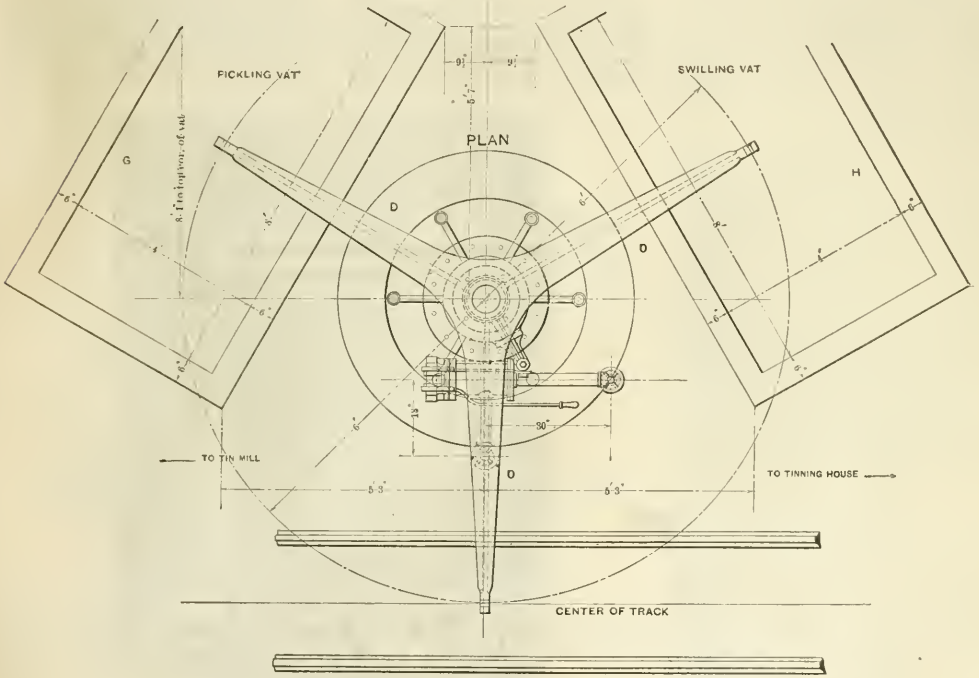


Fig. 2.—Plan.

THE MESTA PATENT AUTOMATIC PICKLING MACHINE.

came out of the water vat would be directly over the track, on which is a truck to receive the washed plates. The plunger is then again lowered and put into the other motion to pickle and wash the plates which are now in the pickling vat and water vat. This operation is continually repeated. The crates to contain the plates are of a new design, and the patent for the same has been applied for. The advantage in this crate over others is that the plates can be dropped through the bottom, instead of lifting them out by hand.

Instead of the crate having a rigid bottom there are six shafts running through the bottom, and on these shafts are small arms, which form the bottom of the crate and prevent the plates from dropping through. At the end of each of these shafts there are small arms keyed to the shaft, and on the end of one shaft there is a lever, to which all of the other arms are attached by means of pins. This lever is held in a vertical position, thus closing the bottom of the crate when the plates are to

that would be economical of steam and not liable to get out of order. This has been overcome entirely by employing a piston valve with a positive motion and cut off.

The new machine which was recently placed in the works of Wallace, Banfield & Co. has one of these valves, which requires only about one half the steam that was necessary to operate the first machines of this type built. This machine was only designed for pickling sheets of tin-plate size, although one is now pickling plates 72 inches in length.

SCRAP.

The Laufman Tin Plate Company, P. H. Laufman proprietor, successors to the Pittsburgh Electro Plating Company, issue a four-page circular relating to tin plates of their manufacture. The works of this concern are at Butler Junction, West Pennsylvania Railroad, with Post Office at Freeport, Pa., while the Pittsburgh office is in the Germania Bank Building.

A Seattle, Wash., mining journal says American tin plate is preferred by consumers in that section to the imported article on account of its intrinsic qualities.

The Falcon Iron & Nail Company of Niles, Ohio, manufacturers of sheet iron and steel, and which concern have just about completed the erection of a large plant for the manufacture of tin and terne plate, have applied for a charter of incorporation under name of the Falcon Tin Plate & Sheet Iron Company, with a capital of $300,000.

The English steamship companies complain that so few passengers are booked in Europe for the World's Fair, while travel from America is less than usual.

PLUMBING AND GAS FITTING.

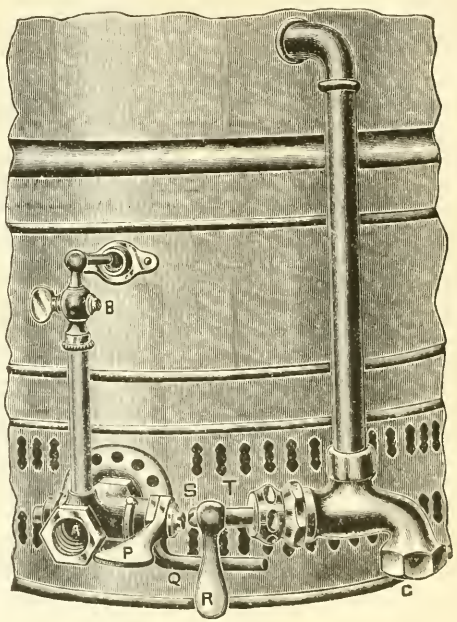
Some Plumbing Questions.

From J. J., *Meriden, Conn.* — Please answer the following questions: In a house here the water closets, washbowls and sinks all run to the main sewer. There are traps under each bowl, but they are not ventilated. The water closets are ventilated to chimney. 1. Will better results be obtained by running ventilation pipe through roof? Would it be any better to take drain pipes from washbowls and run them to a small private drain which there is on the premises instead of to the main sewer as is done at present? Should washbowls be put in a sleeping room?

Answer.—Our correspondent is not as clear as we would wish him to be as to the conditions under which the fixtures are set at present. For instance, we are left to conjecture as to the facilities for sewerage and infer that the soil pipe from water closets and the waste pipes from washbasins and sinks are run in each separate case direct to the main sewer. We are also told that there is a small private sewer, but where it begins or ends has yet to be found out. From the information afforded we give the following as the best answer possible: 1. He will obtain satisfactory results if he runs a vent pipe to above the roof, vents all his traps and carry the vents into said vertical vent pipe. Provided, however, that the work is properly done and the good results expected not neutralized by the fixtures and their traps being improperly set. 2. The proper plan would be to have the soil and waste pipes all discharge into a house drain laid in the cellar and which should be arranged to convey all of the house wastes into the main sewer, if possible. If it be necessary to use the private drain as a connecting conduit between the house drain and sewer it can be done, but whether the house drain discharges into the main sewer or into the private sewer, there should be a disconnecting half S-trap on the house drain inside the front wall, as a sewer-gas cut off. 3. If washbasins are properly set, the traps vented at crown and the vents carried into vertical vent pipe, and the overflow pipe from basin connected with waste pipe between the bowl and the trap, there can be no danger in having washbasins set in bedrooms if the water seal be maintained in the traps. It is better to have no wood work around them, as the closet space under washbasins, when inclosed, is used generally for storage of odds and ends, which help to create foul odors, which can be advantageously dispensed with. The venting of the water-closet trap into chimney is bad practice. The function of the vent pipe in a trap is mainly to supply the necessary air to prevent a vacuum being created by the discharge of a column of water through the soil pipe. The currents in a chimney have a tendency to interfere with a prompt response of a descending air column, and it is always advisable that the vent pipe alone be used to furnish the necessary air to traps.

Instantaneous Water Heater.

The Instantaneous Water Heating Company of 141 to 143 Ontario street, Chicago, Ill., have just perfected some improvements in the Douglass and Acme instantaneous water heaters which involve, we understand, the use of duplex valves. The advantages claimed by the manufacturers for these valves are that they overcome the only weak point which experience had shown the heaters to possess, and that was the liability of burning out by turning off the water while the gas was ignited. While such instances were comparatively few and due to the carelessness of the operator, it was a point which the manufacturers considered should be perfected and made to correspond with the heaters in other respects. By means of the duplex valves the objection named is said to be overcome, as with them it is impossible to turn off the water without shutting off the gas, and yet the arrangement is such that the water is entirely independent. The arrangement is such that cold water can be had without igniting the gas, and when hot water is required the temperature can be regulated to any degree, the same as if the connections were entirely separate from each other. The illustration presented herewith shows that portion of the heater to which the duplex valves are connected. After lighting the pilot B the gas lever P is raised, which automatically turns on the water by means of the bar Q coming in contact with the water lever R. By this means the gas is turned on full and ignited, while there is only a partial flow of the water. The lever R is then turned toward the heater to allow the desired quantity of water to enter, in order to bring the temperature to the degree desired. When the heater is not in use the gas is turned off during the action of shutting off the water. We are informed that the valves can be placed on all heaters in use and will be sold where such a change is desired.



Instantaneous Water Heater.

Determining Grade of House Drain and Sewer.

Few features of a house-plumbing system cause so much annoyance in many particulars as the laying of the house drain in cellar and the house sewer—that is, the connecting branch between the house drain and the main sewer in street. Where ordinary care and forethought are exercised this part of the business presents no difficulties, but as these qualities are in a great many instances absent, it is not surprising to find mistakes occurring which are both expensive and embarrassing. We allude to mistakes which are frequently made in determining the proper grade at which the cellar drain should be laid, so as to avoid too great a descent for the depth of the sewer, and in the second place, to keep intact the required head room in the cellar where the pipes are to be laid under the floor. For instance, a plumber takes a contract to do the plumb-

ing and drainage in a factory or building where every inch of space in the cellar is to be utilized. The architect desires as great a fall to the drain as possible, and the plumber proceeds to lay his pipe from the street sewer to the house. By the time he reaches the front wall, perhaps he finds that if he keeps up that grade back to the rear of the cellar he will be above the floor; and as that is contrary to the specifications he has to choose another grade. This involves loss of time and money, and the question which it brings up is: How can it be avoided? In a very simple manner, viz., by ascertaining at the outset the best grade possible, particularly if the house drain is to be laid in a trench under the floor: and how this can be done the following case which recently came under our notice will illustrate:

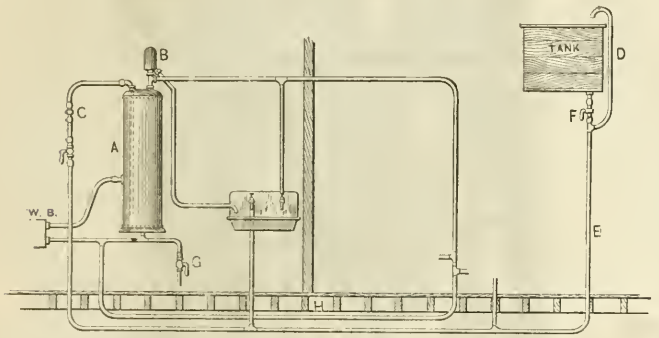
A contractor made an engagement to lay a house drain and sewer without taking the precaution of determining what grade was possible at the outset. After the work had been done in part he discovered his error and proceeded to rectify it, but not without expense. The building was 80 feet in depth, or including 5 feet at rear of building, 85 feet to front wall, and the main sewer was 35 feet distant from the building. This made the entire length of house drain and sewer 120 feet, and the question which then presented itself was, what the grade should be. This was determined as follows: The depth of the sewer in street was first taken and found to be 10 feet below curb level, then the depth of the cellar floor below the curb was found to be 6 feet, leaving 4 feet to be divided up on the 120 feet of drain. This gave an actual uniform fall of $\frac{3}{4}$ inch to the foot or 1 inch in every $2\frac{1}{2}$ feet, which was ample for all purposes.

From this it is apparent that in order to determine the grade of a sewer and house drain it is incumbent to do all of the following, viz.: First, find the depth of sewer in street from curb level, next ascertain the length of sewer and drain from the point of connection with street sewer to the extreme point within the building at which the drain is to begin. Next, if the drain has to be laid in a trench within the building and entirely under the surface of cellar floor, find how much below the curb the cellar floor is to be, and subtract this distance from the depth of the sewer, the difference being the total fall of the drain. Dividing this distance by the length of the drain will give the grade or fall per foot.

Range Boiler Emptied Through Relief Pipe.

From S. I. D., *Canada.*—I have noticed that "C. Q. A.," Ohio, in your issue of March 18, is in trouble. I send herewith a sketch showing a method of arranging his pipes that will obviate his difficulty, which is what he calls "syphoning" of the water in the range boiler back into the tank through the vent turned over top of tank. This, however, is a misapplication of the term "syphoning." The reason of the water flowing back into the tank through the vent is because of pressure in the range boiler becoming greater than the head of water in tank, due to particles of steam mixed with water trying to escape, and which naturally find an outlet at the vent.

Referring to the sketch herewith, A is the range boiler, B is a combination safety and vacuum valve (a small tube is generally run from this over kitchen sink), C is a check valve to prevent any water backing up into the tank. If this boiler were connected with city pressure water works the check would not be needed. The pipe D allows the water to drain out of the pipe E when the stop F is closed; G is a blow-off to sewer. It will not be necessary in this case to have a small hole drilled in tube running down inside of boiler, as the check C will prevent syphonage. H is the circulating pipe, which allows hot water to be drawn from fixtures immediately. Some of the pipes are shown running beneath the floor, but it should be avoided where practicable. It is much better to have all pipes exposed. They can be finished nicely in white and bronze so they will not be at all unsightly and it will materially lessen the plumbers' bills for repair work, as pipes are often almost inaccessible when placed beneath floors or within partitions, &c.



Range Boiler Emptied through Relief Pipe.

Profit in Plumber's Work.

From H. F., *Mass.*—I would like to ask the readers of *The Metal Worker* what they consider a fair and legitimate profit to charge on day-work jobs, stock and time in the plumbing business.

NEW YORK PRICES.

Through interviews with the plumbers of New York it is learned that $3.50 is the standard price paid a good plumber. Helpers receive from $3.50 to $6 per week, the average being over $5. The average charge made for a man and helper is $5.50, though some shops only charge $5, while others get $6. The advance charged on the cost of material varies, some are satisfied with as small an advance as 10 per cent. on large jobs, while getting about 25 per cent. advance as an average on work of less size. A general impression exists that the master plumber is poorly paid at the prevailing prices in comparison with what is charged for the labor of the marble cutter, steamfitter and bricklayer, and the desire for a more remunerative return for his services is based on a reasonable foundation. Car fares, candles and such odds and ends are charged as items in bills. As in all trades where bidding on contracts to be awarded is necessary, the percentage of advance on the cost of the materials varies to a surprising extent, leaving room for some fault to be found, particularly where the business methods are not of a close, systematic character. A 10 per cent. advance having proved satisfactory in some special case, a natural tendency is to apply it to other cases, which is demoralizing.

That on many jobs an advance of 25 per cent. is less profitable than in cases like the above is only too true, and while it is conceded that an average advance of 25 per cent. all around would even things up with a satisfactory balance, unfortunately the "evening up" process cannot be considered a certainty. In consequence many plumbers agree that $33\frac{1}{3}$ per cent. should be had if first-class goods in every particular are to be used. In some special cases a greater advance still is necessary and is secured. The methods of keeping time and account of material between the slipshod and the systematic is one of the great causes of a wide difference in both bids and profits. The following represent actual interviews with prominent members of the plumbing trade in New York:

Mr. Joint says he wants good strong boys of some intelligence, and such boys cannot live on $3.50 per week, so he pays $6, and soon has profitable help.

Mr. Ladle states that intelligent, reliable, industrious men are worth $3.50, and to have them when he wants them he keeps them all the year.

Mr. Pad is willing on a big job of good new work to turn in all of the material bills and accept 10 per cent. advance on their total as his profit.

Mr. Turnpin thinks in smaller work 25 per cent. is too little advance to be profitable, and that 40 per cent. is not asking too much.

Mr. Scraper says the proper way to figure is to carefully account all items of labor, incidentals and materials and add $33\frac{1}{3}$ per cent. to the total for a bid, or if such a record has been kept of work done, 25 per cent. is safe and fair.

Strange as it may seem, while the end in many cases is almost identical, hardly two of the plumbers visited entertained the same ideas or arrived at their conclusions from the same reasons.

CHICAGO PRICES.

The inquiry was submitted to a Chicago correspondent, who replies as follows: In this city the plumbers receive $3.75 and upward per day of eight hours and the helpers from $3 to $6 per week for same time. I have interviewed a number of prominent Chicago plumbers who furnish the following figures:

Plumber A charges $7 per day for plumber and helper, and $6 for plumber alone. Twenty-five per cent. is considered a reasonable profit to add to cost of material on job work.

Plumber B considers 50 per cent. a fair profit to be added to time on job work, and $33\frac{1}{3}$ per cent. on material. One should take into consideration the time lost in shop, loss of material on jobs, breakage of fixtures, &c. The master plumber must be responsible for the proper working of all fixtures. Price charged per day for plumber and helper, $6.

Plumber C: "The usual price for plumber and helper is 75 cents per hour, but the price should be $1, to cover lost time, car fare, &c. Should add from 25 to $33\frac{1}{3}$ per cent. to cost of material used on job work."

Plumber D charges 75 cents per hour for plumber and helper on job work. The price should be $1 per hour.

Plumber E: "The usual price charged for plumber and helper is $6 per day; for plumber only, $5."

Plumber F charges $6 per day for plumber and helper, and $5 for plumber. "Very little profit at these figures, as there is much lost time."

Plumber G: "The usual price for plumber and helper is $7 per day. On small jobs one should get a profit of 50 per cent. to cover incidentals, and on large jobs from 15 to 25 per cent. A profit of from 25 to 50 per cent. should be added

on material, depending on amount of job."

Plumber H charges 75 cents per hour for plumber and helper, and 60 cents for plumber. Considers the proper price for plumber and helper to be from 90 cents to $1 per hour. Should add 33⅓ per cent. to cost of material used in jobbing.

Plumber I: "The usual price per hour for plumber and helper is 75 cents. This is much too low; the price should be $1 per hour. Add one-third to cost of material used in jobbing for profit."

Plumber J: "Pay plumbers from $3.75 to $4.25 per day, and helpers from $3 to $5 per week. Charge $6 per day for plumber and helper on job work. The profit on material should be from 20 to 40 per cent."

Plumber K: "Price for plumber and helper $7 per day, and for plumber only $6. Should get $1 per hour for plumber and helper. Profit on material used in jobbing should be from 25 to 50 per cent."

Plumber L: "Supposing the cost of material for a certain job to be $100 and the labor estimated at $40. A profit of 25 per cent. on the above would be $35, which is none too much."

The general opinion among those interviewed is that the prices charged for job work are much too low. Taking into consideration the high rents paid and the numerous incidental expenses, as cost of collecting, office expenses, lost time, teaming, car fare, gasoline, candles, &c., there is little if any profit left for the master plumber. Take, for example, the matter of lost time. In "ye olden time" there was always plenty of shop work to do, such as making traps, bends, &c., but now all is changed, as almost every article required by the plumber can be bought ready-made, consequently there is little work to keep the men at when in the shop. Customers are liable to grumble if charges are made for such items as candles, car fare or gasoline, yet these must be paid for by some one, and that one is usually the master plumber. There is great danger of breakage of earthen closets, basins and bathtubs, and when an accident does occur, the master plumber is usually the one who stands the loss. When cutting cast-iron soil pipe, the pieces left are of little use and usually find their way to the scrap pile. In fact there are many items of expense that fall on the master plumber that the customer does not realize.

Lead and Tin Pipe.

From F. B., *Delaware, Ohio.*—Some tinners use block tin pipe instead of lead. What is the difference between the two and why do they prefer to use tin?

Note.—There are two very great differences between block tin and lead pipe. One is the difference in material and the other is the difference in cost. Tin is an expensive metal and solid tin pipes are proportionately costly. They have the great advantage of being practically incorrodible, and there is no danger of lead poisoning where tin pipes are used. So far as safety is concerned they are very much preferred to lead, but the objection, as we intimated above, is their very much greater cost.

TRAPS AND VENTS.

J. F. Dalton, 127 Indiana street, Chicago, has the $25,000 contract for the plumbing, gas fitting and sewerage in the Marshall Field building. Sanitas traps and closets are used throughout the building.

Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until April 28, for all the labor and materials required for the general excavation and temporary drainage, including sewer connection, for the United States Post Office building at Haverhill, Mass., in accordance with drawings and specifications, copies of which may be had at the office of the Supervising Architect, Washington, or at the office of the Superintendent at Haverhill.

The Columbus Closet Company, Columbus, Ohio, have about completed their new building located on East avenue of that city and expect to move in about May 1. The new structure is a handsome one of brick and stone, five stories in hight. An entirely new nickel plating outfit will be installed, also new foundry appliances, using natural gas for smelting purposes in connection with the American Gas Furnace Company's apparatus, producing, it is said, the same amount of heat in 40 minutes that usually requires over two hours.

The Walworth Mfg. Company, Boston, Mass., issue a little catalogue and price-list descriptive of the line of goods that they manufacture and handle. A large variety of pipe wrenches, vises, stocks, dies, cutting tools, &c, are illustrated and described. Hall's Patent Trapping Machine is likewise given an extended notice. At the end of the pamphlet are illustrations and price-lists of corporation stops, gate valves and other supplies.

Advancing with the demands of progress in the plumbing trade, E. J. Brady, at 58 Warren street, New York, has just arranged to run his pipe-cutting machinery by power, much to the delight of the ever ambitious and industrious helper.

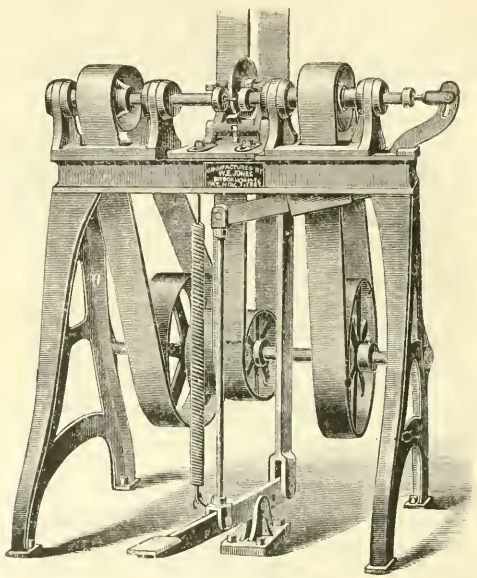
The Walcott-Hurlbut Company, 175-177 Lake street, Chicago, are furnishing 16 nickel-plated showers of a new pattern, also the slop sinks, bathtubs and water closets for the Snell and Beecher halls of the Chicago University. D. F. DeWar & Co. of Englewood, Ill., are the plumbers.

Gay & Culloton, 50-52 North Clark street, Chicago, are doing the plumbing in the German Village, California Building, Arkansas Building, St. Charles Evaporated Cream Company, Agricultural Building and Hayward restaurant at the World's Fair. Also in Colonial Apartment Building, Oglesby avenue and Sixty-third street. Two four-story apartment buildings at Lake avenue and Forty-fourth place; Augustina Hospital, Cleveland and Lincoln avenues; Franchere Hotel, Throop street and Vernon Park, place and residence of J. Taylor at Maplewood, Ill.

Benjamin C. Smith, dealer in plumbers' supplies, sends notices to the trade, under date of April 15, that he has removed to 275 Pearl street, between Fulton and Beekman streets, New York City.

Jones Patent Trimming Machine

The accompanying illustration shows a general view of a machine intended for trimming the ends of covers, dippers and ladle bowls; also for trimming and beading tin boxes, and which is made by W. E. Jones, 14-16 Water street, Brooklyn, N. Y. It will trim and bead from 1 to 8 inches in diameter, and ¼ to 2 inches in depth. One cutting head only, we understand, is necessary for each size, cover or box. This, it is pointed out, saves the expense of chucks. By the pressing of a treadle the revolving disk is brought up to the cutting head, which revolves at the same speed, thus clamping the work firmly, while the large cutting wheel is thrown in doing the trimming by the same movement of the treadle. An inexperienced boy with a little practice can, it is stated, trim from 25,000 to 30,000 daily. The machine requires but one adjustment for all diameters, the slide on which the large cutting wheel is carried being slotted so that it can be moved to suit the cutter to be used. The machine is described as compact and substantial, having steel countershaft 1¼ inch in diameter with two 8 and two 16 inch pulleys driving two 4-inch pulleys, or steel spindles, 1 1/16 inches in diameter, and which run in anti-friction bearings. The weight of the machine is about 300 pounds.



Jones Patent Trimming Machine.

The entire trade between Canada and Australia does not represent much more than the cargo of a single round voyage, and yet, with the aid of a Government subsidy, the plan is to maintain a monthly service between New South Wales and British Columbia. Incidentally Honolulu will be kept in close communication with the British Empire.

Prize Competitions

$25.00.

Prize Competition No. 21.

SUBJECT:

The Safety Line in Credit Business

Among the causes to which the failure of 95 per cent. of business enterprises are attributed, that of extending too large a line of credit is prominent. This competition is designed to draw out from the trade their ideas of the limit beyond which it is deemed unsafe to go in extending credits. Suggestions may be given in regard to this matter, touching upon such points as the following:

Should the definite amount of credit to be given be decided upon at the beginning of the year?

Is this to be fixed at a certain percentage upon the gross sales of the previous year?

Or, should it be an amount proportionate to the stock carried?

Is it better that the amount of credit extended to individual customers depend upon the circumstances at the time?

This competition will remain open until May 13, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than May 13, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96-102 *Reade street,*
New York.

Prize Competition No. 21.

The committee to whom the contributions in Prize Competition No. 7 were referred have awarded the prizes as follows:

First Prize of $50 to L. A. TURLEY, Boston, Mass.

Second Prize of $25 to WALTER DISCOUNTS, New York, N. Y.

Third Prize of $15 to FRANK KAVANAUGH, Rusk, Cherokee Co., Texas.

Fourth Prize of $10 to W. D. FORREST, Boston, Mass.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 18. Closing April 22.

The Extent to Which Merchants Should Devote Their Attention to Outside Interests.

No. 19. Closing April 29.

Electrical Goods as a part of a Hardware Stock.

No. 20. Closing May 6.

A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

No. 21. Closing May 13.

The Safety Line in Credit Business.

Another subject will be announced in our next issue.

Cremation of Garbage.

The destruction by fire of city garbage and refuse, where the material cannot otherwise be utilized, has been adopted in many countries with complete success. It has great advantages from a sanitary point of view. A number of cremators have been established in various cities of the United States for this purpose. A plant, consisting of two cremators on the Engle principle, has been lately put into operation in the grounds of the Columbian Exposition at Chicago for the consumption of the miscellaneous garbage from the fair buildings and the sludge from the sewage plant. These cremators have been installed by the Engle Sanitary and Cremation Company of Des Moines, Iowa, who have a number of their furnaces now in operation in the United States and other places on the American continent.

The general principles and mode of construction of the Engle furnaces is described in the *Engineering News* as follows: "The Engle cremator is a rectangular brick structure, with openings in the top through which to feed the material. It has a fire at each end, with the garbage gate between them, so that the smoke and products of combustion from the garbage are thoroughly consumed. Below the garbage grate is a hearth, or pan, which catches and retains all liquid matter, which is then evaporated by the heat of the furnace. When the furnace is charged, the fires are lighted and the flames from the fire next the smoke stack end pass over and through the garbage driving the smoke and gases to the second fire, where they are consumed. The flame and gases then pass over the top and down at the side of the second fire and then through a return flue, which acts as a combustion chamber, under the garbage grate, to the stack. Fire doors and ash-pit doors are provided on the same side of the furnace, and also small doors for stirring the garbage. Part of the garbage grate may be made of tubes, in which water circulates, so that there is a supply of steam and hot water for cleaning and disinfecting the pails, barrels, carts, &c., and for keeping the platform clean. The walls are lined with specially made fire clay blocks, 12 x 9 x 8 inches, laid close and backed by a double brick wall. All openings are protected by fire clay blocks made to shape, and no iron work is exposed to the flame, as in the later furnaces the garbage grate is also of fire brick. On the outside the structure is held firmly together by braces, thrust bars, buck stays and tie rods. The fire doors are carried in iron panels similar to boiler fronts. Carts can discharge their loads directly into the openings. The covering house incloses the cremator and receiving slopes, and this is ventilated into the chimney. The cost of operation ranges from 9 to 17 cents per cubic yard, according to the materials, fuel, &c."

The fuel used in the exposition furnaces is oil, but coal is used in Lowell, Mass., and wood in the cremators at Savannah, Ga., while the furnaces are so built that any fuel or combination of fuels may be utilized. In Savannah two large-sized Engle furnaces built in 1891, consumed during last year an average daily of 135 cubic yards of garbage, including waste and refuse of all kinds, not only house offal, animal and vegetable matter, but straw, leaves, paper, clothing, tinware, &c., at a cost of 13 cents per cubic yard. Night soil, containing large quantities of liquid, was destroyed to the extent of some 50 barrels a day, and withal it was reported by the city Health Board that no offensive smell whatever resulted. The latest garbage cremator built by the Engle Company has been installed at Lowell, Mass. This furnace is destroying from 10 to 12 tons per day of household offal, while its capacity is 30 tons, in addition to 40 cubic yards of combustible refuse and bodies of animals.

The Brass Consolidation.

Work is progressing on the consolidation of the brass and copper rolling mill and manufacturing interests of the Naugatuck Valley. The appraisal of the plants has been nearly completed, but it will take at least a month before the basis for a general agreement can be arrived at. The conditions affecting the industry are peculiarly favorable to a union of interests. The stock ownership of the different plants is largely identical. The same parties are often holders of shares in a number of rival concerns, so that the sharp competition among them is particularly hurtful to this class, which is very influential. To what lengths this competition has gone may be judged from the fact that some time since a contract for 200,000 pounds of trolley wire for Brooklyn was taken at 12½ cents per pound at a time when ingot copper was selling at 12 cents. While this is of course an extensive case, it does not illustrate how competition has cut into the business. The Waterbury brass and copper interests justly boast of having an exceptional record in the harmonious relations between the manufacturers and the workmen, but the former will soon be placed in the position of choosing between the alternatives of a sharp reduction in wages, with a possible conflict, or a consolidation which will put prices on a better level.

One of the peculiarities of the Naugatuck Valley concerns, like Benedict, Burnham & Co., the Waterbury Brass Company, Holmes, Booth & Haydens, Plume & Atwood and the Coe Brass Mfg. Company are capitalized far below the actual investment, the stock issues ranging from $325,000 to $400,000 in a number of cases. In prosperous times the different corporations extended and remodeled their works out of surplus earnings until the actual valuation of the plants ranges from $1,200,000 to $1,800,000. The death, during the past few months, of some of the most prominent men connected with the industry at one time raised some doubts as to whether the undertaking would be proceeded with. It looks now as though it would not be an obstacle. Everything of course depends upon how the report of the appraisers will be received. Even if it does not meet with general approval, it may readily serve as the basis of negotiation which may lead to a final adjustment.

STEAM AND HOT WATER.

Difficulty With Hot-Water Heating.

From F. P. Hamilton, *Cleveland, Ohio.*—In *The Metal Worker* of March 25 is published an illustration of a hot-water problem submitted by "R. B.," Massachusetts. I would suggest to him the advisability of cutting down the fire pot and grate surface to a proper amount to supply radiation. The amount of radiation is not stated, but no concern will put over 50 feet of radiation on ¾-inch pipe. Good practice would not put over 24 feet on a ¾-inch pipe, and then it would have to be much shorter than in the case in question. A 16-inch fire pot as adapted for some hot-water heaters has a rating of supplying 412 feet of radiation. If our friend from Massachusetts will put 1 foot of heating surface for 8 feet of radiation, and a grate of 1 square foot to 30 feet of heating surface, or thereabouts, he will not be troubled with expansion tank overflowing. By this I do not wish to be understood as saying that the tank cannot be made to overflow, for it can by hard firing. He might cut down the amount of heating surface in coil considerably, as there are some hot-water heaters on the market that are rated as high as 20 feet of radiation to 1 foot of heating surface. In short, change the grate to 6¼ inches in diameter, the coil to 6¼ inches heating surface, then the fire pot in proportion, and then observe the amount of fuel consumed as compared with the amount consumed with the present construction.

Key's System of Warming and Ventilation.

The Key system of warming and ventilation, as carried out in the Victoria Hospital, Glasgow, Scotland, is briefly described in the *Sanitary Journal* of Glasgow. Dr. T. G. Nasmyth, District Medical Officer, gives the following details in regard to the system: "In the Victoria Hospital, the incoming air, which passes down a vertical shaft, 16 feet long by 3 feet 2 inches wide, built of white glazed bricks, is driven into the wards by means of two Blackman fans. Each fan is driven by a four-horse power Crossley Gas Engine. From the main air inlet, branches pass to the various wards. Air enters each ward by wide shallow ducts placed along the walls 5 feet above the floor. The incoming air drives out the air which had previously filled the wards through openings at the floor levels. The unique features of the system consist in the air, previous to its discharge into the wards, being filtered, washed and warmed. This is effected by passing the incoming air through a screen made of horse hair and hemp, measuring 16 feet by 12 feet. There is a constant trickling of water down this screen, by which it is kept wet, and the air passing through it is deprived of its dust, soot and other solid particles. An automatic flushing tank discharges 20 gallons of water every hour down the screen, and this removes the dust which has collected in the interval. After passing through the screen, the air is heated (when necessary) by passing through coils of steam-heated pipes. So effectually is the air purified from dust and soot that it is said it has not been necessary to clean the wards for three years, and although fogs are frequently enough found outside the wards, none is ever found inside. The air of the wards is removed six times an hour without producing appreciable drafts. As no fires are necessary in the wards, there is a great saving of labor both from carrying of coals and from cleaning."

The air from the wards has been tested by experts and found to be abnormally free from impurities of any kind.

New Series of Sunray Water Heaters.

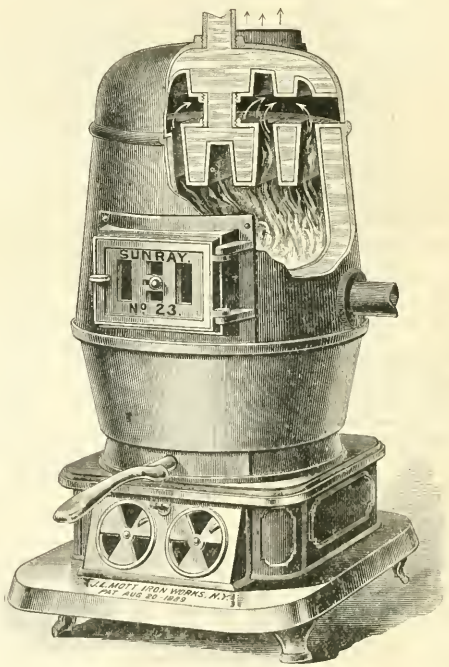
The J. L. Mott Iron Works of New York and Chicago are about to place on the market a new series of water heaters to be known as the Sunray, Nos. 22, 23, 24 and 25. These heaters are designed to heat conservatories and small dwellings, and for heating water for apartment houses, hotels, laundries, bath houses, stables, or wherever a large quantity of hot water is required.

It is said they will heat from 1 to 350 feet of direct radiation, and will supply from 100 to 250 gallons of hot water per hour.

It will be noticed from the illustration that this heater has new features of construction, for which special merits are claimed. The upper part of the cylinder or fire pot is cross-connected with cast-iron tubes that greatly add to its heating power, as well as facilitate the water circulation. In the center of these cross-connecting tubes is formed a collar for a nipple connection to attach the upper section or top of heater. Deflecting plates are introduced between the sections to make the products of combustion traverse the entire heating surface before escaping up the smoke pipe. It is claimed that these features of construction make this a very economical heater.

The heaters are quickly set up, being shipped in two pieces; the base and lower part of the fire pot joining one part, and the water sections the other. No bolt or cement is needed to put them up.

Nos. 22 and 23 are tapped for 2-inch iron pipe, Nos. 24 and 25 for 2½-inch pipe, and all sizes are made with hubs for 3 or 4 inch pipe for greenhouse work.



New Series of Sunray Water Heaters.—Broken View of Heater.

HEATING NOTES.

Mr. Langenberg, representing Barr, Reynolds & Co. of Rochester, N. Y., is busily engaged in installing the steam heating plant at the Mother's Home, at 533 East Eighty-sixth street, New York.

Frederick K. Caswell, Hartford, Conn., is the patentee of a new form of hot-water heater, the idea being to insure a positive circulation of heated water. The principal feature of the apparatus is the circulator, which divides the interior of the boiler into an upper and lower part,

the former being that in which the steam may accumulate, while the water is located in the lower part. The accumulation of steam forces the water to rise within the circulator and prevents any steam from flowing from the steam space into the valve chamber until the level of the water within the boiler has been forced below the lower edge of the circulator.

James R. Vance, Geneva, N. Y., has secured a patent on a steam generator, the object being to arrange the pipes so that increased heating surface will be obtained without increasing the cost of the boiler or impairing its efficiency. The construction is such that the water is confined within a tubular space of no great thickness and both of the outer walls of the tubular space are subjected to the heat from the products of cumbustion.

The New England Engineering Company, 79 Milk street, Boston, Mass., publish in pamphlet form the essay read by O. L. Breckenridge before the Steam and Hot Water Fitters' Association of the United States at their last meeting, on the economy and efficiency of heating by exhaust steam under Andrew G. Paul's patents for removing air.

Robert M. Dixon, East Orange, N. J., is the patentee of an improved form of hot-water heater of a coil pattern. The specifications describe a heater containing three individual systems of coil pipe, each of which is connected outside the heater to the upper and lower connecting chambers, and hence all communicate with one another.

Chas. Weinspach of Fifth avenue and Grand street, New York, is remodeling and enlarging the plant of the Novelty Candy Company (Limited), at Pittsburgh, Pa. A steam system will be used for warming the building, as well as for heating the candy slabs and other manufacturing appliances. The fittings are being furnished and the pipe cut to sketch by John Simmons, New York.

The Jarecki Mfg. Company, Limited, Erie, Pa., issue a very attractive illustrated catalogue of the Erie extension radiators of their manufacture. The catalogue, which is square in shape, contains some 40 pages, and presents numerous illustrations of all descriptions of the Erie extension radiators for steam and hot-water heating. Beginning with a general description of the radiators, the pamphlet proceeds with illustrations of the several styles together with full price-lists, giving dimensions, heating surface and other particulars. Altogether 11 different forms of direct radiators are shown, including corner, stairway, window and dining room radiators. The Erie direct-indirect radiator is likewise illustrated, together with the improved Gold pin indirect. At the close are illustrations of special fittings and pipe threading tools and machines. An attractive feature of the catalogue is the printing, which is done in a red bronze ink.

Russell Wheeler & Son, Utica, N. Y., issue a leaflet addressed specially to architects and engineers, in which they illustrate with sectional and general views the Palace King hot-water heater of their manufacture.

James B. Clow & Son, Lake and Franklin streets, Chicago, are offering to the trade Guillott's metal gaskets for packing all kinds of steam joints, man and hand holes, traps, cylinder heads, steam chests, flanges and unions, tanks, heaters, &c. These gaskets are made of a special metal composition, tempered to stand heat and high pressure, and molded with grooves on the bearing surfaces. The pointed ridges between the grooves make the joint when pressure is applied, working efficiently even on rough castings. They are made in all sizes and shapes.

After a more than tedious illness Geo. B. Cobb has recently been able to make daily visits to his office, and now feels equal to the requirements of business at 42 Duane street, New York. The new signs announce that Geo. B. Cobb & Co. are engaged in the heating and ventilating business where the Pierce, Butler & Pierce Mfg. Company formerly had an agency, and that they make suburban house heating a specialty. The enterprise of the new firm is bringing to them an excellent business.

One of the latest postal travelers issued by the United States Heater Company, which is the new name of the Capitol Heater Company, Detroit, Mich., directs attention to the Capitol and Bolton hot-water heaters and to the Hecla steam heater, and refers to their offices in Chicago and Boston. On the front of the card are a couple of lines from a famous epilogue, slightly varied to apply to the business of the United States Heater Company.

New England Engineering Company, 79 Milk street, Boston, have recently put in Paul's system of heating and drying at the Southworth Paper Mills, Mittineague, Mass., and are working on contracts for Carew and Hampshire Paper Mills at South Hadley Falls, Mass. It is stated that this system dries much larger quantities of paper on a machine than by former methods, and at the same time keeps the cylinder free of water condensed from the steam.

Heating Coil in Hot-Water Tank.

From J. H. C., *Shelburne, Ont.*—Would you kindly inform me what length of 1-inch steam pipe would be required per cubic foot of space in a tank to make water boil (212°)? The tank is oblong, 10 x 4 x 3 feet deep (120 cubic feet). It is placed about 12 feet from engine, and exhaust steam will be used, with boiler gauge at 75 pounds pressure.

Answer.—It is somewhat difficult to give a satisfactory reply to the above query, for the reason that it gives incomplete data as to several essential conditions affecting the calculation. It is clear that any length of pipe which would be sufficient to impart heat to the contained water, in the least degree, more rapidly than would be necessary to make up for the rate of loss from various causes, would eventually cause and maintain the desired temperature of 212°. Presumably, however, this is not the information which our correspondent desires, and it will therefore be necessary to assume the probable conditions under which the heating is to be done. The several factors entering into the calculation, other than those specified, are as follows: 1. The quantity of water in tank; 2, Material of which tank is made; 3, Time allowed for heating; 4, Quantity of heat taken from water, dependent on what purpose it is used for; 5, Temperature of water at starting; 6, Temperature of surrounding atmosphere; 7, Temperature of exhaust steam. We will assume: 1, That, as the total cubic space in tank is 120 cubic feet, and that it will not be filled to the top with the water, an allowance of, say, 3 inches in hight will be necessary. As the area is 10 x 4 feet, or 40 square feet, we must deduct $40 \times \frac{1}{4} = 10$ cubic feet, and our volume of water becomes 110 cubic feet. This, at 212°, weighs 50.82 pounds per cubic foot—say, 60 pounds, and we have $60 \times 110 = 6600$ pounds of water. 2. The tank to be of boiler iron. 3. Time allowed for heating, say 15 minutes or one-quarter hour. 4. Say the tank is to be used for heating feed water for a 20 horse power boiler, which at 30 pounds water per horse-power per hour will require 600 pounds. 5. Initial temperature of water, say 60°. 6. Temperature of the atmosphere, 60°. 7. Temperature of exhaust steam will depend on its pressure in the coil, and this we may fairly assume to be about 3 pounds per square inch, the temperature of which is 222°, or 10° above that required in the water. First, to ascertain the quantity of heat required to raise and maintain the temperature, we have 6600 pounds $\times$ (212° — 60°) = 1,003,200 heat units as the net amount of heat in the water for the difference between 60° and 212°, which must be imparted by the steam in 15 minutes. There will be, also, 600 pounds per hour continually flowing into the tank, requiring $600 \times 152 = 91,200$ heat units per hour. To this must be added the quantity necessary to replace the heat lost, by radiation, &c., from the surfaces of tank, and also by evaporation from surface of water. The combined loss by radiation and contact of air will be about 1 heat unit per square foot per hour for each degree of difference between its temperature and that of the water, or 152°. As we have in two sides, two ends, and bottom, say 125 square feet, the loss will be $1 \times 125 \times 152 = 19,000$ heat units. The loss by evaporation (supposing the tank to be open) will be about $4\frac{1}{3}$ pounds of water per square foot of surface per hour, or $4\frac{1}{3} \times 40 = 173\frac{1}{3}$ pounds. As the latent heat of vaporization, or 966 units per pound, must be added to the 152 units of sensible heat lost, we have $173\frac{1}{3} \times (966 + 152) = 193,787$ heat units per hour, or more than twice as much as is required to raise the sensible heat of the 600 pounds of feed water from 60° to 212°. These three items, then, constitute the total quantity of heat (91,200 + 19,000 + 193,787 = 303,987) necessary to be supplied by the steam coil, to maintain the temperature at 212°, against the above loss. To calculate the length of 1-inch pipe required to furnish this amount we must ascertain, in the first place, the rate of transmission of heat from the steam to the water, bearing in mind that the supply of the former is unlimited, and that, therefore its temperature must remain constant at the degree due to its pressure, which we have found to be 220°. Owing to the high specific heat and great absorbing power of water, the only limit to the transmission from the internal to external surface of pipe will be the conductivity of the iron, the thickness of which is 0.15 inch. Of course, this applies only to pipes so placed as to admit of perfectly free natural circulation of the water, and it is much better to make a liberal allowance on this account than to risk the efficiency of the apparatus. The conductivity of iron is 233 heat units per

square foot per hour for metal 1 inch thick and for each degree of difference in the temperature of the two sides. As the pipe is 0.15-inch thick the amount will be $\frac{233}{0.15} = 1553.3$ heat units. The difference in temperature 222° — 212° = 10° which × 1553.3 = 15,533 units per square foot per hour; and the above number 303,987 ÷ 15,533 = 19.57 square feet of pipe required. The area of 1 foot of 1-inch pipe is about 0.3 square feet and 19.57 ÷ 0.3 = 65.2 feet in length. If we allow 50 per cent. for defective circulation the length will be 97.8, say 12 pipes 8 feet long, connected at both ends by manifolds. This makes (96 ÷ 120) = 0.8 feet pipe for each cubic foot of tank, for the specified proportions of length, depth and width. We have, however, a stated conditon which will render this length of pipe totally inadequate; and that is, the heating of the 6600 pounds of water in the given time—15 minutes. To the quantity of heat previously found necessary for this purpose—1,003,200 heat units—must be added the loss during the time, which, for the mean difference of temperatures, will be 26,526 heat units; and the total heat required from the coil is 1,003,200 + 26,526 = 1,029,726 units. The transmitting power of the pipe—that is, the mean for the given range of temperatures—is found experimentally, to be 343 heat units per square foot per hour, for each degree of difference; and we have (343 × 162) × one quarter hour = 13,892. Then 1,029,726 ÷ 13,892 = 74.12 square feet, or $\frac{74.12}{0.3} = 247.1$ feet of 1-inch pipe; which, with the 50 per cent. allowance = 370.6 feet, say 46 lengths of 8 feet each, or a little over 3 feet for each cubic foot of tank space. Of course it is understood that these figures are only approximate, as it is impossible to calculate exactly, by any known data, the practical results from given conditions. Experimentally, where the utmost care is observed to note and maintain these conditions, the accuracy of results is sufficient to demonstrate the correctness of accepted rules, and in their practical application it is only necessary to make an allowance, not for the method, but for the uncertainties of the existing conditions by which it is affected.

Duty on Pickled Plates.

The Treasury Department issued under date of April 10 the following circular of instructions addressed to the Custom House collectors:

Paragraph 142 of the act of October 1, 1890, imposes certain specific duties on black sheets of iron or steel, according to gauge, and paragraph 144 of said act provides for an additional duty of one-fourth of 1 cent per pound on such as have been "pickled or cleaned by acid, or by any other material or process, or . . . cold rolled, smoothed only, not polished."

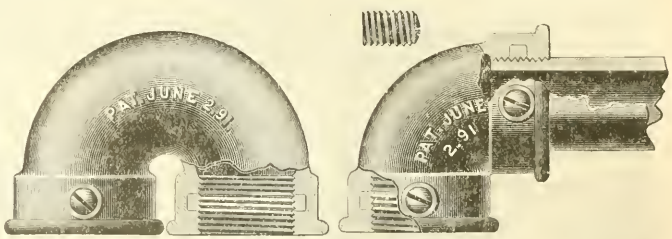
It having been reported that black plates, treated as above described, are being sold in this country at prices which would indicate that they do not pay duty under the proviso in paragrph 144, you are hereby authorized to reject all invoices of such merchandise which bear date on and after the 15th proximo, provided the same do not contain one of the following descriptions: "Pickled or smoothed or cold rolled" or "not pickled or smoothed or cold rolled."

A New Joint for Couplings, Tees, &c.

The Tight Joint Company of 545 West Twenty second street, New York, are putting on the market a new form of joint, applicable to ammonia tees, couplings, return bends, and, in fact, to all kinds of fittings. This joint is similar to an ordinary screw coupling, except that a groove is cast in the threaded portion of the fitting, into which a collar or ring of lead is run. This is formed upon a threaded mandrel of slightly smaller size than the coupling, so that the lead projects a very little beyond the threads. A small hole with a thread cut upon it is made through the exterior of the coupling, into the lead filled recess, and a small set screw is inserted. If now a pipe is screwed into the coupling it will expand the leaden packing, causing it to tightly fill the screw threads, and if the joint is not made tight by this means, one or more turns of the compressing screw crowds the lead around the pipe and makes it absolutely tight.

The tight joint does not leak from unequal expansion and contraction, because the pipe when heated expands the lead packing and fills the recess and the pipe threads. Upon cooling the fitting contracting about the leaden ring forces the lead around the pipe and again makes it tight. In hydraulic systems any loosening of the pipe is readily taken up by the compressing screw

Exhaustive tests made of this joint have proved that it will remain tight under the highest pressures and most trying conditions.



NEW JOINT FOR COUPLINGS, TEES, &c.

The Burn Stamping & Mfg. Company.

An admirably designed plant for the manufacture of milk cans has just been completed by the Burn Stamping & Mfg. Company at Chicago Ridge, 16 miles south of Chicago. The main building of the works is a very substantial four story structure, 200 x 48 feet, with high ceilings and numerous windows. Immediately joining, but separated by a fire wall, are the boiler and engine room and an annealing house. Completely detached from all other buildings is a tinning house.

A noteworthy peculiarity of the company's methods is that they receive all their material in black sheets and do their own tinning, which they find much more satisfactory than to buy tinned stock. The sheets used are of Nos. 18 and 20, as milk cans require unusually heavy tin plate to withstand the rough treatment which they receive. The first floor of the main building is devoted to the heaviest machinery, consisting of stamping presses, welding rolls, squaring shears and a full equipment of tools for making dies. A number of special machines of the company's own design are used for some of the processes through which the material passes. The second and third floors are used for making up milk cans. Tinners' benches extend around the walls and along the center. A gas plant is being installed for the manufacture of gas for both illuminating and soldering. The fourth floor is used for the storage of made-up cans. A large freight elevator serves all floors. The machinery is run by a 65 horse-power Hamilton-Corliss engine. Water is pumped at the rate of 50 gallons per minute from a 110-foot artesian well to a tank on the roof, whence it is distributed through the building. The annealing furnaces are located in a fire-proof compartment and are of large size.

The tinning house is a typical Welsh plant. It is thoroughly fire proof, built of brick and iron. The roof is constructed of I beams, with brick arched between, and even the windows have iron sashes. There are two tinning stacks with brick hoods. One of these stacks is fitted with what is claimed to be the largest pot in the country. It is a Phillips pot, built 20 inches wider than the standard, and will take a sheet 50 x 23 inches. The other stack has five separate dipping pots or kettles, and is of special construction to suit the class of work done by the company.

Another brick building, from 75 to 100 feet long, will shortly be erected as a wing to the main building. The ground floor will be used for storing raw material and the upper floor will be devoted to special work.

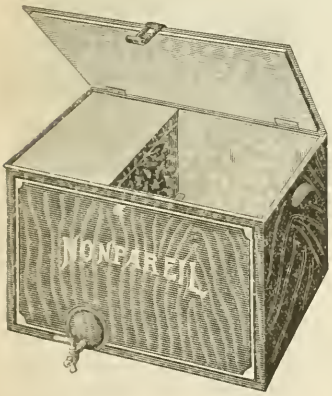
The tract owned by the company comprises 10 acres, thus giving them ample room for expansion. It is situated in an angle formed by the crossing of the Wabash and Calumet Terminal railroads. Side tracks run into the grounds between the buildings, all of which have been built so that their first floors are on a level with freight-car floors, for convenience in receiving and shipping freight. The Calumet Terminal Railroad being a belt line, connection is thus made with all the roads running into Chicago, which insures shipping facilities of the best character.

The leading officers of the company have had long experience with other concerns in the manufacture of the same class of goods, and are therefore undertaking no experiment. It is their intention to manufacture all kinds of milk cans to meet the requirements of this class of trade in any section of the country from the Atlantic to the Pacific coast. Every city uses a special pattern of milk can, and local preferences must be faithfully adhered to in order to secure such trade. While milk cans will constitute the bulk of the company's business, they will also be prepared to do work for those who want special dies made or other work in related lines. Their equipment of machine tools was carefully selected to enable them to meet a demand which is rapidly growing in and about Chicago. Employment is given to between 150 and 200 hands. W. P. Ketcham is president of the company, John T. Dale vice-president, W. S. Burn general manager and superintendent, W. H. Burn secretary and M. J. Higley treasurer. The Chicago office and salesroom are located at 66 Lake street.

THE RETAIL STORE.

Refrigerators for Nurseries or Sick Rooms.

August Kreamer, manufacturer of kitchen and culinary utensils, house furnishing goods, &c., 17–23 South Third street, Brooklyn, N. Y., is making a number of portable refrigerators, which can be supplied at a moderate cost. In the illustration is shown what may be termed a nursery refrigerator, made in a very thorough manner of heavy tin and lined inside with galvanized sheet iron. At the left of the box is a section in which to place ice, a movable tray at the bottom being provided for holding it. The water from the melted ice is easily drawn off by means of the faucet. On the right is seen the space intended for food, milk, medicines, perhaps, or whatever is desired to



Refrigerators for Nursery or Sick Room.

be kept cool. This portion is equally divided into two compartments by a movable tray. The contrivance is expected to supply a want where refrigerators are not available, as in apartments, hotels, hospitals, boarding houses, &c. The refrigerators are made in two sizes. No. 1 is 16 x 12 x 12 inches; No. 2 is 19 x 13 x 13 inches in dimensions. Another pattern is made corresponding with the above description, except that less space is allowed for ice and more for food, &c., while the faucet is placed half way between the top and bottom of the box.

Bread Mixer and Kneader.

The accompanying cut represents the Prescott-Stanyan Bread Mixer and Kneader, which is being introduced by Edwin Prescott, 8 Medford Street, Boston, Mass. It consists of a blade and guard revolved by a crank in a pan, which is set in the frame, the machine being fastened to a shelf or table. After the correct proportions of flour and moistening have been put in the pan the crank is turned and at the same time the pan is rotated slowly by hand until the flour is moistened sufficiently to move the pan itself; after which

Bread Mixer and Kneader.

the pan is prevented from turning too fast by pressing lightly on the edge with one hand. After rising the machine is set in the pan for a second kneading. The guard is to prevent the dough from winding upon the blade, and should be as near the latter as possible, yet not touch. The makers claim that the machine thoroughly cuts and beats up the dough, stretching and rolling it into that elastic condition necessary to produce light, fine-grained bread; that it will save half the time and more than half the labor; that the machine is simple and not liable to get out of order; with no more pieces to clean than the ordinary pan and spoon, and that with the machine a boy or girl 10 or 12 years of age can mix and knead a batch of bread as easily as the strongest and most experienced woman in the old way. The point is made that the machine is equally well adapted for mixing rye, graham, brown bread, fruit cake, &c. Two sizes are now ready—No. 1 with a 7-quart pan, and No. 2 with an 8-quart pan. It is stated that each works best with the pan half full of flour, yet that either will handle a quart more or less.

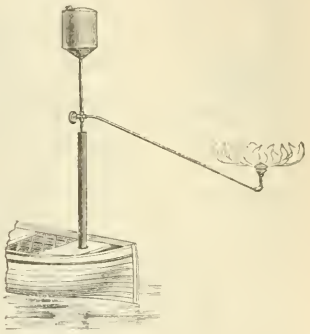
The Gem Cake and Batter Mixer.

North Brothers Mfg. Company, Philadelphia, Pa., are offering this household article as shown herewith. The metal part of the beater consists of steel bands ⅛ inch wide bent and inserted in a wooden handle. The makers claim that being light and convenient, it does not fatigue while being used, and that it does the work rapidly and thoroughly. It is pointed out that one of its important features is the tenderness it imparts to everything beaten with it. The device is intended for mixing all kinds of cake and for beating up batters:

The Gem Cake and Batter Mixer.

The Baker Fishing Lamp.

J. R. Baker & Son, Kendallville, Ind., are offering the above lamp, as shown herewith. The lamps are designed to be used when spearing or gig fishing, taking the place of wood jacks or pine torches. The point is made that with the lamps sparks, smoke, unsteady light, the constant dropping of coals into the water, the preparation of fuel and the frequent stoppages necessary to replenish the fire are annoyances not encountered. The gas-

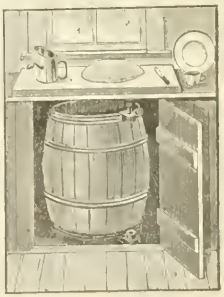


The Baker Fishing Lamp.

burning fishing lamps are made in two sizes, No. 1, as shown in the cut, having a 5-quart tank and one burner; No. 2 has a 6-quart tank and two burners.

The Perfection Barrel Swing.

The barrel swing shown in the accompanying illustration is being introduced by the Leavitt Machine Company, Orange,



The Perfection Barrel Swing.

Mass. The swing is so arranged that barrels can be swung under a broad shelf or counter, leaving the floor room free when the barrel is not in use; and the manufacturers claim that a barrel thus swung can be operated by a child as readily as by a grown person. The swing is adapted for use in the home, also for grocers, hardware and paint dealers, or for any stores using barrels.

Arrangement of Stores

The accompanying illustrations relate to the Hardware establishment of Dayton & Hall, First and Taylor streets, Portland, Ore. The building is of brick and iron, 26 feet front by 110 feet deep, of which the basement,

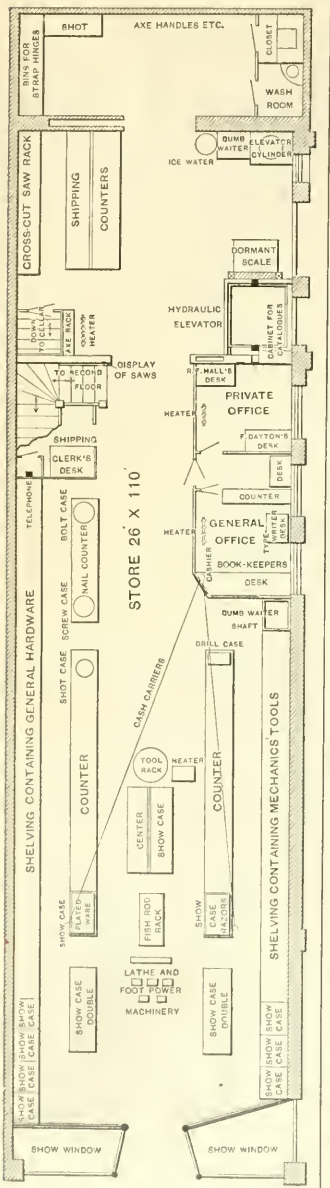


Fig. 1.—Plan of Main Floor.

first, second and third floors are required for the business. The building is handsomely fitted up, with modern improvements, among which electrical appliances are used to a great extent. The building fronts on First street, Taylor street being on the side, thus giving large show windows and fine receiving and shipping facilities. On the Taylor street side is a wooden awning supported by brackets, extending along the rear portion of the building over the wide sidewalk, affording protection for goods temporarily outside the store.

In front of the store at the curb is a Padlock sign, mounted at right angles to the store, on a handsome iron post, the lock being almost an exact copy of the No. 8454 Yale. The post is the Mott Iron Works' No. 39 and is 9½ feet high, finished in maroon and gold. The Padlock is of galvanized iron, 3 feet wide and 4 feet high. The Lock was first painted with red lead and then with two coats of paint, giving it a dead black rustless finish. The name Dayton & Hall, in porcelain letters, 4 inches high, is on both sides of the shackle of the Lock, and the word Hardware is cut out of the body of the Lock with porcelain letters placed back of the galvanized iron. The edges of the Lock and the half balls on the body are covered with gold leaf, the whole Lock being made and finished in the best manner possible. The Lock and post are conspicuous and the firm think an excellent advertisement. The Lock at night is illuminated by electricity, bringing out the word Hardware quite prominently.

From Fig. 1 it will be seen that the store is supplied with basement heater, cash carriers, wall and show cases, Shot, Screw and Bolt cases, bins, dumb waiters, elevators, dormant scale, general and private offices, type-writing machine, shipping desk, washroom, closets, &c. At about two-thirds of the depth of the building partitions run part way across the store dividing the room into two parts—the store proper and the shipping room, where also larger and heavier goods are kept. Fig. 2 shows the gallery, which is suspended from the ceiling of the first floor and reached by the stairway to the second story. This largely increases the capacity of the store; its construction is shown in Fig. 3. On the gallery over the first floor offices are a builder's Hardware sample room and an office.

In the wallcases on the right of the entrance on the main floor are kept stock and samples of fine Tools, novelties and new goods in the Tool line. In the corresponding cases on the opposite side are samples of split bamboo and fine Rods, Telegraph Instruments, Electrical Goods, Dog Collars and other showy articles. On each side of the store, in front of the shelving, are double showcases, one of which is shown in Fig. 3, which are a novel feature, and not only add to the appearance of the room but increase the space for displaying fine goods. In the upper part of the double case, at the right of the entrance, 200 styles of Pocket Knives are kept, while below is a fine display of Builders' Hardware. In the opposite case, the one shown in Fig. 3, the upper part is devoted, in season, to Fishing Tackle, or Cutlery, Novelties, &c., and the lower part to fine Carvers and various attractive goods. Changes are made in the goods and arrangement of these cases from time to time.

The shelving under the gallery on both sides of the store is filled to a convenient hight with wood shelf boxes, sampled, and the two upper shelves are utilized for stock in original packages. On the right-hand side of the store Tools and Builders'

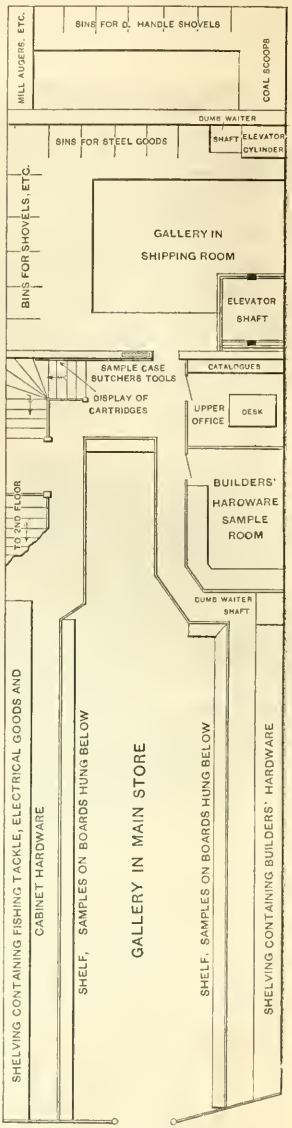


Fig. 2.—Gallery in Main Store.

Hardware are kept, most of the stock of Builders' Hardware, however, being above the gallery. On the opposite side is kept the retail stock of Fishing Tackle, House-Furnishing Goods, Electrical Goods, Cabinet Makers' Supplies, &c. Above the gallery on this side is the larger stock of these goods. Goods are sold both from below and above the gallery, and the gallery shelf is used as a counter for putting goods on. A view of this shelf and the manner in which the under part is utilized for hanging sample boards, is given

in Fig. 4. Samples of Saws are displayed on the front of the partition at the stairway leading to the second story.

The Fishing Rod Rack shown in Fig. 5 during this season stands in the center of the main floor between the double show cases. The legs are of $1\frac{1}{4}$ x $1\frac{7}{8}$ stuff, beaded, with two shelves

Fig. 3.—Showcase, Shelving and Gallery.

2 x 4 feet, held in place by shelf brackets. The top shelf has beaded edges, the whole being finished in natural wood. The top shelf has 38 holes $1\frac{1}{2}$ inches in diameter, and the lower shelf has a cor-

Fig. 5.—Fishing-Rod Rack.

responding number of holes, bored only part way through. This displays a quantity of rods to good advantage in a comparatively small space.

Fig. 6 illustrates a fine show counter recently made for the first floor, on which samples are displayed. The lower part of the counter is 9 feet long and 3 feet high, made of spruce; the top of $\frac{7}{8}$ inch oak, with red wood molding immediately under the top. The front of the partitions are beaded, and the shelves are adjustable. Three-quarter inch gas pipe rests on the top and supports the shelf above,

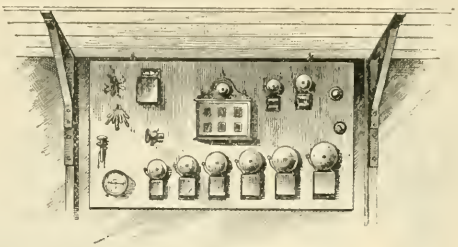


Fig. 4.—Gallery Shelf and Sample Board.

which is of oak 18 inches wide. Above this is another oak shelf 9 inches wide, supported on $\frac{1}{2}$-inch gas pipe uprights. The iron work was furnished by the firm, and the finish moldings, &c., were made to correspond with the shelving, and varnished, oiled, stained, and painted to correspond with the other wood work in the store. The counter was finished in the best possible manner at a cost of $38.

The store is lighted by incandescent lamps, and the clock in the office is self wound by electricity. A complete burglar alarm consists of a large Electric Bell located in the front of the basement, connecting the doors, windows, show-

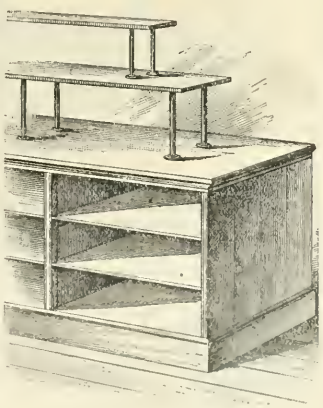


Fig. 6.—Show Counter.

cases, safe, &c., the circuit of which is closed automatically by an electric clock from 11 o'clock p.m. to 6 o'clock a.m. The bell when ringing can be heard by their private watchman a distance of four squares from the building. Electric bells and speaking tubes connect the offices with each floor. The electric lamp at the shipper's desk is controlled by a floor push, while the electric lamp in the telephone closet lights automatically upon entering. The light in the padlock sign, together with those in the show windows and in the store, are under the control of the watchman.

The basement is used for keeping Wire and Steel Nail, Chain, Grindstones, Rope, Grindstone Fixtures, Sash Weights and like heavy goods. A portion of the basement at the rear of the building extends under the sidewalk. Elevator and dumb waiter run from the basement to the other stories. The basement is provided with a sink and the second floor with washroom and closet.

On the second floor is shelving for wholesale stock of general Hardware, Miscellaneous Tools, Cartridges, Wire Brads in papers, wood ornaments, &c. There are also sample counters of Meat Cutters, Coffee Mills, Apple Parers, Scales, Vises, Weather Vanes, and a counter with bins below for Lag Screws, Machine Bolts, Washers, &c. Samples of foot-power machinery are shown on this floor. Clothes Wringers in cases, and cases of Axes, both handled and unhandled, are stored near the elevator.

The front portion of the third floor is occupied as a storeroom for goods in cases, cased machinery, Electric Batteries, Apple Parers, &c. The rear part of this floor has upper and lower bins for the wholesale stock of Shovels and Steel goods. Cases of Cross-cut Saws and Wheelbarrows knocked down are also kept here.

Family Grist Mill.

The Rogers Iron Company, Springfield, Ohio, are offering a farm and ranch family grist mill, mounted in various styles, two of which are shown in the accompanying cuts. They are also made with a bracket to fasten to the wall, and with a low stand to bolt to a table or bench. The

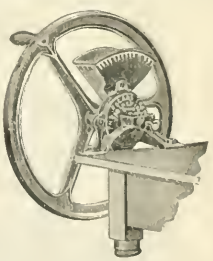


Fig. 1.—Family Grist Mill.

mill is described as having large chilled iron burrs, $4\frac{1}{2}$ inches in diameter, ground perfectly true; the burrs having teeth which cross at angles, insuring rapid grinding. The shaft is of steel, with a fly wheel 20 inches in diameter. It is remarked that the workmanship on the mill is first-class and that all parts are made to duplicate. The mill is adjusted by one thumb screw for different kinds of grinding, and the makers claim it is adapted to

grinding corn, wheat, coffee, spices, or grain of any kind for domestic uses or feeding purposes. The manufacturers state that corn meal, hominy and graham flour may be produced at the operator's home

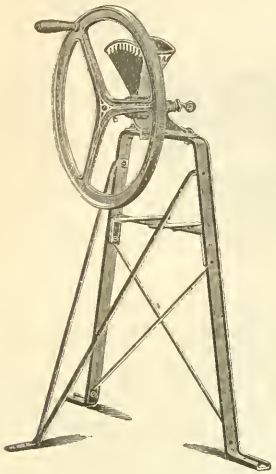


Fig. 2.—Grist Mill With Legs.

fresh and pure; that the mill grinds 1 pound of coffee in one minute, and flour or meal in a longer or shorter time, according as the mill is set to grind fine or coarse.

Torsion Grocers' Balance.

The Springer Torsion Balance Company, 92 Reade street, New York, are putting a grocers' scale on the market, as illustrated in Fig. 1. The balance takes its name from the manner in which the fulcrums twist or "torse." There are no knife edges about the scale, but the beams tip or oscillate upon sensitive steel bands, sprung upon trusses, as shown in Fig. 2. The trusses are first cast and then accurately cut out, so that, it is stated, they do not vary $\frac{1}{1000}$ inch where the bands are placed. After the band is sprung on to the truss, the truss is put under a squeezing machine to expand it equally in all directions from the center. This causes greater tension of the band, and the expansion is continued until the band on the center truss vibrates to the note F sharp. The bands on the end trusses are tuned in the same manner to F. The

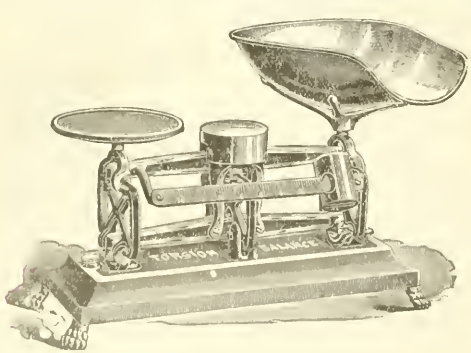


Fig. 1.—Torsion Grocers' Balance.

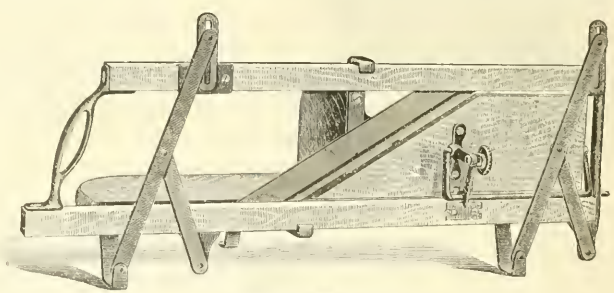
center truss has a base by which it is rigidly fastened to the base of the scale, and to the upper and lower bands of this truss the scale beams are attached, the beam being pivoted at the base, below the lower steel band. Upon these bands the scale tips or oscillates, and the bands take the place of knife edges. The end trusses, one of which is seen in Fig. 2, are only used for holding the ends of the beams in place, and are not attached to the base of the scale. The ends of the beams are fastened to these bands in the same manner as at the center. It is stated that the scales are made of the best material obtainable by experienced and skilled workmen. All parts are interchangeable, and can be easily duplicated if accidentally broken; also, that the working parts

Fig. 2.—Truss and Band.

of the scale are virtually one piece, as the beams are made fast to the fulcrums. It is explained that this obviates the errors arising from the scale shifting, and that the various parts of the balance cannot be displaced. The manufacturers claim that the scales are accurate, durable, sensitive and simple in construction. The scale is made in various sizes, with and without the poise and weighing beam.

The Matador Meat Slicer.

The accompanying illustration is of a slicer being put upon the market by the



The Matador Meat Slicer.

Gwinner Mfg. Company, Hamilton, Ohio, for whom Harmon & Dixon, 118 Chambers street, New York, are agents. The knife is attached to a frame, which is carried by parallel motion levers. It is so arranged that the knife can be adjusted to cut the desired thickness, and the gauge is also adjustable to take up the wear of the knife. It is stated that in the construction of the slicer ordinary grooves are dispensed with and parallel levers substituted, and that the easy action of the knife is not affected by shrinking, swelling or warping. It is pointed out that in this machine small fragments of meat do not find lodgment in the grooves and recesses, and become decayed, on account of the substitution in this machine of levers for grooves.

Wire Glass.

C. S. Weber & Co., 415 Broadway, New York, inform us that they have been appointed general agents in New York, New Jersey, Delaware and the New England and South Atlantic States for the American Wire Glass Mfg. Company of Philadelphia. "Wire glass," the new architectural medium, of which an account was given in a former issue, appears to have been received with great favor by architects and builders. George Hayes, a well known authority on fire proof construction, says: "Glass having a woven wire imbedded therein is substantially fire proof. Glass, when attacked by fire, coming in contact with water will fly into small particles, becoming entirely disintegrated, and will leave any opening which it has filled entirely unprotected. But when woven wire is incorporated, as in the substance known as wire glass, the particles will be most effectually held together, and will protect an opening, resisting the spread or communication of fire. This material would be specially useful in the protection of exterior openings, and would avoid the necessity of cumbersome iron shutters, which are more often neglected than used. A skylight, or glazed roof composed of hollow rafters and glazed with wire glass, will hold out against fire as long as any other portion of a building, giving a thorough protection at a point hitherto the weakest feature of a structure. Besides this, a sure prevention of falling glass by ordinary breakage will be acquired."

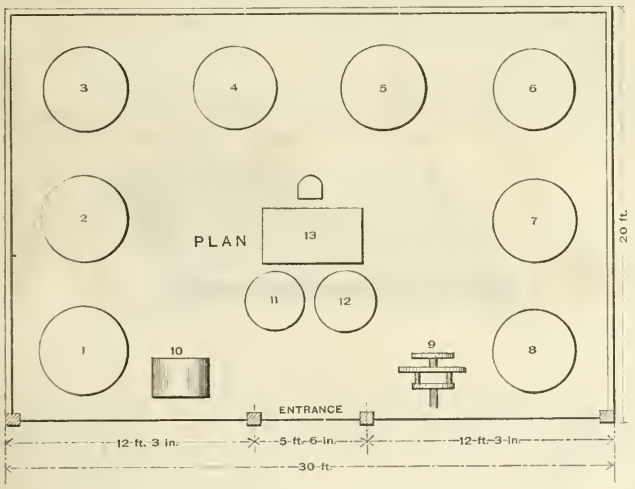
The first invention of wire glass, as now made, was due, as we have before mentioned, to Frank Shumann of Tacony; but the circumstances which led to his invention have not, we believe, been previously noticed. It appears that President Roberts of the Pennsylvania Railroad Company, applied unsuccessfully to the glass manufacturers for a glass stiffened with wire. Mr. Shumann, however, tackled the problem and successfully solved it, and an order for 200,000 square feet of wire glass was placed with his company by the Pennsylvania Railroad Company for their Broad street station at Philadelphia. This one order will give two months' employment to the new manufacturing plant which the American Wire Glass Company have erected at Tocony, near Philadelphia. The works are nearly completed, and will, we understand, be ready for operation soon after May 1. They will run eight pots with a total capacity of 5000 square feet of glass daily.

A new suspension bridge to be erected at Niagara Falls will be a single span of 600 feet and include a double track for the Grand Trunk Railway.

STOVE TRADE NOTES.

The J. F. Pease Furnace Company's Exhibit at the World's Fair.

The space allotted to the J. F. Pease Furnace Company, Syracuse, N. Y., at the Columbian Exposition at Chicago is located in the northeast portion of the building for Manufactures and Liberal Arts on one of the main aisles in Section O, Block 4, and is 20 feet wide and 30 feet on the aisle. The exhibit is classified under Group 116, Class 725. The firm applied for 800 square feet, and the first allotment made by the exposition authorities was a space of 15 x 20 feet, but on the final adjustment this was increased to 20 x 30 feet. The exhibit is mounted on a hardwood platform, and is inclosed on all sides. The aisle front is 30 feet long by 17 feet high, and is constructed of well finished hardwood. The space between the railings is filled with carved panels, and there is also to be a grilling or lattice work under the panel cornice, and from this grilling will be suspended two handsome polished signs with maroon-colored letters. The interior of the booth is finished in hardwood panels decorated in handsome colors, while small incandescent electric lights will be placed at intervals in the cornice at the inside of the booth, and a large arc light will be suspended in the center. Samples are to be arranged as shown in the plan of the exhibit presented herewith. 1 is a No. 120 hot-water heater, cased; 2, a No. 318 Economy low-down water and air combination heater without casing; 3, a No. 314 Tropic furnace, cased; 4, a No. 320 regular pattern warm-air furnace without casing; 5, a No. 314 Economy low-down pattern warm-air furnace without casing; 6, a No. 310 Economy regular pattern steam and air combination heater, cased; 7, a No. 318 Economy low-down pattern steam and air combination heater without casing; 8, a No. 118 New Economy all steam heater, cased; 9, sections of low-down water and air combination heater; 10, steel boiler of a low down steam and air combination heater; 11, bottom, ash pit, fire pot and T grate; 12, bottom, ash pit, fire pot and A. C. grate; 13, flat top desk on which will be arranged a unique little line of nickel-plated models, cut samples of steel, &c. Sections of warm-air furnace and part of their heating apparatus, to show the quality of the wrought steel used, will be displayed in different parts of the exhibit, while upon the walls will be hung pictures of fine buildings heated by Economy heaters.



Plan of the J. F. Pease Furnace Company's Exhibit.

The Excelsior Mfg. Company.

We are indebted to the Excelsior Mfg. Company, St. Louis, Mo., for advance sheets of a catalogue which they are about distributing to the trade. The pages are of large size, and the printing in two colors, red and black, forms a pleasing contrast. The line of goods to which attention is invited is the Charter Oak, provided with wire-gauze oven door. In connection with each stove is presented descriptive matter calling attention to the special features, while tables show the various sizes in which the stoves are made, prices at which they are offered, the code words for ordering the different varieties, together with dimensions of ovens and weights. The Royal Charter Oak is a new line which the company have brought out, with solid oven doors and ornamental base. The general make up of this line is the same as the regular Charter Oak, with the exception of the oven door. The manufacturers state, among other things, that on account of the large number of Charter Oak stoves and ranges which they sell some of the dealers appear to have gained the impression that no other kind is manufactured. The company wish to correct this, and state that they turn out a large line of first-class, medium and low-price cooking and heating stoves; also laundry and tailors' stoves, farmers' boilers and hollow ware. They also sell tinners' stock, as well as tinners' tools and machines. Catalogues of a full line of these goods will, we are informed, be sent to any address on application to the company.

Merritt Peckham.

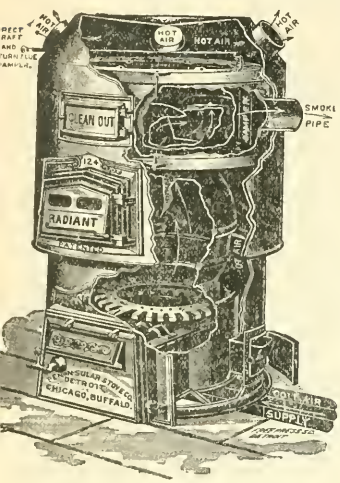
Prominently identified with the stove industry for many years was Merritt Peckham, who died at his home in Utica, N. Y., April 13. He was one of the city's foremost business men, and much sorrow has been caused by his death, though it was not entirely unexpected. Mr. Peckham was born in Pittstown, Rensselaer County, N. Y., onJanuary 20, 1813. He was a son of Seth Peckham and one of a family of 11 children. Mr. Peckham's father acquired the title of "The Plowman of Pittstown," on account of being a manufacturer of plows. The Peckham family were among the pioneers of Rensselaer County. They were Quakers and the deceased had accepted that faith. Merritt Peckham attended the district schools in Pittstown. He spent his spare time in his father's shop, having taken a liking to the business. His father sent him to Troy when but a lad, where he learned the plow-making industry, with Starbuck Brothers, manufacturers of steam engines, plows, &c. He remained in that city about nine years and in 1834 went back to Utica. From that time he resided in that city until his death. John S. Peckham in 1828, succeeded to the plow factory of his uncle, Seth Peckham, at Utica, and in 1835, Merritt Peckham, his half-brother, was admitted to the firm, which was J. S. & M. Peckham. The partnership continued until the death of the senior member, May 2, 1879. The plant of the firm was then located on Catharine street.

In 1840 the firm began the manufacture of stoves, the foundry being located in the rear of the store, 22 and 24 Catharine street. The business grew rapidly and the firm built up a large patronage. Afterward the manufacture of heaters and furnaces was commenced. It was found that larger accommodations were needed, and the firm removed their foundry to the corner of Third and Broad streets, where it is now located. Until the death of John S. Peckham, in 1879, the firm of J. S. & M. Peckham continued. At that time S. Townsend Peckham was admitted, the firm name remaining the same. About a year since S. Townsend Peckham went West, and in February last the firm was changed to J. S. & M. Peckham Company, with the deceased as its president, Merritt Peckham retaining a controlling interest. Although he practically retired from active business life six or seven years ago, he still gave the firm the benefit of valuable advice and wisdom gained by long experience. Mr. Peckham was married about 54 years ago at Trenton, N. Y., to Miss Adeli M. Ross, and six out of ten children survive him. He was an Odd Fellow, an exempt fireman, and held positions of trust on the boards of the Utica Orphan Asylum and

the Faxton Hospital. He never held political office. He was a man of generous traits and held in high esteem by all.

Radiant Peninsular Furnace.

The Peninsular Stove Company of Detroit, Mich., have just brought out a new furnace which is said to be something of a departure in this line of heating apparatus. The construction is known as the Radiant Peninsular furnace, and is adapted for using hard coal, soft coal, coke or natural gas. The broken view presented herewith shows the internal arrangement. One of the features to which the makers direct special attention is the return flue radiator, in which the heat is made to fully encircle the radiator before it passes into the smoke pipe. In addition to this the radiator is supplied with a damper by means of which the smoke or the draft is made to pass directly into the smoke pipe, thus insuring a quick start for the fire, and do-



Radiant Peninsular Furnace.

ing away with any liability of the smoke escaping into the room. Another feature of the furnace is the company's patent duplex grate and annular shaking ring, which is claimed to prevent the accumulation of clinkers, while thoroughly cleansing the fire pot of all dead matter. As it is self-mounting it requires an exceedingly short space of time to pull out the entire grate through the ash-pit door, while it can be replaced in the same time by the most inexperienced. The furnace is also provided with a double extra heavy fire-pot, large ash-pit and other features, which, the manufacturers claim, make it the best article of the kind yet put on the market. The doors and frames of the heater are neatly japanned and highly ornamented in bronze.

Burton Electric Heaters.

A new electric stove, suitable for heating stores, offices and residences, made under the Burton Electric Company's patent, and placed on the market by Taylor, Goodhue & Ames, Monadnock Building, Chicago, is herewith illustrated (Fig. 1). This stove is 36 inches in hight, resting on a handsome nickel-plated base, with a nickel-plated top. The radiating surface is broken up into numerous small projections, with the result, it is claimed, of making it a rapid heater, and, as compared with other similar devices, an economical consumer of current. The connections are made underneath the stove. This heater is provided with a switch, by which the degree of heat may be regulated. Moderate heating will consume from 5 to 7 amperes of current on a 110 volt circuit, while in cold weather the heater will consume from

Burton Electric Heater.—Fig. 1.—General View of Stove.

15 to 20 amperes. At the latter point the stove generates heat very rapidly and water may be boiled within a few minutes. Underneath the nickel-plated top is a flat surface upon which anything may be placed for warming or boiling. The stove itself is a hollow cylinder, and, as the castings are of thin metal, it takes but a short time to heat. Fig. 2 illustrates the new electrical device, made under the same patents as the electric stove, for cooking griddle cakes, and is used to advantage in residences or restaurants where heat and smoke are objectionable. This griddle cake device is about 20 inches long by 15 inches broad, and six griddle cakes can be cooked at one time upon it. It stands about 2½ inches high, and is attached to the socket by a simple plug and No. 18 incandescent lamp cord.

Fig. 2.—Electrically Heated Griddle.

ODD PLATES.

In our issue for last week we presented the text of a decree recently issued in the case of John E. Gaitly against Frederick W. Collins. In order that the trade may not go astray in the matter, we would remark that the defendant in the case was not Frederick W. Collins of the Howe Ventilating Stove Company of Cortland, N. Y.

William H. Switzer, general manager of the Superior Furnace Company, Little Falls, N. Y., has just returned from a business trip, as far West as the Rocky Mountains. He reports trade good in the West and brings favorable accounts from the Missouri River towns. Mr. Switzer booked some large orders for the Superior Furnace and informs us that the new Superior steel range was received with much favor by the Western trade.

An interesting record that conveys or suggests an idea, which may awaken useful reflections, has been kept by Kedian Bros. of 248 Third avenue, New York. Since 1866 they have a yearly record of all of the heating stoves they have sold, and it shows a steady and gradual decline for a number of years back, while their general business has increased. A possible explanation is that in an old and thickly settled section the demand is satisfied or is supplied with the gas and oil heating stoves, which have in the same period increased in use.

The Excelsior Hardware Company at 58 Warren street, New York, represent John Wright of England, the manufacturer of gas stoves and open fires. They also handle the line of gas stoves and gas cooking goods of F. & L. Kahn of Hamilton, Ohio. In addition to these goods they are making a line of one, two and three burner hot plates after designs of their own. The increasing demand by the people of all classes for gas goods is made very apparent to them, owing to the varied line they carry, and their shipments increase accordingly.

L. A. Buck, representing the Ringen Stove Company, St. Louis, in the interest of their quick meal gas and gasoline stoves, has made a remarkable record during his last trip. He visited 295 towns, and entered 288 orders. To indicate the success of his trip, it might be remarked that the Ringen Stove Company sell to one dealer only in each town.

The new plant of the Joseph Bell Stove & Range Company at Muncie, Ind., is now ready for the machinery. The Lake Erie road is rushing to completion a switch to connect with the stove works. This will be ready in a few days and then the machinery will be placed. The machinery used has been brought from the old works at Wheeling, W. Va., and is now on the ground. It is expected that molding will begin within a few weeks. The new buildings are models of completeness and adaptability and are admirably located. The Bell Company own a tract of seven acres on the bank of the White River and in this tract they have their own gas well. They will have about three times the capacity in the new works that they had in the old. They desire the trade to know that while they have abandoned the manufacture of stoves and ranges at Wheeling, they will maintain there a large warehouse filled with complete lines of their well-known goods, and that the Eastern trade will be supplied as promptly as before.

The Simonds Mfg. Company, at 50 Cliff street, New York, make a rack that can be attached to any wall register, and which serves as a foot rest, or is an excellent place to set a glass dish to hold water for contributing that moisture to the atmosphere which many persons consider necessary for comfort.

A notice conspicuously displayed informs the trade that the Marcy Stove Repair Company will occupy larger and more convenient quarters at 74 Beekman street, New York, about May 1.

We have received with the compliments of the Laura Nevins Range & Heater Company, St. Paul, Minn., a pamphlet of 16 pages, of a size convenient to carry in the pocket, and relating to the

Laura Nevins Range. Within the covers of this little book is to be found a full description of the stove named, as well as a large number of testimonials from those who have used it. The stove is illustrated by engravings showing a general view, and also sectional cuts indicating the interior construction.

THE TROY OIL STOVE COMPANY of Troy, N. Y., are distributing circulars relating to their New Beauty oil stove, which is offered the trade in a variety of sizes and styles. It is made of cast iron, from new patterns, and is placed upon the market as representing original ideas. Every burner is supplied from the bottom with air, coming up through the oil tank, which tends to keep the oil cool. There is also supplied in connection with each burner a spreader, which gives a clear, large flame. The ornamentation of the New Beauty is neat and effective, and it is meeting with a gratifying demand.

THE THATCHER FURNACE COMPANY, 33 Peck Slip, New York, report the receipt of large orders through their traveling salesmen who have been visiting the trade in the West. On account of new improvements which have been made in the company's mounting and molding rooms, they are now in a position to promptly handle all orders, great or small, with which they may be intrusted. Mr. Benedict, the vice-president, is also superintendent of the foundry, and, being a practical furnaceman, everything runs along very smoothly and satisfactorily.

THE PENINSULAR STOVE COMPANY of Detroit, Mich , have forwarded to Chicago material for their exhibit at the World's Fair. It consists of 23 stoves and ranges and one furnace, the goods being highly finished and embodying all the modern improvements. One of the most interesting features of the exhibit is the display of wrought-steel ranges intended for use in hotels, restaurants and other places where a large amount of cooking is required. One of the ordinary cooking ranges in the company's exhibit has been nickel plated throughout and finished with a high polish. The company expect that their exhibit will be one of the best at the World's Fair, as they have spared no time and trouble to make it first class in every respect. The company will occupy a space 20 x 35 feet in size in the building devoted to manufactures. The stoves will stand on an old gold carpet in front of a red plush background.

THE FULLER & WARREN COMPANY, Troy, N. Y., send us a pamphlet of 12 pages, which is known as their range supplement No. 3. It is neatly printed in two colors, and describes three new ranges which the company have brought out. These are known as the F. & W. Co.'s No. 38, provided with oval fire box, triangular grate, large portable wrought-steel oven, heavy linings, large cut top and other features of convenience and utility; the Advance, a six-hole range of neat appearance and embodying the modern features; the New Rescue, a five-hole range, made for burning hard and soft coal or wood, and the New Advance, another member of this general class. One of the features of the pamphlet is an illustrated description of the direct draft damper as arranged for the No. 38 wrought-steel oven range. This damper is placed on the back of the stove and out of the way of anything that may be on the top. The words "open" and "shut" are cast on the top, thus making it impossible for any one to become confused and turn the handle the wrong way.

SECRETARY EDWARD BOWDITCH of Rathbone, Sard & Co. has returned from a visit to the South, where his family have been for some time.

THE OHIO STOVE COMPANY of Portsmouth, Ohio, have just completed the erection of a large and substantial brick structure adjoining their present plant. It will be used for offices and warehouse purposes, while the old building will be used entirely as a foundry. A number of new patterns of cook stoves and heaters have been added to the company's already extensive line, among the number being the Buckeye range, the Columbia square heater, and a new parlor cook stove. The works of the company are running full in all departments in anticipation of a large fall trade.

THE IMMENSE sample floor of the Albany plant of Rathbone, Sard & Co. has been redressed in regal fashion. The ceilings and side walls have been handsomely frescoed in harmonizing tints and striped in gilt. The radiators and iron work have also been handsomely gilded. The Lamson cash-carrying system has been put in between the office and the repairs and shipping departments. This has been found to be a most useful facility. The sample floor is being rearranged and will show all of the immense lines of stoves and ranges manufactured by the company.

THE EXCELSIOR STEEL FURNACE COMPANY, Chicago, Ill., appreciate very thoroughly the advantage of the free use of blanks in keeping records and obtaining information. Two interesting samples of such publications of theirs are blank for individual report and town report, to be filled out by their traveling salesmen. The individual report, a sheet of ruled paper 10 x 8 inches in size, is arranged at the top for inserting the name of the firm, location, date, capital, salesman reporting, principal stock carried, appearance of the store, trade papers taken, if advertisement has been seen, and, if so, where, with two lines left for comments, while below are 28 lines for the names of creditors, the amount, time and report. On the back of the sheet are squares for memoranda of the goods handled and from whom bought, these including a line of heating apparatus and appliances. The second form is for a town report, giving name, State, the fuel chiefly used, system preferred, whether hot air, steam or hot water, estimated sale of furnaces and other heaters, leading furnace dealer, while blanks are left for the names of the different dealers in hot-air furnaces, steam boilers and hot-water heaters, together with a column for the insertion of the name of furnace or boiler sold. On the back of the town report is memorandum for quotations made on furnaces, fittings, &c. Altogether the forms are got up in the most complete way, and if properly filled out must bring to the Excelsior Steel Furnace Company a vast fund of most valuable information.

SUPERINTENDENT LIDDLE of the Perry Stove Company of Albany, N. Y., says that, notwithstanding a backward spring, it has opened favorably for the company, he having no fault to find with the demand up to date. The company are preparing some new goods which they will probably offer to the trade in the near future. The trade in oil goods has opened briskly and promises well. The company expect to run their plant full during the summer.

A HANDSOME new sign has just been got out by Rathbone, Sard & Co., Albany. It reads: "Acorn Stoves and Ranges," in fancy black letters on an aluminum background. It is to be hung in windows.

THE EXCELSIOR MFG. COMPANY, St. Louis, Mo., have just issued from the press an eight-page circular relating to Filley's Challenge steel ranges, which are shown in several varieties. The Challenge range is made of cold-rolled steel with steel angle corners, closely hand riveted and every rivet countersunk. Where bolts are employed the steel plate is threaded to receive the bolts, thus making, the company state, "the strongest, handsomest, heaviest, finest finished and most perfectly constructed steel ranges manufactured, embracing every improvement of merit." Both ends of the range are lined with heavy asbestos, while the top flue above the oven, or over the over door, has cast-iron lining, which will prevent the heat from burning off the paint. The appearance of Filley's Challenge range is very neat, and the company confidently expect for it a large demand. The circular also calls attention to the Monarch steel range, the closets of which have a door which rolls back out of sight and out of the way, thus leaving an opening the entire length of the closet. Other features of convenience and utility are embodied in this range, which is made in a variety of styles.

H. H. WATERMAN of New York City, representing the Central Oilgas Stove Company, has just returned from a four months' trip through the Southern States. He reports having booked a number of good orders, and taken as a whole the sales are said to have been double what they were for the corresponding period of last year. Mr. Waterman has a certain magnetism which has led to the remark that "his friends stick to him like sealing wax."

WE ARE INDEBTED to the Chicago office of the Detroit Stove Works, Detroit, Mich., for a proof of the first page of the World's Fair edition of *The Jewel Record* which will be distributed to the trade next week. The page presents the particulars of an interesting and unique programme of a special feature of World's Fair entertainment. The company announce to all their customers and stove merchants throughout the country that arrangements have been completed for running a line of "Jewel" Tally-ho coaches during the World's Fair regularly from the Chicago headquarters of the company, 269–271 South Canal street, to the World's Fair grounds and return. The exact route the coaches will take has not yet been definitely decided upon, but we understand it will include a ride of at least seven miles each way, over the boulevard system of Chicago. Accompanying each invitation sent out by the company will be a pass admitting the holder to a seat on the coach. The only condition which the company impose upon their friends is their registration and counter-signature of the pass at the Chicago office. Owing to the small amount of space which it was possible for the World's Fair authorities to allot to each exhibitor, and also to the fact that the time for the preparation of an exhibit was very limited, the company state that their World's Fair display of Jewel stoves will be shown at their Chicago headquarters. In this connection it may be interesting to state that merchants intending to accept the company's invitation should communicate with the Chicago headquarters at least ten days in advance of their arrival and give the date when they desire to ride on the coach.

THE STUART & PETERSON COMPANY'S new hollow-ware plant at Burlington, N. J., covers ground 410 x 200 feet, and the foundry building is 280 x 67 feet, the main building being three stories. The fire protection is excellent, there being automatic sprinklers on every floor. The enameling ovens are of improved patterns and are capable of the enameling of extra large articles. There are many improved appliances in connection with the plant, mainly the result of extended investigations by a member of the company during a special visit to Europe. The Kearns improved japaning ovens are used, the

only ovens of the kind in this country. The turning lathes turn out the ware automatically, and it is claimed that their set of lathes are, of the kind, the only in existence. There are excellent wharfage facilities at the works, large vessels being enabled to receive and discharge at the company's own wharf. There is a railroad switch opening directly into the plant. Operations were commenced April 1.

In a page announcement Rathbone, Sard & Co., Albany, N. Y., direct attention to their Acorn specialties, and present an illustration of the Magnet Acorn range, intended for hard coal, soft coal or wood. A general account is given of this range, and its special features are alluded to.

The Kansas City Stove Works, Kansas City, Mo., in an announcement in another part of this issue this week direct attention to the Champion Stoves and Ranges of their manufacture, the several excellent features of which are referred to in the text, while an illustration is likewise presented.

The Ringen Stove Company, St. Louis, Mo., have just shipped what is undoubtedly the largest single car of stoves ever sent over any road in this country. This car was specially contracted for and is a veritable warehouse on wheels. It is the property of a private individual and was rented by the Ringen Stove Company for this purpose. It contained 300 stoves, mostly large sizes. The dimensions of the car are 52 feet in length, 10 feet wide and 11 feet in hight.

S. H. Plumb, traveling for the Stamford Foundry Company, Stamford, Conn., is one of the steady men of the trade who is doing good work in New England for his concern.

The Fuller & Warren Company, Troy, N. Y., have got up an advertising novelty in the shape of a metal sign, measuring about 14 x 6½ inches in size, and supplied with a short piece of brass chain, by which it may be suspended in a conspicuous place in the dealer's store. The upper left-hand portion of the sign, which is made of brass, bears the letters "F. & W. Co." At the right of this and occupying the principal portion of the space is the inscription in black letters, "P. P. Stewart Stoves." The company are also distributing some paper signs of about the same dimensions as the metal one, carrying embossed japanned inscriptions, printed in various colors, relating to the company's lines of stoves, furnaces and ranges.

The Smith & Anthony Stove Company of Boston, Mass., are in receipt of a number of letters which they state have been brought out by their recent announcements in the columns of *The Metal Worker* relating to their Hub Heater Furnace. As they put it, "The question of priority seems to have raised a great deal of interest among the trade."

Applications of Coal Gas for Heating Purposes.

The following article, which deals with a subject in which many of our readers are more or less interested, appears from the pen of Thomas Fletcher of Warrington, England, in a recent issue of the *Gas World*:

I have repeatedly had to deal with the problem of heating large beer-bottling stores for conditioning bottled beers; and the experience obtained is valuable for other purposes. No bottled beer would be salable either in this country or abroad unless it is sufficiently charged with carbonic acid gas. The quantity held by the beer in cask is insufficient to produce a satisfactory "head;" and the simplest method of obtaining the required condition is to promote fermentation in the beer after it is bottled and corked: for this a steady temperature of 57° F. is desirable. My earlier attempts have been fairly satisfactory; but the difficulty has been to make the bottlers understand the necessity for carrying out details correctly; and I have never, until recently, been able to obtain an exact and scientifically conducted test which would put the matter on a proper basis. This has at last been done in the bottling stores of Sir Andrew Walker & Sons, Limited.

In my own experience it has been proved repeatedly that for work of this class, where diffused heat, sometimes exceedingly small in amount, is required in large spaces, the best burners are ordinary lighting jets, placed as near the floor as possible, in rows on an ordinary gas pipe, the jets being placed at distances of from 7 to 10 feet apart. With regard to the position of the burners for equal temperatures, the smoke test, verified by a series of exact experiments in plant-house heating, proves conclusively that any irregular distribution of the sources of heat causes eddying currents and great irregularities. In one case a difference of 8.5° F. between two points 6 feet apart has been observed.

The position of the burners indicated by these experiments is one or more straight lines, which, by causing an upward current, induce a corresponding descending one at the part of the room furthest away from the burners. The rooms where the tests were made are three in number—all adjoining each other—the sizes being:

Feet long.	Feet wide.	Feet high.
91	23	8
20	19	8
22	20	8

The total wall surface is 3000 square feet, and the window surface approximately 100 square feet. In the largest room seven brewers' standard thermometers were used.

Owing to the arrangement of the contents, it was found most convenient to run two 1-inch iron pipes on the floor near the center from end to end, with the necessary breaks for cross traffic. In these are screwed, at every 8 feet, one No. 2 Bray's union jet burner, and each pipe is controlled by a 1-inch gas tap, with lever arm and quadrant for exact adjustment. The thermometers were placed:

A, 5 feet 6 inches from floor, 6 feet from nearest burner.
B, 3 feet 8 inches from floor, 6 feet from nearest burner.
C, 7 inches from floor, 6 feet from nearest burner.
No. 1, near door, 11 feet from nearest burner.
No. 2, center of room, 1½ feet from nearest burner.
No. 3, center of room, 7 feet from nearest burner.
No. 4, end of room, 11 feet from nearest burner and 7 feet 6 inches from No. 1.

All adjustments of the gas were made by hand on an ungoverned service, and the following gives a week's readings:

Daily Temperatures—Degrees F.

November 1, 1892.

Thermometer.	6 a.m.	Noon.	6 p.m.
No. 1	58	58	59
2	58	57¾	59½
3	59	58¼	60
4	58	56¾	59
Outside	—	45	34

November 2, 1892.

No. 1	57½	58	60
2	57¼	57¾	60
3	57½	58	60
4	57¾	57½	58½
Outside	40	44	45

November 3, 1892.

No. 1	58½	58	58
2	58½	59½	60
3	58½	59	58
4	57½	58	58
Outside	46	55	49

November 4, 1892.

No. 1	57½	not taken	56
2	58	not taken	56
3	58	not taken	56
4	58	not taken	56
Outside	51	not taken	55

November 5, 1892.

No. 1	57½	57	not taken
2	58½	58	not taken
3	58	58	not taken
4	57½	57	not taken
Outside	51	51	not taken

November 7, 1892.

No. 1	56	56	57
2	56½	59	59
3	55½	58	58
4	55	58	8
Outside	45	46	42

Thermometers A, B, and C, vertically over each other, were respectively 7 inches, 3 feet 8 inches, and 5 feet 6 inches from floor, in a room 8 feet high. In 6 out of 16 readings the difference between the three did not exceed 1° F. The greatest difference was 3° F.; and occurred in only one reading. So that, for all practical purposes, the heating of the room vertically may be considered perfect. The most striking point is the extreme uniformity of heat obtained by hand regulation during excessive changes outside. The total gas consumption for heating the three rooms was taken twice. With an outside temperature of 19° F., the consumption of gas was 100 cubic feet per hour; with an outside temperature of 35° F., the average was 50 cubic feet per hour.

In the two smaller rooms a center tube was impossible; and the only available method was to put a pipe with union jets along one wall, near the wall and near the floor. One end of the pipe was turned to run along the next wall for about 6 feet. This, I think, is a mistake; and further trials will be made without this extra length. A break in the straight line of jets evidently causes eddying and irregular currents. As a proof of this, the reading of the thermometer 2 feet 6 inches from the end flame was 56° F. in the center of the room, and 10 feet from the nearest flame 58° F.

Taking the whole result, I found that, with a wall surface of 3000 square feet and windows 100 square feet, a gas consumption of 100 cubic feet per hour will maintain a rise of 39° F., which will give approximately the following rough rule: 1 cubic foot of gas burned per hour will maintain a rise of 1° F. in a room having 1200 square feet of wall surface, if burned in a common lighting burner near the floor, with very limited ventilation and good brick walls. My method of calculating by the wall surface is, I believe, the only one which is of any value in this class of work, as practically the whole of the loss is through the walls. The amount expended on heating the air is exceedingly small in any case where the ventilation is limited; and it must be very clearly borne in mind that the gas consumption given is only the amount necessary to maintain the temperature after the correct heat has been obtained by steady heating day and night, until the inner wall surface corresponds in temperature with the air in the room.

As a maker of atmospheric burners, this would appear to be a matter outside my own special department; but it is one of very considerate interest to gas engineers, and therefore, if not directly advantageous to myself, is worthy of careful consideration, as showing the simplicity, perfection, and cost of exact work on a fairly large commercial scale. There is no doubt whatever that the steady temperatures obtained would be impossible with any system of steam or fire stove heating, and would be very difficult, even if possible, by hot-water pipes. If steam were used the heating of the pipes would be very irregular, unless working at full power; and the accumulated heat in hot-water pipes would prevent the rapid adjustment required for the great outside variations which constantly occur.

Halifax is at loggerheads with the Dominion Government on the question of admitting emigrants to land without fumigation at quarantine.

TRADE REPORT.

The Iron Market.

The course of the market during the past week may be summed up in a very few words: "Iron firmer, Steel weak and a shade lower." The general situation, however, is practically unchanged, and so far as any one can see is not likely to change to any very important extent. The most notable feature is the steady absorption of stocks of Pig Iron, and the possibility of an unexpected advance in case there is no change in the proportions between supply and demand. At present it is perfectly clear that we are using more Pig Iron than we are making, which of course cannot continue much longer without affecting prices. On the other hand, Steel shows signs of weakening, which may in some measure offset the strength in Iron. However, a good deal will depend on developments during the next 30 days, so that it is impossible for any one to say for certain what course the market will take. It will not require any very great amount of new business to make things very active. There is enough on hand to give a splendid backing, all that is required is to take deliveries on lots already sold. The Ore situation is still in abeyance, but the impression is that prices will not change to any very important extent. There is some talk of an attempt to advance freights on Soft Coal, and on Ores, but the thing is so absurd and so unreasonable that it is hardly likely that it will amount to anything. Eastern mills and furnaces are already so badly handicapped that any further steps to increase cost could only result in a wholesale shutting down and blowing out. Taking everything into account, we should be inclined to say a little higher prices are not unlikely for Foundry and Mill Irons; perhaps a little lower for Steel stock, but with prompt specifications for the Finished Material contracted for during January and February, we may see better prices for Plates, Shapes, &c., which at present are at the lowest on record. Mills rolling Iron and Steel Bars are only moderately active, and extremely low prices continue to be named for desirable orders and specifications. The makers of Pipes and Tubes met in New York City last week and rearranged prices and discounts. Wire continues active with prices being firmly maintained. More or less anxiety will be felt in business circles from this time forward over the settlement of the wage scales. Interviews with prominent manufacturers in different branches of the trade indicate that if the workmen exhibit a spirit of fairness when the time comes to take up the different scales in conference, there will not be any difficulty in bringing about settlements that will be satisfactory to all concerned.

Pig Iron.—In the New York market makers of standard Northern brands report a very good run of business, while agents of some of the other furnace interests, North, and South, report that current business is confined practically to carload orders. Reports of cutting are again heard, the most conspicuous case being the offering of No. 2 Southern Iron by a prominent maker to consumers direct at $9, Birmingham. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14.25 @ $14.50 for No. 1; $13 @ $13.50 for No. 2 and $13.25 @ $14 for No. 1 Soft.

Both Foundry and Mill Irons appear to be in a good position in the Philadelphia market; and while there is no quotable change in prices, they are distinctly firmer, and with a continuance of present conditions will probably soon work to a higher level. All the best known brands are close sold up; some, indeed, are engaged up to the fall months, so that it is a matter of favor more than business to be able to place an order at current quotations. Medium brands are also pretty well cleaned up, while the very low qualities have also been liberally taken, but at extremely low figures. One lot of about 10,000 tons is said to have been secured at a very small fraction over $12, Philadelphia, but the cleaning-up process has been so thorough that there is now really very little Iron of any kind to be had at less than quoted rates. The situation is in fact a very comfortable one for sellers, inasmuch as they are not heavily loaded with stocks, while there is a demand at prices which can be pretty accurately calculated upon. At the same time, there is nothing specially urgent in the demand, neither are consumers in the least alarmed at the possibility of a scarcity. The capacity for production is so large that every 25¢ advance in prices will add to the supply, while a dollar might again lead to an undesirable surplus. Under these circumstances, the situation attracts no unusual attention, and, barring the possibility of slightly higher prices for the better grades of Foundry and Mill Irons, there is nothing to indicate any decided change from the figures recently ruling, which in ordinary cases are quoted as follows for Philadelphia and equivalent deliveries, with 25¢ @ 50¢ less on Southern brands at Harrisburg and Intermediately to Baltimore:

American Scotch, No. 1X	$16.00	@	$16.50
American Scotch, No. 2X	15.00	@	15.50

From Chicago we learn that the demand is of an irregular character, covering heavy transactions of special qualities, with only light sales in a general way. Among the contracts placed the past week was one for several thousand tons of Bessemer Pig. Local manufacturers are still enjoying the bulk of the business. Their prices are quite firm but unchanged. Representatives of Southern companies are talking a little more cheerfully, having advices that on most grades their companies are now well sold up. Less is heard of concessions on Southern, cuts of 5¢ @ 10¢ securing such orders as are now current. Inquiries are a little better for Lake Superior Charcoal. Consumers talk about purchasing considerable quantities, but it is likely that, as usual, they will discuss the matter for some time before really entering the market. An effort is being made to push Charcoal prices down, and reports are current of weakness in some quarters, which the manufacturers deny, claiming that the small sales now being made are realizing $16.75 and higher. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	$16.50	@	$17.00
Local Coke Foundry, No. 1	13.75	@	14.25
Local Coke Foundry, No. 2	13.00	@	13.25
Local Coke Foundry, No. 3	12.75	@	13.00
Local Scotch	14.00	@	15.00

In Southern markets there has been a slow and easy Pig Iron market during the week, the demand being mainly restricted to the current consumptive necessities of consumers, who as a rule are indisposed to anticipate their wants, and while some of the stronger Southern Iron companies are not disposed to accept orders for long forward delivery at current prices, yet orders can be placed for delivery all this year for No. 2 Foundry at $9 and for Gray Forge at $8, f.o.b. Birmingham. There is a fair inquiry for Mottled Neutral Coke Iron, and, being in light supply, it sells pretty close up to Gray Forge. The reduction in stocks during the month of March does not seem to have any influence upon the market, probably because the capacity of the furnaces in blast or available for production is large enough to meet all probable demand. There is no demand for Charcoal Iron except in a retail way, and even that is scarcely of the usual proportions. Quotations are as follows:

Foundry.

Southern Coke, No. 1	$13.25	@	$13.50
Southern Coke, No. 2	11.75	@	12.00
Southern Coke, No. 3	11.00	@	11.25
Ohio Soft Stone Coal, No. 1	16.00	@	16.25
Ohio Soft Stone Coal, No. 2	15.00	@	15.25
Mahoning and Shenango Valley	14.75	@	15.00
Hanging Rock Charcoal, No. 1	19.00	@	19.25
Hanging Rock Charcoal, No. 2	18.00	@	18.50
Tennessee and Alabama Charcoal, No. 1	15.50	@	15.75
Tennessee and Alabama Charcoal, No. 2	14.50	@	14.75

Metal Market.

Copper.—Some contracts have been made for Lake Superior Ingot for future delivery. As to the quantity of Metal involved and the prices paid, secrecy is observed. In this particular the large producers are as non-committal as they are regarding the amount of Copper on hand, and through this perverseness encourage suspicion regarding what little information does come to the surface regarding the true status of the market, besides developing suspicion as to accuracy of statistics of production. In short, there is strong circumstantial evidence of manipulation in more directions than one, not the least among which is the dissemination of misleading reports as to true market value. For example, the word is dropped that the leading producers are not sellers at less than 11¼¢. That and higher prices were quoted some time ago, but there is reason to believe that good-sized orders have been taken recently at 11¼¢ if not at a lower price, or at concessions from "nominal" prices that have been the rule for several months in certain quarters. In support of this is the fact that "outside" lots have gone a begging at 11¼¢ and that distant future deliveries were offered on the Metal Exchange at as low as 11.15¢ without stimulating inside or outside speculation to the slightest extent. Upon the whole it would appear that the restriction of output has thus far had little effect outside of preventing prices from falling to a normal point. Casting Copper is generally quoted at 10½¢, but desirable orders at ⅛¢ less would probably be clinched, and it is not certain that bids of 10¼¢ for large blocks would be refused. Some Lake Ingot has been sold for export at 11¼¢, and it is understood that negotiations involving 5000 tons are under way.

The monthly production of Copper in the United States since July has been as follows, the first column giving the aggregate returns from the reporting mines, which include the principal lake, Montana and Arizona producers; the second being the metal from pyrites and from a number of smaller outside sources, being estimated:

American Product.

1892.	Reporting mines. Gross tons.	Outside sources. Gross tons.	Total. Gross tons.
July	9,294	924	10,218
August	10,807	870	11,677
September.	9,710	994	10,704
October	9,668	1,289	10,957
November.	9,888	1,036	10,924
December.	9,872	1,174	11,046
Total, six months.	59,239	6,287	65,526
1893.			
January	9,187	989	10,176
February.	8,213	1,042	9,245
March	9,065	1,321	10,386

The product of the foreign reporting mines was as follows:

Foreign Reporting Mines.

1892.	Gross tons.
July	6,358
August	6,888
September	6,478
October	6,476
November	6,789
December	7,666
Total six months	30,655
1893.	
January	5,736
February	6,702
March	6,896

The exports of fine Copper from the United States were as follows:

United States Exports.

1892.	Gross tons
July	3,450
August	1,545
September	1,458
October	3,144
November	3,897
December	4,486
Total six months	17,980
1893.	
January	3,171
February	1,815
March	2,334

Pig Tin.—The "bull" interest in the speculative arena have had a new card in the shape of advices by wire of shipments of only 775 tons from the Straits during the first half of April. They also had some assistance from London in the form of stiff quotations there for prompt and near future deliveries. Neither circumstance has, however, counted for much against the natural weight of excessive supplies on this side of the Atlantic and strong circumstantial evidence that no opportunity is missed in this or the foreign markets to transfer holdings At present, London is selling futures at a heavy discount, while a considerable premium is still maintained by the local manipulators. The natural deduction from this is that the United States is destined to be the dumping ground for a large amount of Tin attracted from the primary sources of supply by the McKinley tariff law. Trade demand is running slower at present than it has for some little time past, chiefly for the reason that jobbers are quite liberally stocked, and purchases for consumption are on a more restricted scale also, although very fair in the aggregate amount. At the close of the week prices softened to 20.65¢ @ 20.70¢, net cash, for 10-ton and larger lots, and buying interest was very tame.

Pig Lead.—The higher prices established on last week's transactions have been maintained, but buyers have become more cautious and the volume of business for the period under review makes a very indifferent showing. Spot offerings are moderate, however, as are also round lots for near future shipment from the West and at less than 4.17½¢ there is little Lead on sale. The popular quotation at this writing is 4 15¢ bid, 4.20¢ asked.

Spelter.—Sales have been made of carload lots at 4.40¢ delivered here and at other Eastern points. At this writing 4½¢ is generally asked and the indications are that no considerable quantity of the metal can be secured at the intermediate price. The rise is due chiefly to steady consumption that is now quite on a level with the production and apparently ahead of late calculations. Efforts to effect a combination of producers have been renewed, but thus far it does not appear that the market has been affected thereby.

Antimony.—Outside of routine jobbing sales there has been little doing, and the demand at present is slow. Prices remain quite steady, however, at 10½¢ for Hallett's, 10⅝¢ @ 10½¢ for L.X. and 10⅝¢ @ 10¾¢ for Cookson's.

Tin Plate.—Coke Tins, of 100 lb and lighter weight, have realized very good prices, unsold supplies of the same being under close control at the moment. Other varieties have merely held their own, however, since supply and general assortment is now somewhat fuller. Still the change in prices is narrow, and without sign of the supply becoming at all burdensome. The demand for Tin Plates from consumers continues moderate, with no change in prices.

Coal.

Anthracite Coal is dull and easy, except Buckwheat and Pea, which are scarce, the former at $1.85 @ $2, f.o.b.; Pea, $2.50 @ $2.65, f.o.b. Stove and Chestnut are $4.15 alongside, which is the net circular. The accession of Mr. Harris in the Reading management as yet has no effect on the trade. Large sales of Egg, Stove and Chestnut are reported at prices 25¢ under the circular. Bituminous Coal is quoted $3 25, and prices are said to be well maintained. Western Coal prices will be considered April 25, and a meeting of freight agents to adjust railroad tolls to Western points will soon be held. The Bituminous operators report no later contracts.

The total Anthracite Coal production since January 1 is 10,814,000 tons, an increase of 887,000 tons compared with last year. The Reading Company is operating 51 collieries three-quarters time, and, having already a large tonnage piled up at tidewater, have begun to stock coal in the storage pockets near Mahanoy. The bituminous mines are active. Clearfield production for the week, 67,451 tons; Huntington, 45,735 tons; Norfolk and Western, 70,136. All regions are ahead of last year.

Financial.

The condition of the United States Treasury is again the uppermost theme, the loss of gold by the outgoing European steamers having raised the question whether the parity of the two metals, gold and silver, can be maintained much longer. At the present time silver is a fraction below 38 pence in the London market. It is generally believed by Treasury officials that the order stopping the issue of gold certificates which was given last Saturday, and the expected gain in the condition of the gold balance, will preclude the necessity of an issuance of bonds. The majority of the bank officials in this city believe that the order referred to will have no direct effect on the situation. One bank president said: "The whole thing resolves itself into a formal announcement that the Government treasuries can no longer be used as a warehouse for gold coin. The step now taken should have been taken years ago; in fact, should have been arranged for simultaneously with the resumption of specie payments in 1879." Another bank president said: "The Secretary, in making the order, simply obeys the law. It was formerly designed to make speculation in gold impracticable by compelling traders to make deliveries in actual coin. This condition no longer pre-

vails, and it is possible the step is simply the first movement in the direction of bond sales. A large amount of bonds are already printed and ready for delivery to agents of prominent European banking houses, who will ship gold to pay for them from the other side as soon as the issue is announced here." The continued export of gold to supply the Austrian demand, together with the probability that gold will go out for some time to come, causes an uncertainty of feeling detrimental to all interests, especially as the excess of foreign imports at New York is the largest ever known. At the same time the exports of breadstuffs, cotton, provisions, cattle and oil in March were $17,889,184 less than in the same month last year. On the other hand, low prices for cotton should stimulate exports of that staple, and enormous amounts of grain will come forward on the opening of navigation. The recent Australian failures, which in the aggregate are comparable to the Barings failure, tend to increase the stringency in Europe, and are an unfortunate coincidence as related to monetary affairs in the United States.

Returns of the foreign commerce of the entire country for nine months to April 1 are important. During March alone the imports of merchandise were $26,000,000 in excess of the exports, and for nine months, specie excluded, there is an adverse balance of $47,000,000, as compared with a favorable balance of $209,000,000 for the same time in 1892.

The general markets are dull for the reasons above intimated and in the absence of speculation. One exception was coffee, which broke sharply under a bear raid, and business on Monday was larger than before for several years The net decline was equal to $1.50 ℔ bag. Cotton and wheat were also lower. Spot cotton was marked down $\frac{3}{16}$¢. In wheat the most notable feature is the area of the Indian crop, which shows an increase of 2,750,000 acres. Crop accounts from Texas are very good. Corn is up 6 or 8 inches, and oats are occasionally seen in head. West there is nothing in the general outlook for winter wheat to warrant as large a crop as last year's. Provisions are rather firmer. Anthracite coal is weak, while bituminous prices are well maintained.

For the nine months ending March, 1893, the exports of breadstuffs were $145,032,000; for the corresponding nine months in the previous fiscal year they were $233,159,000, a falling off in nine months of $88,127,000. The decrease in the exportation of hog, beef and dairy products has been almost equally marked. For the nine months ending March 31 the exports of these products were $27,300,000; for the corresponding nine months of the previous fiscal year, $33,983,000, a falling off of $6,683,000.

The port of Acre on the Mediterranean, the only good harbor between Alexandria and Beyroot, has been connected with Damascus by an English company and promises to become commercially important.

Chicago Report.

Scrap.—Wrought Scrap is very weak, consumers forcing prices down. Stove Plate is in demand, and dealers are offering higher prices for it. Dealers' buying prices are as follows :

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	8.00	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12.00	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	6.00	....
Horseshoes	12.50	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	3 ¢

Anthracite.—A new price list is to go into effect about the 25th. Meanwhile carload lots of 12 net tons are quoted as follows:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.85	$6.10
Milwaukee, Wis	5.85	6.10
Kansas City, Mo	9.05	9.30
Council Bluffs, Iowa	9.05	9.30
St. Joseph, Mo	9.05	9.30
Leavenworth, Kan	9.05	9.30
Omaha, Neb	9.05	9.30
Burlington, Iowa	7.35	7.60
Des Moines, Iowa	8.80	9.05
Davenport, Iowa	7.15	7.40
Dubuque, Iowa	7.15	7.40
Madison, Wis	7.35	7.60
St. Paul, Minn	8.35	8.60
Lincoln, Neb	9.20	9.45
Sioux City, Iowa	9.05	9.30
Aberdeen, S. Dak	9.10	9.35

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.	
Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

Coal Dust Explosions as a Motive Power.—Accounts come from Germany that Krupp, the famous gun maker, is now building a number of experimental engines to test a novel idea. A German inventor has taken patents on the utilization of the general principle that finely divided carbonaceous matter floating in the air readily explodes. He proposes to grind coal to an impalpable powder, and after introducing the dust floating in the air into the cylinder of an engine, explode it, the idea being to follow very much the same lines which are being so thoroughly developed in the use of gas in engine practice. Naturally, the first question which has risen has been how to get rid of the ash. Krupp is reported to have stated that his experience in gun manufacture convinces him that this is not a serious obstacle. The advantages which would grow out of a direct utilization of mineral fuel as mined are very obvious. While modern practice converts only 10 to 15 per cent. of the heat energy stored in coal into power at the crank shaft of a steam engine, it is believed that no less than 75 to 80 per cent. could be made available by the direct combustion of the fuel through explosion of coal dust.

It appears from an official report that the cost of the World's Fair buildings at Chicago has been $16,708,826, or twice the sum expended for the same purpose at Paris in 1889.

CONDITION OF THE

Hardware Trade.

WITH THE ADVANCE in the season a still further increase in the volume of business is noticeable, and trade may in a general way be referred to as in a very satisfactory condition. In some lines, however, there is complaint on the part of the manufacturers that the season's demand has not yet set in in full volume, the severe weather which has until recently prevailed having the effect of keeping back trade somewhat. Seasonable goods are especially active. Wire Cloth, Lawn Mowers, Freezers, Barb Wire, Steel Goods, &c., are moving very freely. The tone of the market does not show any important modification. Prices on the whole are quite well maintained, with slight advances in some lines. There is a good deal of complaint in regard to collections, which are sluggish and unsatisfactory in several parts of the country.

Advices from Chicago.—The volume of business in Shelf Hardware is of a satisfactory character and is now up to about that which is usually expected in April. The improvement which has taken place this month is in marked contrast with the comparative sluggishness of the first quarter of the year, when sales ran below the average for that season. The demand now is unusually heavy for Wire Cloth, Poultry Netting, Wire Screens, Screen Doors, Garden Tools and summer goods generally. Roofing Plates are moving much more freely with the advance of the building season. Bright Tin Plates are also in much demand. No special change in prices has occurred since our last report. Heavy hardware is in very good demand, all houses here reporting an excellent condition of business. The carriage-makers' strike is losing its force and is not felt to any considerable extent.

There is no scarcity of Poultry Netting in this market. One or two manufacturers may have oversold, and those having contracts with them may suffer a little inconvenience in securing stock from other manufacturers, but such ample preparations have been made by the latter to meet such a contingency that assurances are given the trade that a plentiful supply will be available. This statement is made to counteract the impression that there is a shortage and that prices may be materially advanced.

Notes on Prices.

Cut Nails.—There is a large demand for Cut Nails and the volume of business is entirely satisfactory. Prices are also fairly well maintained on the basis of $1.20 for carload lots at mill. A concession of 2½¢ to 5¢ is however made somewhat more freely than a week or two ago. New York quotations are $1.40 for small lots from store.

Advices from Chicago.—An increasing proportion of Cut Steel Nails is now being sold as the gap widens between Cut and Wire Nails, but Wheeling manufacturers are making themselves felt to a greater ex-

tent in this territory and prices are not so firm as they have been. Open quotations on factory lots are still $1.35 Chicago. Jobbers have slightly reduced their prices and now name $1.45 from store for small lots.

Wire Nails.—The market is firm at the same prices which ruled last week—namely, $1.55 f.o.b., mill, with Cleveland as the point of equalization for the West and Pittsburgh for the East. The demand from the large houses is not as heavy as before the late advance, their requirements for the near future having been pretty well covered, but the volume of business at present prices is large and the trade would not be surprised if another advance were determined upon. There is some disposition on the part of jobbing houses to undersell the manufacturers, as many of them are enabled to do this on account of having purchased large stocks at former prices. Small lots from store in New York are quoted at $1.80 to $1.85.

Advices from Chicago.—The demand for Wire Nails is exceedingly good from consumers of Nails, but jobbers are well supplied with stocks and are not doing much in placing new orders with factories. A peculiar feature of the recent trade is the very high average of orders caused by the great demand for fine Nails. Manufacturers' prices have been firmly maintained at $1.55 Cleveland, but it is possible that the meeting of the manufacturers at Cleveland may have slightly advanced this rate. Such action is expected by the trade. Small lots are selling from stock at $1.75.

Barb Wire.—A very heavy business is in progress, and prices are steadily maintained; $2.45 for Four-Point Galvanized in carload lots at mill is firmly adhered to, and in some cases $2.50 is asked. While the tone of the market is excellent there does not appear to be a disposition on the part of manufacturers to ask higher prices, as those now ruling are referred to as remunerative, and it is regarded as good policy not to encourage competition or cutting by unnecessarily high quotations. Small lots delivered in New York are quoted at $2.70 for Galvanized and $2.30 for Plain.

Advices from Chicago.—Manufacturers report that second orders are not coming in so well as they would like to see them, but heavy shipments are still being made on old contracts and prices are firm. The trade of this season is by no means as large as it was a year ago, but makers look forward to a better business later, arguing that it is simply postponed and will make itself felt in due time. Plain Wire is in heavy demand with consumers frequently telegraphing their orders to hurry shipments. Quotations are unchanged on factory lots at $2.20 for Painted and $2.60 for Galvanized. Jobbers report the Barb Wire trade running rather light for the season, and, therefore, a disappointment. They quote small lots at $2.30 and $2.70 respectively.

Shears.—The leading makers of Steel Shears have just perfected an organization to be known as the American Shear Manufacturers' Association. The officers are as follows: F. C. J. Wiss of J. Wiss & Sons, president; J. H. Clauss of the Clauss Shear Company, vice-president, and Henry T. Seymour of the Henry Seymour Cutlery Company, secretary and treasurer. The object of the association is to secure concerted action to prevent the excessive cutting in price which has characterized the market in this line for some time, and to establish more uniform prices which will yield the manufacturers a profit on the goods. A number of the principal manufacturers have already identified themselves with this movement, and it is expected that it will include others so that this line will be in a more satisfactory condition than has recently characterized it.

There has also been formed an association to regulate the price of Cast-Iron Shears, which includes the leading manufacturers of this class of goods. The price on these goods has been in a demoralized state for some time, but the market in this line has now a better tone.

Rope.—As a result of the condition of things referred to in our last report a reduction of ¼ cent per pound has been made in Manila, and the base prices for Cordage are now as follows:

	Per Pound. Cents.
Manila	8¾
Sisal	7¼ to 7½
New Zealand	6¾ to 7

These prices, it will be observed, are exceptionally low and are regarded by many large houses as affording an excellent opportunity for the advantageous placing of orders, as it is not unlikely that a reaction will occur before long.

Galvanized Pump Chain.—In accordance with the understanding reached by the associated manufacturers of Galvanized Pump Chain, the following prices are regularly maintained, terms f.o.b., factory:

	Per 100 pounds.
5 ton lots	$5.50
1-ton lots	5.75
500-pound lots	6.75
Less than 500 pounds	7.00

Bicycle Lock.—This Lock is put on the market by the Smith & Egge Mfg. Company, Bridgeport, Conn. The goods are sold from the following list, which in less than gross lots is subject to a discount of 50 per cent.:

No.	Per gross.
12, Corrugated Brass Shell, Nickeled	$60.00
32, Figured Brass Shell, Nickeled	75.00

The Matador Meat Slicer.—This article is manufactured by the Gwinner Mfg. Company, Hamilton, Ohio. It is sold to the trade at $9 each, subject to a discount of 40 per cent.

Needle-Point Saws.—The following is the price-list of the Needle Point Saws put on the market by the S. A. Haines Company, Indianapolis, Ind. It is subject to a discount of 40 per cent.:

Needle-Point Hand-Saws.

26,	28,	30 Inch,
$36.00	42.00	48.00 per dozen.

	Per dozen.
No. 16 Needle-Point Wood Saw Blades	$8.00
No 516 Wood saw, No. 8 Blade, Frame Red, List	12.50

Needle-Point One-Man Cross Cut Saw.

3	3½	4	4½	5	5½	6 feet.
$2.56	2.76	3.24	3.70	4.16	4.62	5.06

Needle-Point Cross-Cut Saw.

4	4½	5	5½	6	6½	7	7½	8 feet.
$3.20	3.60	4.00	4.40	4.80	5.20	5.60	6.00	6.40

The Columbia Fly Fan. — Matthai, Ingram & Co., Baltimore, Md., who are manufacturing the Columbia Fly Fan, quote the goods to the trade at $20 per dozen, with 10 per cent. discount in lots of less than one dozen, and 20 per cent. discount if ordered in full case lots of one dozen or more.

Family Grist Mills—Are manufactured by the Rogers Iron Company, Springfield, Ohio. The list price on their No. 1 Mill, which weighs 27 pounds, is $5, and that of No. 3 Mill, with Wrought Iron Legs, weight 44 pounds, $7. These prices are subject to a discount of 40 per cent. to the trade.

Glass.—The conferences of the National Window Glass Company in the East, to which we referred last week, have resulted in several important accessions to membership in the association, among which are included New Jersey Glass manufacturers, while New York jobbers of American Glass who are not already members of the National Company, are considering the matter favorably. The New York Importers' Window Glass Association have the matter of working in harmony with the National Company under advisement, though no definite course has been decided upon. The New York and Boston importers have arranged, however, for uniform prices. These consolidations tend to strengthen the Glass market, and to put it in a better condition than for some time past. At a meeting of the National Window Glass Company, held in Chicago April 11 and 12, a change in prices was made to apply only to territory west of the Alleghenies, going into effect April 17, as follows: Carloads of not less than 24,000 pounds, specifications to be sent within two weeks of order, for shipment in one lot to one purchaser, within 30 days thereafter, a discount of 80 and 10 and 2½ per cent. One hundred boxes or over, but less than a carload, in one lot to a single purchaser, discount 80 and 7½ per cent. Less quantities than 100 boxes, discount 80 and 5 per cent. The National Plate Glass Company, whose incorporation was noticed in our Glass review of last week, have not yet announced their plans, but it is reported that possibly all the plants in the country may be purchased by the National Plate Glass Company, which will issue stock in return. We are advised that the restriction put upon the output of the Plate-Glass plants in this country, and the consequent restricted amount that is allowed each dealer, is stimulating the importation of certain grades of Glass, for which importers have never had inquiries. Among these are Plate Glazing Glass and Glass for cheap mirrors. We understand that when an American Plate-Glass plant has produced its allotted amount of Glass it is shut down. Quotations

in all lines are well maintained as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	@	.04
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔ lb	@	.04½
Wringer Wire Rolls, ℔ lb	@	.02
Syringes, ℔ lb	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb 9½¢
Light and Tinned Copper	℔ lb 8½¢
Heavy Brass	℔ lb 7¢
Light Brass	℔ lb 6¢
Lead	℔ lb 3½¢
Tea Lead	℔ lb 3½¢
Zinc	℔ lb 2¾¢
No. 1 Pewter	℔ lb 14¢
No. 2 Pewter	℔ lb 7¢
Wrought Scrap Iron	℔ gross ton, $13.00
Heavy Cast Scrap	℔ gross ton, 9.00
Stove Plate Scrap	℔ gross ton, 6.00
Burnt Iron	℔ gross ton, 4.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags	℔ lb	4 ¢
No. 2 White Rags	℔ lb	3 ¢
Mixed Rags	℔ lb	1½ @ 1¾¢
Blues and 3ds	℔ lb	1¾ @ 2 ¢
Hard Sized White Shavings	℔ lb	2½ @ 3 ¢
No. 1 White Book Shavings	℔ lb	2¼ @ 2⅝¢
No. 2 White Book Shavings	℔ lb	1½ @ 1¾¢
Light Book Shavings	℔ lb	⅞ @ 1 ¢
No. 1 Mixed Shavings	℔ lb	1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @ ⅞¢
No. 1 Printed Books	℔ lb	1⅜ @ 1½¢
Ordinary Mixed Books	℔ lb	¾ @ ⅞¢
Newspapers	℔ lb	½¢
No. 1 Manila Paper	℔ lb	1⅛ @ 1¼¢
No. 2 Manila Paper	℔ lb	⅞ @ 1 ¢
Bogus Paper	℔ lb	⅝ @ ¾¢
Common Paper	℔ lb	¾ @ ⅞¢
Straw Chips	℔ lb	⅛ @ ⅜¢
Binders' Clippings	℔ lb	⅛ @ ⅜¢
Jute Butts	℔ lb	1¼¢
No. 1 Jute Bagging	℔ lb	1¼ @ 1⅜¢
Mixed Bagging	℔ lb	1 ¢
No. 2 Bagging	℔ lb	⅞¢
Hemp Twine	℔ lb	2½¢
Manila Rope	℔ lb	2¾¢
Jute Rope	℔ lb	1⅞ @ 2 ¢
Mixed Rope	℔ lb	¾ @ ⅞¢

Trade Notes.

THE TINNERS' MACHINERY & SUPPLY COMPANY, 9 Cliff street, New York, successors to Hibberd & Spinner, issue a handsomely illustrated catalogue and price-list of an extensive line of goods. In an introductory note to the trade they state that this catalogue is intended to present in compact form their line of machinery. Reference is made to the general excellence of the machines, as well as the quality of the material from which they are made; also the extent of the line covered. Following the introductory note is an alphabetical index. Information to buyers is given on one of the earlier pages and immediately after begin the illustrations with descriptions and prices of the various goods noted, commencing with bar folders, forming rolls, sheet iron folders, Niagara incased machines, Raymond's machines, &c. An extensive variety of tinners' stakes are illustrated and tinners' small tools. Firepots and tongs of all sorts are noted, and shears, circular and squaring. The catalogue is of interest to those engaged in sheet metal work and is attractively published.

THE ADAMS & WESTLAKE COMPANY, Chicago, issue a handsome catalogue descriptive of their manufactures. The pamphlet is bound in flexible dark-colored cloth, while the title is in red ink. The frontispiece is a view of the factory of the Adams & Westlake Company on Ontario, Franklin, Ohio and Market streets, the buildings covering an entire block. The catalogue is known as their No. 15, and is devoted to Lanterns, Lamps, Oil Cans, Sieves, Sifters, Water Coolers, Air Guns and sundry Hardware specialties, including Bath Tubs, Faucets for Oil Cans, Ice Shaves, &c. A special feature of the volume is the fine paper and excellent typography; the engravings are also well executed and printed. An alphabetical index in the fore part of the book enables easy reference to be made to the contents.

CLAD'S 1893 CATALOGUE, issued by V. Clad & Sons, 117 South Eleventh street, Philadelphia, Pa., has just come to hand. The publication of 25 pages is bound in tinted paper and gives illustrations, prices and particulars of a very extensive line of ice cream machinery and supplies. The great number of illustrations in the pamphlet, all given up to appliances for making ice cream, shows in an indirect way the importance of this cool industry and the magnitude of the business it supports.

THE BOSS WASHING MACHINE COMPANY, 212 and 214 West Pearl street, Cincinnati, Ohio, present an illustration and a few particulars of the Eli Washing Machine in an advertisement elsewhere, and invite the trade to write for particulars and terms.

THE FIRM OF HIBBERD & SPINNER, 9 Cliff street, New York, have been succeeded by the Tinners' Machinery & Supply Company, who will continue the same business in Tinners' Tools and Machines.

THE MERITS OF ROYAL MILK CANS are set forth in a card from Haslet, Flanagen & Co., 116 North Second street, Philadelphia, among which are claimed special advantages of strength and durability, making them excellent heavy shipping Milk Cans. Each Can has their patent Royal handle, which is a feature of strength and convenience. The finish is first class, and the price is right, they confidently assert.

HASLET, FLANAGEN & CO., 116 North Second street, Philadelphia, have just brought out the Royal iron enamel which they claim on the announcing card is a glossy jet black, and the best and most brilliant in the market. It is adapted for Grates, Fenders, Mantels, Stove Pipes, Registers, Coal Hods, Sinks and Oil and Gas stoves, or any purpose for which a permanent glossy enamel is desired. They say it will stand any degree of cold without chipping and is not affected by heat as it will last a year on stove pipe and retain its surface, making cheap pipe look like Russia Iron. It can be applied by any one, and is put up convenient for retailing. Appropriate to the season they say it can be reduced with turpentine and makes a superior walnut stain for fly screen frames and such work. As a finishing suggestion they say: Paint your stove pipe before putting it away for the summer and prevent it from rusting out.

THE COLUMBUS SHEET STEEL WORKS, Columbus, Ohio, will reorganize and be under the management of C. C. Moore. The new company will erect a modern plant and manufacture, in addition to their present line of goods, Patent Gutter, Corrugated Iron Sewer Pipe and Galvanized Iron. The new plant will be fitted up with the latest and most improved machinery, especially adapted to their requirements.

EDWARD LITTLE, manager of the estate of S. Whitnum, North Eleventh street and Driggs avenue, Brooklyn, N. Y., reports a busy season, with large orders for Galvanized Sinks and Leader Pipes. He states that he is now making a new variety of Pipe, which is destined to prove very popular with the trade. A new pickling bath has recently been placed in the works, making a total of five in all, with a capacity, it is claimed, for galvanizing the largest articles. The factory and offices are adjacent to all the ferries leading to New York City, and are, therefore, convenient of access. Mr. Little will at all times be pleased to see his business friends and furnish them with estimates when desired.

THE LALANCE & GROSJEAN MFG. CO., 19 Cliff street, New York, issue a notice to the trade under date of April 18, referring to their suit against the Haberman Mfg. Company and J. E. Moseheim, their auctioneer, which was decided last December in favor of the Lalance & Grosjean Mfg. Company. They refer to the circulars sent out by the Haberman Mfg. Company to the effect that an appeal would be taken. This appeal, it is stated, was taken to the United States Circuit Court of Appeals, being argued before Judges Wallace, Lacomb and Shipman, who handed down a unanimous decision on the 18th inst., affirming the previous decision, to the affect that the Haberman Mfg. Company had violated the patented process of the Lalance & Grosjean Mfg. Company, and that the injunction issued against them and J. E. Moseheim must stand. The Lalance & Grosjean Mfg. Company trust that the decision will be heeded by all, and that no coagulated, mottled, wavy or cloudy ware infringing their patent will find a purchaser, as they shall hold dealers responsible for their infringements. They say that those who report infringements will be leniently treated, but that those who fail to do so will be prosecuted and made to pay the full measure of damages.

THE CAPITAL STOCK of the Detroit Sheet Metal & Brass Works, Detroit, Mich. has been increased from $100,000 to $150,000.

THE S. OBERMAYER COMPANY of Cincinnati, Ohio, have been appointed sales agents of the Blakeney cupola.

THE PITTSBURGH STEEL HOLLOW-WARE COMPANY of Allegheny, Pa., were granted a charter last week with capital stock of $50,000. The incorporators are Jno. S. McIntosh, Jas. McNaughner and Daniel McNaughner.

AMONG recently authorized corporations in Illinois are the following: The Hinson Car Coupler & Mfg. Company, Chicago; capital stock, $2,650,000; incorporators, Joseph E. Forsyth, Erskine R. Merrill and James P. Ennis. The Chicago Wind Motor Company, at Chicago; capital stock, $30,000; for the manufacture of Wind Motors, Pumps and Towers; incorporators, Frank A. Hecht, A. B. Peterson and Albert Raymond. The Shilvock Mfg. Company, at Cragin, Cook County; capital stock, $25,000; for the manufacture of iron, brass and copper goods for plumbing and for enameling; incorporators, Francis L. Shilvock, Ernest C. Shilvock and Albert M. Woodward. The Taylorville Mfg. Company, at Taylorville, capital stock, $15,000; to manufacture wind mills, tanks, towers, pumps, &c.; incorporators, H. B. McCaslin, N. Gandy and H. S. Willey. The Sykes Steel Roofing Company, at Chicago; capital stock, $50,000; for the manufacture of roofing;

incorporators, R. G. Sykes, C. O. Hart and H. G. Murphy.

THE GRANT CORUNDUM WHEEL MFG. COMPANY, whose plant at Chester, Mass., was burned recently, will seek a new location for building, probably in the West, where the greater portion of their product is marketed.

THE APOLLO IRON & STEEL COMPANY of Pittsburgh, with works at Apollo, Pa., manufacturers of galvanized iron and terne plates, have recently purchased considerable property in Apollo, which will be used for the extension of their present plant. Just what the nature of these improvements will be has not as yet been determined by the firm. We are advised that the report that a Bessemer plant would be erected on the property is without foundation.

THE PECK, STOW & WILCOX CO., recently received an order for upward of a thousand mills for grinding coffee to be shipped abroad.

THE GEUDER & PAESCHKE MFG. CO. of Milwaukee, Wis., have been obliged by the ever increasing demand for their goods to add very largely to their machinery for the manufacture of Tin and Galvanized Iron ware. They have just put in one of the newly patented wiring machines brought out by G. A. Crosby & Co. of Chicago, having been among the first to make practical use of it. They are now busily engaged in making up a stock of coal hods for the fall trade. In past years they have always been oversold in this line, but expect to be in shape to meet all demands this season. The company are now very extensive manufacturers of Galvanized Ironware. This ware they make from Sheet Steel and galvanize it after it is made up by coating it with molten zinc, which fills up all seams and crevices, and makes the completed article strong, durable and absolutely rust proof.

THE WILLIAM SCHOLLHORN CO., New Haven, Conn., have so far recovered from the effects of the recent fire at their works that since April 13 they have been running full time, and before long they hope to be entirely free from any hindrance occasioned by the fire. It will be remembered the damage was confined principally to the Shear and Plier departments.

HART MFG. COMPANY, Cleveland, Ohio, announce that the contract heretofore existing between them and H. A. Rogers, 19 John street, New York, whereby he acted as the company's agent in New York, has been terminated, and in future orders for Duplex Die Stocks should be sent to the factory in order to secure bottom prices. The company report business as very good, their trade for the past two months having been 25 per cent. greater than for any former similar period.

WE UNDERSTAND from the Clayton & Lambert Mfg. Company, Ypsilanti, Mich., that they are happy to be able to inform their many business friends that even the immense force of a cyclone seems to have recognized as a genial friend the famous blast of their No. 1 Fire Pot, for though it demolished buildings on all sides of their factory, it left that building comparatively unharmed. The firm are, therefore, able to fill all orders promptly.

THE STUART & PETERSON COMPANY, Burlington, N. J., in a circular issued under date of April 17, state that on March 9 the engine at their works in Philadelphia was stopped preparatory to removing to their new plant at Burlington, N. J. An idea of the magnitude of the undertaking will be understood from the statement that they forwarded by boat and rail 48 full carloads. They announce that after one month and eight days shut down they are again running with improved machinery and better facilities.

FLASHINGS.

GARA, MCGINLEY & CO., 13 South Seventeenth street, Philadelphia, Pa., have just been awarded a contract for the sheet copper and glass work on the skylights, gable ends and lobby lights of the Pennsylvania train shed at Broad street station, Philadelphia, which is said to be the largest unsupported single-roof span in the world. The firm are also doing the lateral skylight work, glass gables, tin roofing, galvanized, corrugated iron work, galvanized iron cornices, &c., on the Terminal Railroad Association Building, St. Louis, Mo., which covers a plot of more than four squares in area, or 600 x 700 feet.

THE BRITISH CONSUL GENERAL in Colombia, in a recent report to his Government, says that Great Britain takes the lead in supplying metal roofing material to that republic, sending there 226.6 tons to every 24.1 tons supplied by France and 6.7 tons by the United States.

A STEADY and satisfactory growth of business is reported by L. D. Berger of 224 Arch street, Philadelphia. This has resulted from a thorough understanding of the requirements of the trade in tinners' trimmings and supplies and industriously striving to meet them. Continual additions have been made to his stock of goods, which is now very complete.

THE FIRM OF FALL & YATES, doing a general stove and hardware business at Morris, N. Y., was dissolved by mutual agreement on March 21 of the present year, James A. Fall retiring from the concern. The business will be conducted in the future by A. E. Yates at the old stand.

WE ARE IN RECEIPT of advertising cards from Eberts Brothers Company, Limited, Detroit, Mich., directing attention to iron and steel roofing of their manufacture; also to a full line of roofers' sundries. The second card refers to gravel roofing, the advantages of which are noted.

GARA, MCGINLEY & CO., 13 South Seventeenth street, Philadelphia, Pa., distributes some interesting matter in the shape of circulars directing attention to their extensive line of sheet metal manufactures. One large sheet carries illustrations showing how old and dilapidated buildings, by applying sheet-metal work, can be given an entirely new and attractive appearance at comparatively small cost. On the back of the sheet are illustrations of cornice and window caps of various styles. Another sheet shows a handsome residence, illustrating the possibilities of sheet-metal work. All the ornamentations on the building illustrated are of sheet metal, with roofs of metal, tile or slate. Sheet-metal bay windows, oriole, chimney casings and ventilators, skylight and conservatory work, crestings, wall copings and tops, finials and vanes, door and window heads, cornices, frieze, hip and ridge moldings, panels, balustrades, posts, rails, &c., of balcony and conductors.

THE AMERICAN ROOFING COMPANY, St. Louis and Cincinnati, report an active trade in both plants. Their St. Louis plant is being improved by the introduction of new machinery, among which is a new automatic brake, new double crimper, and a new 10 foot power shear. This new machinery will enable them to increase their output, which is very necessary, as they are at present pushed to fill their orders, and the spring trade promises to be very large.

E. M. SHOUPE, Aurora, Ohio, has sold out his stock of tin and hardware and removed to Dayton, Ohio, where, with C. A. McFarland, he has organized the Dayton Roofing Company, for felt and iron roofing.

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THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, April 29, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....220 South Fourth Street
BOSTON.....146 Franklin Street
PITTSBURGH.....Room 509 Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....312 The Cuyahoga

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Requisites of Modern Steam Heating.

Notwithstanding the rapid growth in popularity of hot-water heating, steam heating will continue to be extensively used, particularly in the larger class of buildings, and in all buildings where steam is extensively employed for power purposes. The modern steam heating contractor will necessarily be obliged to make intimate acquaintance with the steam specialties necessary to effective work in particular cases. The business of manufacturing appliances of this kind has grown to be a large industry, and a variety of nearly every specialty is presented to the choice of the steam fitter. Intelligent men do not shut their eyes and draw from this variety, as in a lottery, any appliance that chance may dictate; but they acquaint themselves with the merits and demerits of each. The particular mechanism of different appliances claiming public favor and the principles of their construction constitute an interesting and profitable field of study, and in mastering them one can scarcely fail to become expert in nearly the entire theory of steam generation and its utilization either for power or heating. The primary sources of information upon the subject of steam heating specialties are the printed descriptions of them in manufacturers' catalogues and trade circulars, or such descriptions of them as appear in the columns of trade papers. Of these, those published in the better class of trade papers are, as a rule, the most satisfactory. In too many catalogues the descriptions are not always clear enough to be easily understood even by those already well versed in principles and in the practical use of steam. Still less are they clearly comprehensible to a large class of steam fitters whose opportunities for gaining theoretical and practical knowledge have been limited by circumstances, yet who are obliged to resort to the use of such appliances in special cases.

Examples of Such Failures.

Without naming any catalogue or trade circular, examples of failure to clearly set forth the principles of construction may be adduced. A case in mind is that of an engineer in charge of a steam heating plant in an office building who was unable to comprehend a circular describing an automatic air valve, and had to seek elsewhere for an explanation of how it worked. The circular was little help in any respect except in its pictorial illustration, which was good enough, and from which one thoroughly acquainted with the general principles upon which devices of this class work could, after a little consideration, determine the operation. To the engineer, however, the circular was merely waste paper and yet he was by no means so ignorant that a description, prepared as it ought to have been, would have failed to make him understand the valve and its operation easily and completely. In another instance a steam fitter in a New Jersey town, whose experience was limited to some half a dozen small jobs in which he had been fairly successful, found it necessary to use a steam trap for returning water to a boiler. In his desk he found a catalogue of steam appliances, in which the subject of simple steam traps for draining pipes, radiators, &c., and traps for returning steam to boilers was so mixed up and muddled, without any clear explanation of either of these to him novel appliances, that he actually made the mistake of ordering a draining trap instead of a return trap. That this man was not below the average in common sense is shown by the fact that he has succeeded as a steam fitter, and is now doing good work, and lots of it. It was the catalogue that was on this occasion deficient.

Out of Working Hours.

How many employers know or care where and how their apprentices or shop hands spend their leisure hours after the day's work is done? Usually the men and boys after leaving the shop are as completely lost to sight and knowledge until the following morning as if the earth had swallowed them up. Yet this matter, looked at in a common sense light, has a very important bearing on the efficiency and trustworthiness of employees, and it is one that is well worth consideration by all those who have youths working for them. Why not take a kindly interest in the tastes and pursuits of the boys out of working hours? They are not machines set a-going to grind out so much work per day, and then stopped to rest and do nothing at all until the next day's labor shall begin. Very often they have worthy tastes which may be easily encouraged by an exhibition of interest, while indifference may crush them. There may be points of contact where social intercourse with their employer will work to the benefit of both. Many young men desire to improve themselves in their trade after hours, and encouragement and assistance from the boss as to lines of study, &c., will stimulate them to perseverance in this line. Opportunities of lending a helping hand in many ways to the boys out of hours may be easily found without any semblance of interference with their liberty. Tact and a good heart will soon establish a feeling of confidence toward the employer who exercises them. Boys who may be living away from any home associations may often, by a little interest in their studies or amusements, have a bias given them which will be of incalculable good in the development of their characters. The establishment of confidence between employer and employed which would result from intercourse out of hours would tend to renewed interest in his duties and a more accurate and conscientious performance of them on the part of the boy. The employer would also discover whom he could trust to carry out work intelligently and faithfully without the necessity of constant supervision.

Salesmen and Prices.

A little "nerve" is often of great value to a salesman and consequently to the house which he represents. In some staple goods on which prices have long been soft salesmen have recently scored material advances by asking better rates and sticking to them with the determination to get some profit for their employers on the business turned in. It is too frequently the case that salesmen hasten demoralization by advising their principals that others are cutting prices when the trouble is either imaginary or confined to a few small concerns who would soon have such business as they need and then withdraw from competition. A salesman's function is, of course, to sell. If he cannot make sales he may soon find himself unattached. He is, therefore, measurably excusable for forcing the market at times so that he can get business. But that man is a prince among salesmen who is keen to perceive when he can obtain better prices.

The Cyclone Season.

The return of spring has brought with it unpleasant conditions not usually associated with the season that budding poets love. The daily papers for the past week have teemed with accounts of the ravages committed by violent wind storms. Cyclonic disturbances have prevailed over a very large portion of the country. The North has suffered as severely as the South, and residents of highlands have fared no better than the dwellers of the plains. Whole communities have been suddenly overwhelmed with destruction by the fury of the winds, and many lives have been lost. The damage to property has been very heavy, although there is no means of forming even an approximate estimate of the aggregate losses sustained throughout the country during the recent stormy period. A winter of great severity and long duration, bearing with much hardship on many business interests, has thus been followed by something even worse.

Meteorological experts explain the phenomena of the destructive winds in easy fashion, but allege that their prevalence over such a broad expanse of country almost simultaneously is a new feature of such disturbances. Cyclones and tornadoes are no longer to be classed as belonging to the tropics, but are now recognized as part of the natural phenomena of the temperate zone. Tornado insurance has been carried to a limited extent in localities in which there has been one of these visitations, but it will be very singular if such insurance does not assume large proportions after the occurrences of this spring. The statement has too frequently been made in print, after a thrilling account of the destruction wrought by a cyclone, that none of the sufferers carried any tornado insurance. The lesson has been taught and the practical application will be made.

The Columbian Naval Celebration.

Forty war vessels, representing the naval forces of ten powers, assembled in the harbor of New York this week to celebrate the four hundredth anniversary of the discovery of this continent. The past three days in New York have been devoted to a series of ceremonials and festivities almost unparalleled in history. The naval powers of the world have sent some of the finest types of their modern men-of-war to do honor to the memory of the great discoverer; and the proceedings of Wednesday, Thursday and Friday have fitly ushered in the great international fair, the doors of which will be thrown open on Tuesday next. New York has done herself honor and the nation credit by the graceful hospitality she has extended to the nation's guests. Banquets, balls and festivities have supplemented the more formal ceremonies of the week and have filled up the days and nights with pleasure. Unfortunately, the unpropitious weather of Thursday marred to some extent the great pageant on the Hudson River, but rain and mist were unable to dampen the spirit of international good will and general happiness which prevails or to spoil the grandeur of the spectacle. The great ships of all nations lying together at unity in two long lines for review by the president of the United States, was a sight which can never be forgotten by those privileged to view it. Friday's skies were bright and all conspired to make the land parade of that day a complete success. Such events make history, and the Columbian naval celebration of 1893 will be one of the red letter events of the century. The array of war ships of every type was striking as demonstrating the wonderful evolution which has taken place in maritime architecture. The contrast between these floating giants and the little Spanish caravels, faithful reproductions of the primitive craft in which Columbus and his associates crossed the unknown ocean, was an education to the observant mind. Such international celebrations as those of this week are happily a feature of the present age which is becoming more marked, and which can but tend to mutual benefit and good will the world over, even when the objects which come together for mutual comparison are engines of destruction. The splendid contingent of United States cruisers which took part in the ceremonies gave gratifying proof of the advance of this country in the line of naval defense.

Preserving the Forests.

A generation of men has risen which clamors for the preservation of our forests, lest the land be wantonly despoiled of its chief adornments, its mountains denuded, its streams dried up, its reservoirs exhausted, and a powerful agency for equalizing the temperature throughout the year cease in a measure to exert its benign influence. Moreover, many of the most charming mountain retreats, like those of New Hampshire or the Adirondack region in New York, are liable to be perpetually marred, if not obliterated, unless an authoritative arm is extended to arrest the process of spoliation witnessed from year to year. It is therefore gratifying to observe that many State Legislatures, acting as by common impulse, are moving simultaneously to effect the same end.

The prairie States were among the first to advocate arboriculture. Their province was not so much to preserve as to restore and rehabilitate. Prairie fires, perhaps more than any other agency, had reduced a vast expanse of territory to a desolation, possible of reclamation only as the result of artificial irrigation and a systematic restoration of forest trees. Thence arose a conviction of the necessity for the appointment of forestry commissions, arbor days, &c., until at last the familiar line, "Woodman spare that tree" becomes a positive prohibition rather than a plaintive plea. At the present time formidable syndicates of capitalists are getting possession of all the most valuable timber lands in the country, from Maine and Michigan to the everglades of Florida, and making incursions into the most secluded regions of Canada, in order to feed the capacious maw of the lumber mills being erected at every shipping point accessible either by railroads or navigable waters.

The general Government interposed seasonably to save the magnificent redwood trees (*sequoia gigantea*) of the Yosemite region and Yellowstone Park in Wyoming, but it remained for the several States, each within its own jurisdiction, to supplement the work initiated in the national domain. New Hampshire has taken action in behalf of the White Mountains to hold in check the vandal hands of scheming speculators bent only on private emolument. The State of New Hampshire has asserted its powers of eminent domain in the protection of those who may wish to purchase portions of the existing forest lands at fair prices. The new law in that State, like the present law in Massachusetts, authorizes the State to take and protect the gifts of land which are made by its own citizens or by the people of other States, and to build roads or paths over these domains, but forbids that they should ever again be used for private purposes. Thus the threatened destruction is arrested. In like manner the Legislature of New York, in passing the Adirondack Park bill, establishes a reservation which insures its protection by placing the entire region in control of a Forest Commission invested with adequate authority. This is a happy consummation of the efforts to save the Adirondacks which have been made in a desultory way for several years. The tract covers at present about 500,000 acres of forest land lying in six contiguous counties, including the islands in Lake George, and provision is made for its future enlargement. Maine is also waking up to preserve the forests in the Androscoggin region, and a bill is now before the Pennsylvania Legislature to stop the denudation of the forest area within that State.

This apparent though independent concert of action is a hopeful augury. And another ground of assurance in regard to forest preservation is found in the declaration of an expert of the Geological Survey, who maintains that the area of forest in the United States is as large as when the country was first discovered, so rapidly do old farms return to woodland where the rural element in population gives way to the advance of manufacturers and commerce.

A Negro Manual Training School.

In a 60-page edition, largely given up to advertisements of patent medicines, the *Daily Inter-Ocean* of Chicago celebrates its twenty-first birthday. There are various interesting articles in the colossal edition, one being on a manual training school for negroes at Tuskegee, Ala. This establishment, the Tuskegee Normal and Industrial Institute, was founded but a short while ago by one of the negro graduates of General Armstrong's colored schools at Hampton, Va., and has grown and systematized rapidly, consisting now of a large brick building, where the various workshops are housed, a saw mill and farm buildings with numerous cottages, all devoted to the industrial training of the negroes of the district. It is managed and taught by negroes, and no white man sets his foot in the institution except as a visitor. The establishment is said to be extremely well conducted, and the manual training given to its scholars thorough and efficient. Besides farming and cognate industries, carpentry, tinsmithing, harness making and shoe making are taught, and it is said that the buggies and carts, harness, shoes and tinware turned out from the school have a more than local reputation, and are eagerly bought up by the surrounding business people and planters on account of the honesty and excellence of their workmanship. As time goes on it is proposed to greatly extend the sphere of operations, and plans are contemplated for the establishment of industrial training here on a very extensive scale.

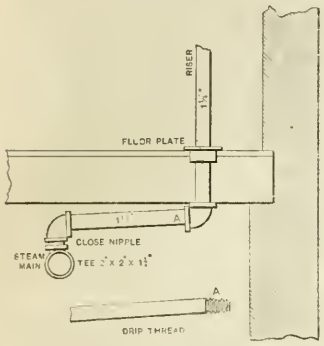
Dr. C. G. Hussey, a pioneer in the Copper and Steel industries, died at his home at East End, Pittsburgh on Tuesday morning, the 25th inst. For many years Dr. Hussey was connected with the firm of Hussey, Wells & Co., and Hussey, Howe & Co., large steel manufacturers of Pittsburgh and now known as Howe, Brown & Co., Limited. He was also the senior member of the firm of C. G. Hussey & Co., manufacturers of Copper, which firm has been established in Pittsburgh for many years. He was in the ninetieth year of his age and sustained an injury last week which has resulted in his death.

STEAM AND HOT WATER.

One-Pipe Connections.

BY HELIOS.

In Fig. 1 is shown a one-pipe connection from the main steam supply pipe from the boiler to the riser that supplies steam to a radiator on the upper floors of a building. This connection is taken from the top of



One-Pipe Connections.—Fig. 1.—One-Pipe Connection from Steam Main to Riser.

the main steam supply pipe so that dry steam will flow to the radiators. The tee in the main supply pipe is turned back a little from a vertical position, so that the branch pipe will pitch up from the main steam supply pipe and all condensation from the radiation will drip back into the main

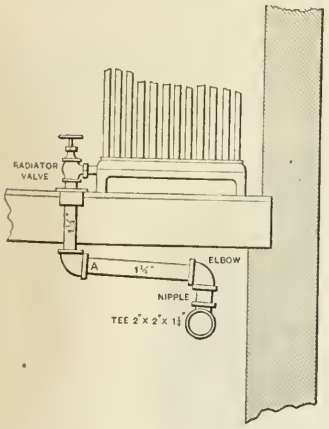


Fig. 2.—One-Pipe Connection from Steam Main to Radiator.

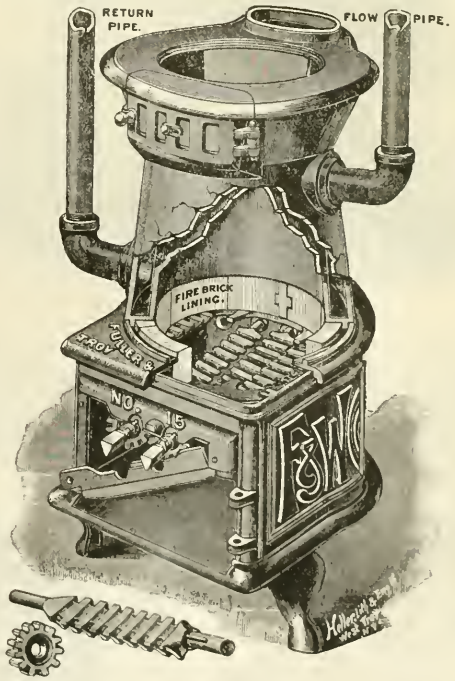
steam supply pipe. A nipple is screwed into the tee, and on the nipple an elbow, then the branch pipe that connects the main steam supply pipe to the riser is screwed into the elbow. The end of the branch pipe that is to connect to the elbow that is on the bottom of the riser, will need to have a drip thread cut on the end in such a way that the elbow will stand plumb to receive the end of the riser. To cut a drip thread on this pipe, as shown in Fig. 1, place it in a vise, take your stock and dies, placing a collar in the stock one size larger than the pipe you are to thread, take a pine stick and cut it wedge shape and drive in between the collar and the pipe to be threaded; hold the wedge in one place on the pipe, turn the stock and cut the thread. After this is cut screw on the elbow and set it by turning it around by hand until it has the right pitch, then mark it and screw up tight. With a little practice you will soon learn to cut a drip thread that will give any pitch to the pipe that you may require. This one-pipe connection must not be used where the distance from the main steam supply pipe to the riser is over 6 feet. The pitch from the main steam supply to the riser must not be less than 1 inch in a foot. This connection is used where all the condensation is dripped back into the main steam supply pipe and a return pipe is taken out at the end of the main steam pipe and carried back to the boiler.

Fig. 2 shows a one-pipe connection to a radiator on the first floor. This connection is made the same as explained in riser connection, Fig. 1, and the same rule will apply for the distance from main steam supply pipe to radiator connection. If the radiator has over 50 feet of heating surface make the branch pipe one size larger than the valve on the radiator, placing a reducing elbow on the end of branch pipe that joins to radiator connection. The above connections should always be used to connect radiators and risers, as it allows the condensation to drop back freely into the main steam main and insures a perfect working apparatus, free from noise of any kind.

All connections to radiators or risers for one or two pipe work should be taken from the top of the main steam supply, as it allows for the expansion of the piping. Never take a connection from the side of the main steam supply pipe, for as no allowance can be made for expansion of the pipe it will be liable to break the fitting in the main pipe.

The Fuller & Warren Company's Hot-Water Heater.

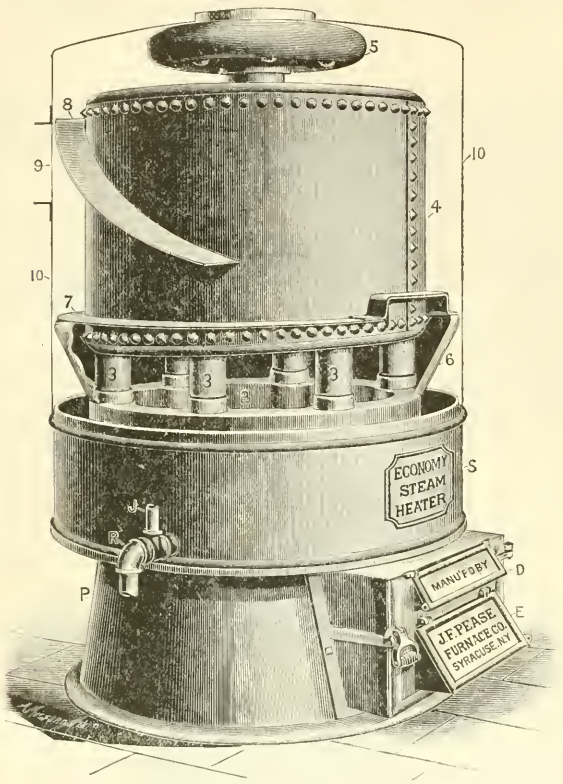
The accompanying illustration shows a broken view of the No. 12 and 15 hot-water heaters, which are being put on the



The Fuller & Warren Company's Hot-Water Heater.

market by the Fuller & Warren Company of Troy, N. Y., and which were designed to meet the demand for a small, low price heater of simple and durable construction. The special features to which attention is directed are that the water section is cast in one piece and that it is absolutely without joint or packing. The flue construction in the top of the boiler is so arranged that the products of combustion impinge directly upon all points of the boiler proper before passing to the exit pipe. This is accomplished by having the inside surface of conical shape and curved at the top to receive the direct action of the fire. The heater is furnished with triangular

grate for which claims of superiority are made. As shown in the cut there is a lining of fire brick at the bottom 4 inches thick, which, it is pointed out, prevents the fire from becoming chilled at its outer edge. The bricks are held in place by a clamp, which is shown at the back of the fire pot. This clamp has a lug extending through the back of the boiler and is fastened in place by a spring cotter. By removing the cotter the lug may be pushed in and the clamp taken out, permitting easy removal of the fire brick. By unbolting the strips supporting the grate shanks and sliding off the wheels the grate bars will fall out into the ash pit. The heater is provided with a large feed door, large and heavy top with large boiler hole, large fire pot and large and deep ash pit, and the makers point out that there are no flues to be cleaned. The No. 12 will, it is stated, heat 50 gallons of water per hour and the No. 15, 100 gallons per hour, from 50° to 212° F. The hight of No. 12 is 37¼ inches, diameter of fire pot 12 inches and the hight of the No. 15, 41 inches, and the diameter of fire pot 15 inches.



The Economy All-Steam Heater.—Fig. 1.—View of Heater with Casing Removed.

Economy All-Steam Heater.

The J. F. Pease Furnace Company, Syracuse, N. Y., have just brought out the Economy all-steam heater, which is illustrated in the accompanying cuts. The apparatus is modeled after the Economy low-down combination steam and air heater, the boiler being of the steel tubular type, as shown in Fig. 2. The manufacturers refer especially to the efficiency and general excellence of this form of boiler. The top and bottom flue sheets are of ¼-inch steel and the shell is a $\frac{7}{16}$-inch steel sheet, the flues in the smaller size being 1¾-inch and in the larger 2-inch standard gauge boiler tube. A feature to which attention is directed is that the bottom of the boiler pitches from the front to the rear, to facilitate pressure cleaning, the sediment which settles at the bottom being easily forced out by the steam pressure through the two rear nipple connections. In this way the bottom of the boiler, which is the most effective heating surface, can be kept clean. The boiler is tested before shipment to 80 pounds steam and hydraulic pressure. Fig. 1 shows the heater with the casing removed. The manufacturers refer especially to the large size of the ash pit, upon which the hollow pot rests, so as to give ample draft around the inside of the pot. The boiler is connected to the pot by six extra heavy connections screwed into the top of the pot, the joints being made tight by divided counter-sunk couplings, asbestos packed. A large steam outlet is screwed into a depressed boss, which is riveted to the under side of the top sheet of the boiler. This outlet opens into a steam chest shown at the top, and rises 1½ inches above the bottom of the chest, forming a circular dam, keeping the bottom of the chest covered with water, and preventing, it is said, the possibility of its being cracked by heat. Loss of heat from the pot is prevented by the outside casing S, Fig. 1, the upper casing being of galvanized iron and the top a piece of heavy cast iron. The products of combustion pass up the flues of the boiler, being prevented from passing up the sides by the cut-off skirts 6 and 7. They are then drawn down the outside of the boiler and deflected toward the front by the shield 8, one on each side. They are then passed between the deflectors and skirt up to the smoke outlet at 9. Attention is directed to the location of the return at R, which keeps the hollow pot full of water and insures the water being heated to a high temperature before it enters the boiler. The Economy all-steam heater is made in four sizes, with diameter of grate from 17½ inches to 27 inches; boiler surface, 80 to 190 square feet, and adapted to heat from 375 to 1150 square feet of radiating surface.

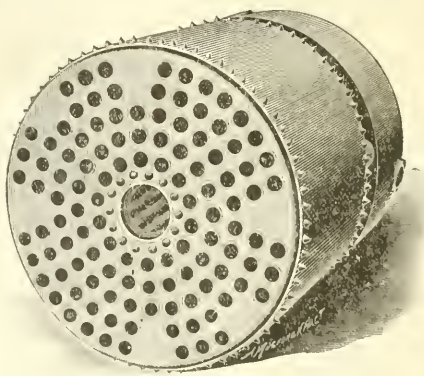


Fig. 2.—View of Steel Boiler.

HEATING NOTES.

Among residences in Chicago and vicinity that have been provided with the Capitol hot-water heater by John W. Mills, Ogden Building, Clark and Lake streets, Chicago, are those of Geo. Rounsavell, Wellington street; Julius Marks, Rogers Park; L. C. Platt, Lake Forest; John W. Low, Evanston, and Chas. Porter, Michigan City, Ind. Mr. Mills also has the contracts for steam heating in the following buildings: Addition to Needham apartment building; Chas. Thisslew's 15-flat building, Warren and Sacramento avenues; Whyland block, West Madison street.

Broomell, Schmidt & Co., Limited, of York, Pa., manufacturers of radiators, hot-water heaters, and Heatencook ranges, are compelled by increase of business to secure more room by the building of a new factory. Plans have accordingly been prepared and building operations commenced. The building will be of brick, 50 x 150 feet, two stories, and will embody some improved ideas and principles in relation to factory building. The main floor will be 3 feet above the street level,

and under the first 50 feet will be a basement 14 feet in the clear. In the basement will bu placed a new 80 horse-power boiler and a 50 horse-power automatic engine. Wash rooms and sanitary accommodations of improved type, for the employees, will also be located in the basement. The smoke flue from the boiler will be made of heavy iron, around which will be built a large ventilating stack with vent flues running from the different apartments. The office is to be located on the first floor front and is accorded a space 50 x 16 feet. Immediately in the rear of the office will be the stock and tool room. The pattern shop, drafting room and an extra stock room will be situated on the second floor, over the offices, and the balance of both floors will be used for the machine shop. The firm will also enlarge their foundry and make other improvements and additions to their plant.

THERE APPEARS to be a well-defined movement among the leading makers of high-grade heating apparatus in warm air, steam and hot water to discontinue contracting. Manufacturers are finding that the demands of their wholesale trade are making it inadvisable to attempt to continue in the retail business. The Excelsior Steel Furnace Company of Chicago adopted this policy some three years since and found it a great improvement over the old method of contracting. The consolidated boiler companies are doing the same thing. Some notable changes in this regard have but recently taken place. The change is one which cannot but be eminently satisfactory to the exclusively contracting firms and retail dealers.

AMONG THE RECENT CONTRACTS of the John Davis Company, heating contractors and jobbers of material, 69-79 Michigan street, Chicago, are the steam heating and power plant for Congress Hotel, which is also to supply the Auditorium Hotel; steam heating and power plants for L. Z. Leiter's new building, Ludington estate building, Phenix building and Presbyterian Hospital; power plant for the South Side Rapid Transit Company, and pipe work for the electrical fountain at the World's Fair.

A GENEROUS TRADE in the steam and hot water boilers made by M. Mahony of Troy, N. Y., is reported from the New York agent, Geo. Franklin, at 142 Centre street. The past severe winter has not found the capacity of the boilers in use inadequate.

"ALBERT A. CRYER & CO., Steam and Hot-Water Heating and Ventilating Apparatus," in large gilt letters, adorns the window of a fine office and showroom at 96 Centre street, New York. Albert A. Cryer having formerly represented the Richardson & Boynton Company in New England, is familiar with the work of installing heating plants and consulting engineering.

HYDRAULIC PIPE WORK for use with elevators is only one of the features of the business of Geo. Franklin, 142 Centre street, New York. His plant comprises a blacksmith shop for all kinds of forgings, and is provided with a steam hammer, cutting shears, drill presses for iron work, and pipe machines for cutting pipe up to 8-inch diameter, according to sketches furnished. Being agent for the hot-water and steam boilers made by Mr. Mahony of Troy, N. Y., he employs a number of expert fitters in the erection of heating plants.

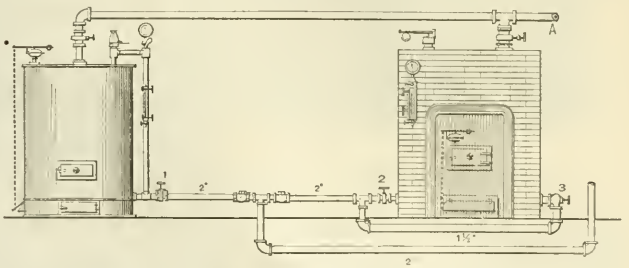
THE D. F. MORGAN BOILER COMPANY will be found in new and more convenient quarters at 85 Centre street, New York, after May 1. One of the contracts which they have filled was the installation of steam boilers in a building operation of 28 handsom residences at East Orange, N. J. Direct radiation of the latest design, elegantly finished, was used, ample to secure proper heat in all weather.

ONE OF THE FEATURES of the new headquarters of the American Boiler Company at 94 Centre street, New York, is a handsome table in the middle of the sample room on which are kept files of the trade papers that directly interest the heating fraternity. Specially prepared samples are coming which will make their showroom worthy of a visit to get new ideas in displaying goods.

THE ELWOOD IRON WORKS, Elwood, Ind., are putting up an extensive plant for the manufacture of the Holland steam and hot water radiators. They will employ 200 molders. They have made contracts with a Chicago concern, who will take their entire output. The Elwood Iron Works are incorporated, and have a capital of $100,000. The officers are John Holloran, president, and J. E. Jeffries, secretary. They will have their works in operation May 15.

Brick-Set and Portable Boiler Combination.

From J. P., *Brooklyn, N. Y.*—In reply to "Interstate," Philadelphia, whose letter appears in *The Metal Worker* of April 1, I inclose a sketch which shows my idea of the proper method of connecting the two boilers. Should the water return to the large boiler more freely than to the small one, I would check it by adjusting the valve No. 3. I have no doubt that it could be adjusted so as to equalize and give the proper quantity of water in both boilers.



Brick-Set and Portable Boiler Combination.

The report has been published of a special sanitary commission which was sent to Chicago by the well known English medical journal, the *Lancet*, to inquire, in the interests of English visitors to the World's Fair, into the condition of the water supply of the city. Numerous samples taken by the commission have been subjected to analysis by experts who report that the water of Lake Michigan compares, on the whole, favorably with the London supplies. The lake is, however, the recipient of a large proportion of Chicago's sewage, and it is reported that suspended matter is present in the water to an extent to make it unfit for drinking until filtered.

The British Ambassador at Constantinople advises manufacturers of goods for export to Mohammedan countries not to use trade-marks which may be liable to wound Moslem susceptibility. The custom house at Magador in Morocco has lately received an order from the Sultan not to admit certain cotton goods, cloths, boxes of matches, &c, bearing in Arabic characters the names of Mohammed, Hassan and Ali, these names being considered sacred.

Carborundum.

A new abrasive material has lately been patented by Edward G. Acheson of Monongahela, Pa., which appears likely to become of considerable importance. The material, which has been named Carborundum, is, as nearly as can be determined, a compound consisting solely of carbon and silicon, one atom of each element to a molecule, so that the chemical symbol of Carborundum is SiC. Physically it is a crystalline substance, very brilliant and usually of a dark color, although the color varies with the materials used in its preparation. The process of manufacture is simple and the materials inexpensive. As described in *Engineering News*, the process in general consists of subjecting a mixture of coke with silica, or silicate of alumina and a flux of common salt, to the action of the heat of an electric furnace. This is accomplished by forming an electric arc in the midst of the mass of material. When the chemical action is completed the products are removed from the furnace and the carborundum is freed from impurities by breaking it into small pieces and washing and drying it. The different-sized crystals are then graded.

The Carborundum Company, who have taken up the manufacture of the material, will, it is stated, shortly be able to produce about 500 pounds a day, when its present cost, the only obstacle which stands in the way of its general adoption for grinding purposes in place of emery, will, it is said, be reduced. One evidence of the extreme hardness of carborundum is that it has been successfully used for cutting diamonds, being the only substance other than the diamond itself which has ever been able to accomplish this work. The application of the material for cutting and polishing glass, porcelain, steel, cast iron and other hard substances is said to be steadily increasing.

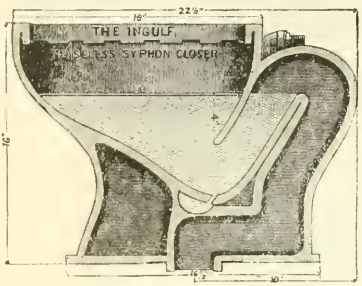
Speculation in our principal agricultural products is supposed to be mainly responsible for the derangement of foreign trade which makes possible the present large outflow of gold, threatening the stability of our currency system. Under a money pressure the prices of cotton, grain and pork products have declined, but speculation held up these prices artificially until the opportunity to sell on favorable terms was lost, foreign markets having been supplied meanwhile from other sources. At the same time foreign competition has been encouraged by the stimulus given to agricultural production in remote quarters of the globe. With their accumulated gold foreigners may now be able to control the prices of American products at the expense of the producers.

The red iron tower that has been a conspicuous landmark at Sheepshead Bay was tilted over by jack screws and will be sold as scrap iron.

PLUMBING AND GAS FITTING.

The Ingulf Noiseless Syphon Closet.

Louis Waefelaer, 54 Beekman street, New York, is now offering the Ingulf noiseless syphon closet, as here shown. In designing this article it has been sought to avoid the gurgling noise so common in syphon closets when in operation, and the manufacturer states that the Ingulf has overcome this objection. The suction of the large quantity of water in the bowl washing through the syphon is said to be so powerful that by a slight pull of the



The Ingulf Noiseless Syphon Closet.

chain it carries suddenly any quantity of toilet paper and water from the bowl through the trap.

Plumbing in New York State.

From J. E. T., *Rondout, N. Y.*—For the benefit of myself and other apprentices in the plumbing trade, please inform me what is the State law in regard to plumbing. I mean the actual law, not the law or rules laid down by the different boards of health or boards of master plumbers. I would like to have the matter explained very briefly, as I have seen several statements in print which seemed to differ regarding the work to be done. I wish to know what the law requires, and how the plumber can tell what he must do and what he must not do. I cannot find any journeyman who can explain the matter, and I think even some of the bosses cannot give the information. Another point is: Does the law govern all villages or only places over a certain population?

Answer.—We think our correspondent has probably become confused between the State law covering the registration of plumbers and the local regulations adopted by the different cities. The State law passed last year does not regulate the plumbing—that is, it gives no rules which must be followed in doing plumbing work. What it does provide for is the examination and registration of plumbers, and it leaves to the boards appointed for the purpose the work of drawing up rules to be followed in doing plumbing work. Therefore, the regulations describing how work shall be done in any locality depend upon the regulations adopted in that place and will vary in different cities. As the law reads it applies to the cities of the State excepting New York, Brooklyn and Albany. Villages and towns are not mentioned.

The New York Trade School Plumbing Exhibit for World's Fair.

Among the exhibits at the World's Fair from New York State the New York Trade School will have a rather limited space in which to present specimens of the young men's work after one season's course of instruction and practice. A plan of the exhibit is shown in Fig. 2. The samples of plumbing work sent on to Chicago consist of a horizontal double boiler, Fig. 1, and two basins, Fig. 3, with all of the fittings complete; also two cases of miscellaneous plumbing work executed by the young men of the class of 1891-92. One of the cases is shown in Fig. 4. Of the exhibits the horizontal boiler alone calls for any special comment, as, although it is to be classed as a "double boiler," it is in the sense that it is as though composed of two boilers set horizontally, end to end—not one within the other. The piping is all of galvanized iron. The water is to be heated in the usual way, in a water back, from which it returns to the boiler, but not in the usual direct manner. It is returned first to what is called a "receiver," whence it is distributed into both sections of the boiler by independent pipes. As an exhibit of hot and cold water supply, under a novel arrangement of pipes, it will be interesting to those who can readily grasp its features, whether as seen in the illustration we present herewith or when placed in position at the World's Fair.

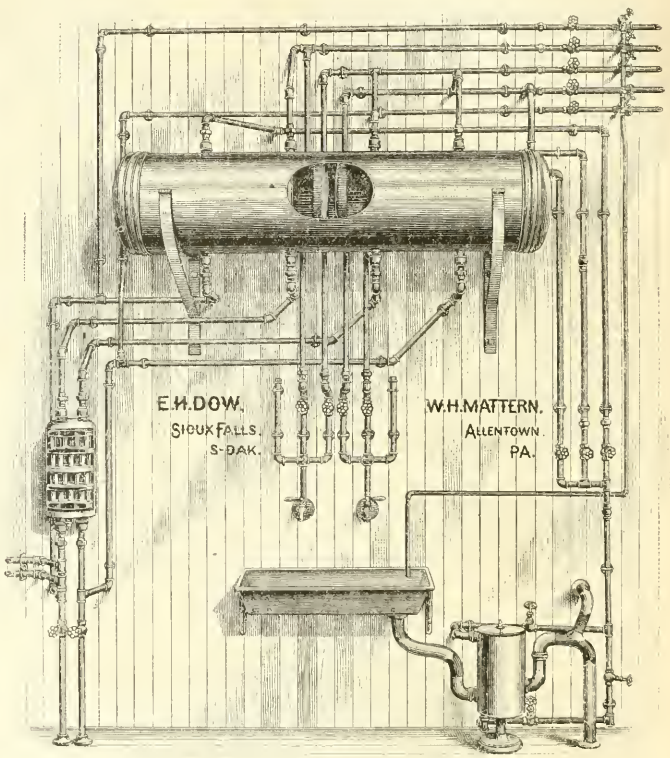


Fig. 1.—Horizontal Double Boiler.

NEW YORK TRADE SCHOOL EXHIBIT AT THE WORLD'S FAIR.

The specimens of plumbing work show the useful character of the instruction given at the school, as it enables young men to overcome obstacles which are likely to present themselves in country places where sources of supply are not always equal to the demand. It may be well to state that, in selecting the specimens of work for exhibit from that of the class of 1891-92, the school trustees had no option in the matter, as the exhibits had to be shipped to Chicago before the

finishing touches were given to the work of the plumbing class of the season just closed.

New Plumbing Regulations for Washington, D. C.

The new plumbing regulations for the city of Washington, D. C., which became operative on March 15 of the present year, are comprehensive enough to satisfy the most exacting sanitarian, and it is to be presumed that the master plumbers of the National Capital may be included in that category when their ten years' struggle for proper sanitary laws is considered.

This is not the first attempt at legislation of this character instituted in Washington. In December, 1882, a sanitary code went into operation, which, from its provisions and the mode of enforcement by the health authorities, was never popular with the master plumbers, who were then and have been since agitating for something better. The present regulations, adopted February 15, 1893, by the Commissioners of the District, and made operative on March 15, have been issued under authority of an act of Congress approved April 23, 1892, and styled "An act for the appointment of an Inspector of Plumbing in the District of Columbia, and for other purposes." The provisions of this act are ample, and include, besides general regulations to be followed by the Inspector of Plumbing when appointed, copious rules for excavations in streets, water service and connections with water mains, house sewers and connection with public sewers, plumbing and drainage of buildings, examination and registration of master and journeymen plumbers, gas fitters, &c.

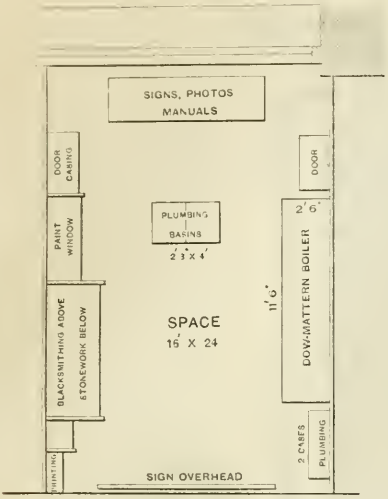


Fig. 2.—Plan of Exhibit.

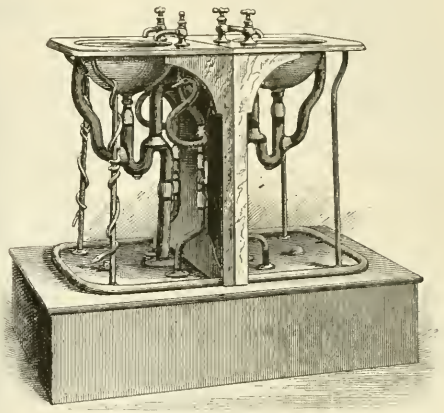


Fig. 3.—Basins with Connecting Pipes.

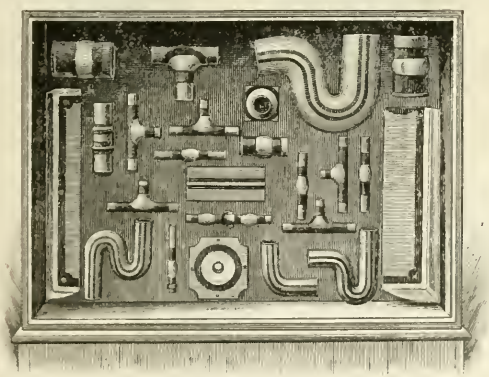


Fig. 4.—Case of Specimen Work.

NEW YORK TRADE SCHOOL EXHIBIT AT THE WORLD'S FAIR.

MASTER AND JOURNEYMEN PLUMBERS.

From and after May 1, 1893, all master plumbers and those desiring to become such must apply for examination before a board consisting of six members, viz.: The Inspector of Plumbing, one representative from the Water Department and from the Sewer Division, two master plumbers and one journeyman plumber. The applicant is required, if passed by the board, to register his name and address, take out a license and file a bond on the usual conditions for $2000 as indemnity for any loss occasioned to the District by any acts of his for a period of three years. After April 1, 1894, employing or master plumbers must be licensed, otherwise it will not be lawful to employ journeymen plumbers after November 1, 1893. No one can be employed as jonrneyman plumber who has not undergone an examination before and been licensed by the Plumbing Board and registered in the office of the Inspector of Plumbing. Other provisions require the filing of plumbing plans and specifications preparatory to permits being issued, with the Inspector of Plumbing, whose approval will be necessary in the first instance, and without which no subsequent alterations can be made in the original plans. The plumber is to be held responsible for violation of permit restrictions and for bad faith in the execution of contracts, and offenders are liable to suspension or revocation of licenses for violations.

PLUMBING AND DRAINAGE OF BUILDINGS.

Vertical soil pipes must be at least 4 inches in diameter and extend 2 feet above the building, the diameter to be increased 1 inch above roof in the case of three-story buildings, the increase to be made 1 foot below the roof. Where there are more than three stories the pipe is to be increased 1 inch in diameter every 25 feet above the third story. A Y branch with a 4-inch clean-out screw to be at the base of each vertical line of soil pipe, and pipes, traps, &c., are to be exposed to view where practicable. The provisions in relation to location and protection of pipes, the use of proper fittings, the trapping of all fixtures, and the venting of traps are very minute, but do not in the main differ from those in most existing regulations. The running of the vent pipe above the roof is not compulsory, but may, if preferred, be run into the vertical soil pipe above the highest fixture.

A somewhat peculiar provision is that which refers to the size of vent pipe (section 103) as being governed by the number of trap vents which connect with it. By this section it is required that where a building is three or more stories high and the traps of more than three water closets, or more than three traps or other fixtures, are to be placed in the first or second story, the vertical vent pipe is to " be increased in diameter at each story having additional fixtures, until the area of the said pipe at point of connecting the vent pipe of the highest fixture in the building shall be as nearly equal as practicable to the combined area

of all the vent pipes to be connected with it, or shall at least be equal to the area of the vertical soil pipe with which it is to be connected."

Another peculiarity observable is in the use of lead traps of 1½ inches caliber, in which case it is made permissible to use a waste pipe of 1¼ inches in diameter, though on larger traps the waste must not be of less size than the trap.

Lead safes or "linings" are called for under fixtures cased in wood, the safe waste to be run through the exterior wall of the building or to the cellar in the usual way.

Extra heavy cast-iron piping is called for in buildings, and the weight per lineal foot is required to be cast on the outer surface and where wrought-iron soil pipes are used they are to be of extra heavy galvanized iron.

The house drain and vertical pipes after being tested and passed may be coated with hot coal tar, and the usual running trap is called for with hand hole facilities for cleaning. The fresh-air inlet which is called for is to be 6 inches in diameter, that is, 2 inches greater than the New York laws call for. Unless all house drains are intended to be 6 inches the inlet will have to be reduced at point of connection with house drain so as to conform with the smaller bore of the house drain.

Lead water pipes are required to be what is known as "strong," which corresponds with A pipe ranging from ½-inch, weighing 2 pounds per lineal foot to 2-inch weighing 7 pounds per foot.

There shall be a gate valve on the supply, the free-water way of which is to be equal to the bore of the service pipe.

The general directions for setting water closets are in harmony with general practice. None are to be allowed in bedrooms, nor in any other room, apartment or vault which has not a window having an area of 4 square feet, opening to the onter air. Flushing tanks to be set over closets, flush pipe not to be less than 1¼ inches; all closets to have flush rim and have brass floor plate and rubber-gasket connection. Vent pipes for water closets to be 2 inches and those of other fixtures 1½ inches, unless over 20 feet, when they are to be 2 inches in diameter. Where water closets are set in yards they are to be located near the house and the flush tanks set within the buildiug, so as to guard against frost.

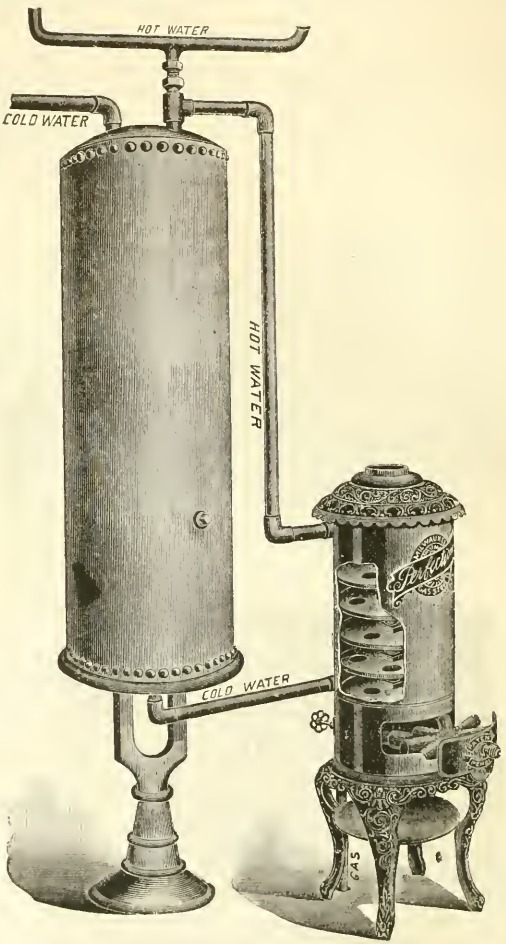
The pressure test to the extent of 10 pounds to the square inch is required of the plumber on all pipes in new buildings and the new work in old buildings. When the work is finally passed the Inspector of Plumbing issues a certificate to the plumber and a duplicate is furnished to the owner or authorized agent, if requested.

Wiping Stop and Waste Cocks.

From H. J. BAILEY, *Pittsburgh, Pa.*—I notice in *The Metal Worker* of April 15 an mquiry from "A. C. M." The answer is correct, so far as it goes. It states the fact that a good workman need not remove the plug of a key cock while wiping it on. To prevent trouble to all concerned in placing a key cock in position, the key should be removed, unless the workman is expert enough to make a homogeneous, clean-edge joint, with just the amount of heat necessary and no more.

The Perfection Water Heater.

The Milwaukee Gas Stove Company of Milwaukee, Wis., have recently brought out their Perfection gas water heater, which is herewith illustrated. As shown in the engraving, this water heater is cylindrical in form. It is 8 inches in diameter, 20 inches high, and has a double jacket to prevent loss of heat from radiation, the outer covering being made of Russia sheet iron. The interior is constructed in five sections, as shown in the broken view of one side. The flues and the spaces between them alternate in each section to retard the heat and secure the utilization of all the heat generated. Thus, very little heat is felt at the vent, and no chimney connection is considered necessary. The burner is of telescopic form, and is shown drawn out for lighting. When lit it is pushed back in place. There is thus no accumulation of gas in the water heater when lighting. The manufacturers state that 30 gallons of water are heated with it in three-quarters of an hour, while three baths may be taken in an hour. The consumption of gas is rated at 20 cubic feet per hour, and much less after the water becomes warm.



The Perfection Water Heater.

TRAPS AND VENTS.

WE HAVE RECEIVED from J. A. Brown, Riverhead, Long Island, N. Y., a sample of plumbers' wiping cloth which he is making and supplying to the trade. It is a fine quality of closely-woven cloth and of smooth texture. Mr. Brown thinks that the common bed ticking is too coarse to use for the purpose as it takes too long to break the cloths in.

S. DAVISON, 56 Beekman street, New York, has since last November been representing the Steel Bath Mfg. Company of Detroit, Mich., for the introduction of their goods in this territory. He says the bathtub made by them is selling freely, necessitating working overtime at the factory to execute orders, being now a full month behind in deliveries. This tub is a new feature in the plumbing business, designed to supply at moderate cost an article to take the place of the more expensive detached tubs where everything is exposed and any difficulty quickly reached. An order was taken recently for 15 of these tubs for some buildings at Ninety-sixth street and Fourth avenue in this city. Owing to want of space, the bathroom doors being but about 2 feet wide, it was found impossible to get the tubs in their places. The management, therefore, brought a trained workman, employed in the manufacture of these goods at their Toronto factory, to New York, who, taking off such portions as was necessary, succeeded in placing the tubs properly.

UTICA PIPE FOUNDRY, Utica, N. Y., for whom Charles Millar & Son are selling agents, issue a circular of cast-iron pipe for water and gas. They refer to the excellent record of this pipe, alluding to its special advantages, and furnish a partial list of new water works to whom they have furnished pipe as well as other water companies and railways among their customers.

THE GREAT WESTERN POTTERY WORKS have decided to locate at Kokomo, Ind., the pioneer gas city in the Indiana gas belt. They will manufacture fine sani-

tary goods as well as tableware. Their works will comprise eight buildings, all to be constructed of stone and brick, with slate roofs. They will have a floor space of 87,000 square feet, and will employ 500 hands. The Whitaker Supply Company, manufacturers of brass goods and other plumbers' supplies, will also build a factory at Kokomo.

DANIEL G. FINNERTY, vice-president of the National Association of Master Plumbers of the United States, issues from his office at Boston, Mass., 478 Boyleston street, under date of April 25, an invitation to the master plumbers of Massachusetts to attend a mass meeting at the Builders' Exchange, Knowles Block, Worcester, Mass., on May 1, at 1 o'clock p. m., for the purpose of organizing a State Association to affiliate with the National Association. Every master plumber in the State has been invited to attend this meeting, and it is hoped that as many as possible will be present and that Massachusetts may not be behind in association matters. It is mentioned in the call that the business of the convention can be finished in time so that all visiting delegates will be able to return to their homes on the same evening.

MCCAHAN & CO., 8 Central avenue, Baltimore, Md., distribute circulars illustrating and describing the Little Wonder gas bath heater of their manufacture. The device is described as a lighter edition of their Surprise heater, and is intended to come within the means of any one wishing hot water for bathing purposes. The boiler and case are of galvanized iron, strong enough for holding water while being heated, but not intended to stand reservoir pressure. Three feet of hose are furnished with each heater for connecting to cold water spigot. The capacity is nine gallons and heats the water hot in 30 minutes.

D'ESTE & SEELEY CO., manufacturers of plumbers' supplies and brass goods for steam, water and gas, have recently removed to 29-33 Haverhill street, Boston, Mass., occupying the entire five floors of a building 70 x 50 feet. The ground floor has been elaborately fitted up as a showroom. Almost the entire front is plate glass and the walls are of light colored tiling. A large variety of closets, tubs, &c., have been set up and are shown in operation. D'Este & Seeley Co. have been in business 25 years and have established several well-known specialties and made a market for a standard line of brass goods.

SMITH & WEBSTER, manufacturers of fine plumbing goods, 198 Lake street, Chicago, have purchased the marble works of Edward T. Moonan, at 103-105 West Monroe street, to which is to be added new and improved machinery for the manufacture of all kinds of marble, slate and soapstone work required in the plumbing business.

THE MASTER PLUMBERS' ASSOCIATION of Chicago, whose headquarters are at 197 Madison street, room 8, would be pleased to receive copies of catalogues from manufacturers of plumbing supplies, which will be placed on file for the use of the members.

THE EXAMINING AND SUPERVISING BOARD OF PLUMBERS of Niagara Falls, N. Y., has organized and elected F. W. Oliver president and W. W. Edwards secretary and treasurer. The other members of the board are Patrick O'Neill, E. Z. Burns and M. Talbot, M.D., the two latter being *ex-officio* members.

THE CAMDEN, N. J., BOARD OF HEALTH, at a meeting on April 24, passed an ordinance creating an Examining Board of Plumbers, and the following were appointed as members of the board: Messrs. Watson, Lewis, Hammond, Dr. Mosslander and Francis.

THE PEOPLE AND THE PLUMBERS OF GLOUCESTER CITY, N. J., are both happy in the new and improved water supply system just completed. It consists of 12 artesian wells located around an accumulating basin, each one of which has struck a water vein. The old supply is retained and with the better water which the analysis shows an improvement in the public health is expected. A probable increase of water users is what pleases the plumber.

IN PURSUANCE of an agreement between the master plumbers and the journeymen plumbers entered into last fall to go into effect on May 1, the standard wages will advance from $3.50 to $3 75 per day in New York City. In most of the shops this advance, we understand, will be made without hesitation.

The Chicago Master Plumbers.

The regular semi-monthly meeting of the Chicago Master Plumbers' Association was held at 206 La Salle street, Monday evening, April 24. It was decided to recommend to the Department of Health the substitution of heavy cast-iron drainage pipe instead of tiling in the confines of all buildings. Also that a board of examiners be appointed to determine the competency of each applicant for a plumbing license. It was recommended that all plumbing work be tested by the Department of Health, and a certificate given to the plumber when the work was properly done. A prize of $25 was offered for the best essay on "Sanitation," the subject to be treated under the following divisions: *a.* Should sanitation be fostered by legislation? *b.* Should legislation precede education? c. The extent of municipal or State authority in sanitary matters. As a further incentive to literary effort on the part of contestants, the prize essay is to be read before the National Association.

National Association of Master Plumbers.

The official call for the coming convention of the National Association of Master Plumbers, to be held in Milwaukee, Wis., June 13, is presented in the following announcement issued by President Jeremiah Sheehan from St. Louis, under date of April 25.

The Eleventh Annual Convention of the National Association of Master Plumbers will convene in Lincoln Hall, corner Sixth and Grand avenue, Milwaukee, Wis., at 10 o'clock a.m., Tuesday, June 13, 1893.

The Hotel Pfister, corner Washington and Jefferson streets, has been selected as National headquarters; rates, $4 per day and upward. Accommodations can also be secured at Pabst Hotel, $2.50 to $3.50 per day; Republican House, $2 to $3.50 per day, and Schlitz Hotel, European plan, rooms $1 to $2 per day.

As is customary, application was made for the usual reduced rates for delegates in the convention; but I regret to say that such reduction was refused. I give you a summary of the correspondence had with the Western Passenger Association, in whose territory the convention is to be held, and this office, in order that you may know what has been done in the matter.

On March 3 I made applications to the various passenger associations, receiving replies from all. The Western Passenger Association were to take the initiative, and their decision, if in the affirmative, would cause other lines to favor our application, and if in the negative their decision would be upheld by the other lines. The forms of the Western Passenger Association were filled out and returned, and same acknowledged by the chairman of the association, who stated that our application would be laid before the association in due time, and that this office would be advised of result. I will also state that the usual concession is a fare and one-third, three days' limit. Anticipating that many of the delegates would want to stop over and visit the World's Fair, I asked for an extended limit, but was advised that it would be impracticable. On March 14 I was further advised by the Western Passenger Association as follows:

"We beg to advise you that your proposition to make a rate of a fare and one-third on certificate plan from association points has been considered by our lines, but we regret to say that same failed to carry under our rules, and we are, therefore, unable to announce the reduction for this occasion."

I immediately wrote to the chairman of the association, why application had been nonconcurred in, and received the following:

"In reply will say that all matters of this character are subject to vote of lines in this association—a unanimous vote being required to make the proposition effective. In case of this meeting proposition was submitted for the usual reduction but failed to receive unanimous consent, and under the rules we were obliged to declare the proposition negatived. The lines voting in the negative have not assigned any reasons. Under our rules our lines are not required to assign any reasons for their vote; simply to record an affirmative or negative vote on such propositions as may be submitted to them, and it is not within the province of the chairman to ask for an explanation. World's Fair rates will be in effect at the time of your convention from all points in this association to Chicago and return, based on a somewhat similar reduction to that which is sometimes made to meetings similar to yours, and as in all probability most of your members will pass through Chicago, they can take advantage of the reduced rates to Chicago for the World's Fair, in buying thence to Milwaukee and return."

In view of the fact that the desired rates would not have allowed a stop-over privilege in Chicago, and that World's Fair rates will be in effect, which will be equally as good and in some cases better, as well as having an extended limit, I would, therefore, suggest that tickets be purchased to Chicago, thence to Milwaukee and return, as it is only a short distance.

The European Spelter Product.

Through the courtesy of the American Metal Company of New York, we are enabled to present the following statement, compiled by Henry R. Merton & Co. of London, of the production of spelter.

Spelter Production. *Gross tons.*	1892.	1891.
Rhine District and Belgium	143,505	139,695
Silesia	87,760	87,080
Great Britain	28,590	29,410
France and Spain	18,462	18,360
Poland	4,270	3,760
Austria	5,020	6,440
Total Europe	287,607	284,745

The American Metal Company estimate the spelter product of the United States at 77,650 gross tons for 1892 and 71,756 tons for 1891.

New Publications.

MUNICIPAL IMPROVEMENTS. A Manual of the Methods, Utility and Cost of Public Improvements, for the Municipal Officer. By W. F. Goodhue, C.E., member of the Western Society of Engineers. New York: John Wiley & Sons. 1893. $1.50.

To those citizens who suddenly find themselves called upon to fill a place in the councils of their city or town, or some other public office, and who have had little or no previous acquaintance with the questions regarding municipal improvements which must come before them, such a handy little work as that of Mr. Goodhue will be extremely useful. Avoiding in general the use of technical words and phrases, as well as mathematical tables and formulæ, the author has here given in compact form a great deal of useful information in regard to such public matters as come under the jurisdiction of municipal officers. Treating, as it does, of such important questions as sewerage, street-car lines, street sprinkling, lighting, water work, building laws, &c., the newly elected magistrate or councillor who is desirous of obtaining an intelligent acquaintance with these necessary subjects should find this a helpful little work. The last chapter, treating of "Cleanliness and Public Health," is particularly worth the perusal of all conscientious public officers.

A statement prepared by the United States mint director shows that the total specie holdings of the United States treasury and the great banks in Europe are $2,483,000,000, of which about $1,533,000,000 are gold and $950,000,000 are silver.

THE LETTER BOX.

Bending Tin Pipe.

From P. B., *Wilwaukee, Wis.*—I would like to be informed through the columns of *The Metal Worker* how to bend a 1¼-inch round tin pipe to a circle of about 1ft foot in diameter.

Answer.—Sheet-metal pipe that is to be bent is first filled with some substance that will allow the pipe to bend and at the same time keep it in shape as much as possible during the operation. Lead is used as a filling for some kinds of work, and is sufficiently hard to allow the wrinkles that are liable to form inside the bend to be pounded out and the pipe worked until it assumes the desired shape. Pitch is often used as a filling, and should be as hard as possible so as to bend without crumbling, and at the same time be sufficiently dense to allow such wrinkles as might form in the pipe to be pounded out. Pitch can be made by mixing tar with melted rosin until the desired density is obtained. It is probable a tin pipe could be bent by filling with lead or pitch, providing the metal was of sufficient thickness to allow for the stretching of the outer part of bend. An objection to the use of either of the above fillings is the difficulty experienced in removing them, which must be done by melting, and in the case of tin pipe would be liable to injure the appearance of the surface. Plaster of paris is sometimes used as a filling for pipes, and might answer in the present instance. One end of the pipe is to be closed by means of a wooden plug or by soldering on a cap. The pipe is then filled with dry plaster of paris, which is rammed in by means of an iron rod, so the filling will be as solid as possible. When the pipe is filled the remaining end is closed, when the pipe is ready for bending, after which, by opening the ends of the pipe, the plaster can be removed.

Stopping Leaks in Gosoline Stoves.

From C. H. H., *Valparaiso, Neb.*—What is the best way to stop leaks around the burners of gosoline stoves?

Answer.—The best plan to follow with gasoline stoves, when the burners and valves leak, is to repack them and turn them up until they are tight. To repack, unscrew the fittings, put new asbestos in the valves, examine all the threads to see that they are not broken or injured, and rub them with a coat of red lead before replacing. Better results are often accomplished by using ordinary hard washing soap instead of red lead.

Forming Wash Boilers.

From J. H. W., *Williamsport, Pa.*—In answer to "O. J. B.," Troy, N. Y., who wishes to know of an easy way of forming wash boilers: "Use a piece of 1 x ¼-inch steel formed to the curve of boiler, as long as the middle bend, and made pointed at the ends so as to enter the rolls with ease. Set the rolls so the boiler will go through without forming. Put the steel form in the rolls half way and make the first bend; then run the boiler along until the point is reached where the second bend is to commence, when the steel form is to be placed on the boiler and run through the rolls, thus making the second bend. The boiler is then to be run through the rolls as before until the point is reached where the final bend commences, when the steel former is placed on the boiler and the last bend made. Of course each size of boiler will require a separate former, but the expense is so little it should not prevent one from having a full set of these convenient articles.

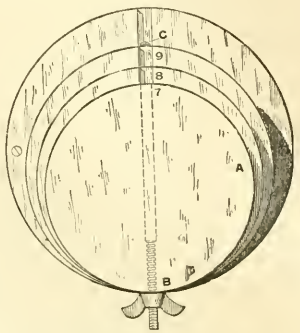
Joints in Lead Pipe.

From E. C., *Buffalo, N. Y.*—I would like to have an expression of opinion from the readers of *The Metal Worker* regarding the strength of joints made in lead pipe. Is not a well-soldered cup joint as strong as the usual wipe joint? While the cup joint may not appear as strong, it is one the tinner often finds convenient to make.

Note.—Experiments, as reported in a former issue of *The Metal Worker*, have been made with pipe known as single X strong, weighing 3 pounds 1½ ounces to the foot and joined by means of the wipe joint, cup joint and butt-sweat joint. Pieces of pipe 8 inches long were used for the tensile and elongation tests, and to make connection with the testing machine ¼-inch steel wire nails were soldered into the ends of the pieces. As 1 inch of each end of the pieces was made solid with the nails and solder, 6 inches of the pipe was left in which elongation could take place. The wipe joint was 2 inches in length and well made, as was the cup and sweat joints. As a result of the tests, the pipe broke in each instance, thus showing that the joints were stronger than the pipe. Pieces of the same kind of pipe, similarly joined to those mentioned above, were also subjected to hydraulic pressure, and in each instance the pipe burst instead of the joint. The conclusions arrived at from the above tests were as follows: The experiments are conclusive proof that the slightest of all joints, the butt sweat joint, is, when well made, fully able to stand 20 times the average pressure to which it is subjected, at least for a short time. But, on the other hand, past experience teaches us that the wipe joint has the greatest endurance of any solder joint providing that the wipe joint is well made and that the other joints be not allowed more contact surface for solder than the wipe joint. In practice the wipe joints are given more than double the hold upon the pipe that is given any of the other joints. As the subject of joints in lead pipe is one of interest to many of our readers, we would be pleased to have others give the results of their experience with the various joints mentioned.

A Home-Made Wash-Boiler Former.

From C. F., *Akron, Ohio.*—In *The Metal Worker* of March 11 "O. J. B." of Troy, Ind., asks how to form wash boilers without the use of a former. I understand by this that he wishes to form boilers without the use of a forming machine. I inclose set of drawings of a little machine that need not cost over $1.50. It is all made of hard wood, except two inch wood screws, one thumb nut and one long bolt about ½ x 16 inches in size, with one end turned up 1 inch at right angles with the length of the bolt. To use the former



A Home-Made Wash-Boiler Former.—Fig. 1. —Plan of Former.

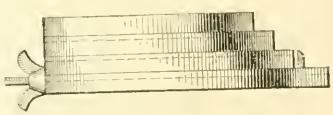


Fig. 2.—Side Elevation of Former.

the boiler body is caught by the end under the clutch C, as shown in the top view, Fig. 1, and if intended for a quarter circle is bent around the former to A, or if for a half circle it is brought around to B. To change from a 9-inch boiler to 7 or 8 inch the bolt or clutch, Fig. 3, can be taken from the former 9 and inserted in the hole above, which will set the machine for an 8-inch boiler, or it can be changed to the next hole for a 7-inch

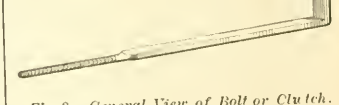


Fig. 3.—General View of Bolt or Clutch.

boiler. This will be further understood by referring to Fig. 2, which is a side elevation of the former. I think with the sketches and this brief explanation any tinsmith can understand its construction. I would only say in closing that wherever this former has been used it has given the greatest satisfaction.

ROOFING AND CORNICE.

Meeting of Chicago Cornice Makers.

The cornice manufacturers of Chicago met at the Grand Pacific Hotel Friday, April 21, to take action with reference to the building ordinance passed by the City Council, March 13, H. C. Knisely presiding. The ordinance prohibits copper and galvanized iron bay windows and light shafts being fitted with any combustible material. There are 150 manufacturers in Chicago, and it is claimed that the business of two-thirds of these would be destroyed if the ordinance be enforced. It is stated that there are over 10,000 metal covered bay windows in the city, and that there has never been an instance known where a fire has caught through the metal covering, and that such bay windows are safer than tin roofs, as fire branda could not lay on them. It was decided to form an association for mutual protection and to take such steps as may be necessary to have the act reconsidered. The following officers were chosen: President, H. C. Knisely; vice-president, G. Burkhardt; secretary, J. H. Perkinson; treasurer, A. W. Cooper.

The following is a copy of the petition to be signed by interested parties and presented to the city council:

To the Mayor and Common Council of the City of Chicago:

We, the undersigned cornic e manufacturers, cornice workers and tinners, also dealers in cornice makers' and tinners' supplies of the City of Chicago and vicinity, hereby petition your honorable body asking you to reconsider and repeal the following sections, Nos. 118, 132, 134 and 135 of the Building Ordinance passed March 13, 1893, relating to the construction of bay and oriel windows and light shafts.

Whereas, Your petitioners believe that these sections, if not repealed, will ruin manufacturers in the business and deprive the workmen of their means of livelihood and injure the city in general.

Whereas, Your petitioners further believe that the aforesaid sections were not fully considered at the time they were passed in your body. We further believe that had the meaning of these sections been fully explained and their effects known, they would not have been passed.

The obnoxious sections of the building ordinance against which the above action was taken are as follows:

SEC. 118. The inclosing walls of bay windows and light shaft walls shall in all cases be built entirely of incombustible material.

SEC. 132. Where sheet metal cornices or external sheet metal gutters are used, their entire frame work and covering shall be of metal, and the walls shall extend behind all such cornices or gutters along their entire light and a water-tight junction shall be made at the line of the wall between the roofing material and the sheet-metal covering of such cornices, or the sheet metal forming such gutters.

Wood shall not be used as the support of any gutter or cornice other than for such gutters as are on the inside of fire walls for buildings of Class I, 100 feet or less in hight, or for Classes II, III and IV, 90 feet or less in hight.

SEC. 134. Skylights made at the foot of light wells or light courts shall be made either of prismatic lights set in cast-iron frames, or of glass at least ⅝ inch thick set in metallic frames; and if the latter are used, they shall be protected against injury from falling bodies by wire nettings placed at least 6 inches above the glass of such skylight and firmly and rigidly supported on iron stanchions and frame work; such netting to be made of wire not lighter than No. 8 and mesh not coarser than 1½ x 1½ inches. All other skylights shall have metallic frame, sash and curbs, glazed with glass not less than ¼ inch thick, except in the case of skylights which occur in courts or in other places below the roofs of the buildings to which they belong; such skylights shall be glazed with glass not less than ⅛ inch thick. This glass shall be protected as against breakage by wire netting placed at least 6 inches above the glass of such skylight and firmly and rigidly supported on iron stanchions and frame work, such netting to be made of wire not lighter than No. 10 and the mesh not coarser than 1½ x 1½ inches.

SEC. 135. The walls of all bay and oriel windows shall be constructed entirely of incombustible materials. The limitations of the dimensions of bay windows and position of bay windows projecting over the street line of any building shall be as follows:

1. No such bay or oriel window shall be at a less distance than 12 feet from the sidewalk grade.
2. No such bay or oriel window shall project more than 3 feet over the street line of any building.
3. No such bay or oriel window shall have a greater street frontage than 15 feet.
4. There shall not be more than one bay or oriel window for any 25 feet of frontage, and no two bay windows shall be built nearer to each other than 5 feet.

Nothing herein contained shall, however, limit the number or size of bay and oriel windows which are built in such a manner as not to project over the street line of the buildings of which they form part, but the structural parts of such bay or oriel windows shall also be made of incombustible material.

The following sections of the ordinance, while not included in the above petition, also relate to the construction of bay windows and light shafts:

SEC. 119. In all cases where the weight of floors within bay windows or abutting upon light shafts is carried on a framing independent of the inclosing walls of such bay windows or light shafts, the thickness of such walls inclosing bay windows or light shafts may be reduced; but in no case shall the thickness of such walls be less than 8 inches, nor shall any part thereof be so reduced in area that the load upon the same will be more than the maximum load hereinafter prescribed for the materials of which such walls are built.

SEC. 120. The use of hollow tile for the walls inclosing light shafts is permitted, but such inclosing walls shall be firmly anchored to the framing of each successive floor.

SEC. 121. If the walls of bay windows or of light shafts begin at any point above the foundations of the building their means of support shall consist entirely of incombustible material.

FLASHINGS.

THE CORTRIGHT METAL ROOFING COMPANY, Broad and Hamilton streets, Philadelphia, Pa., state that during the Columbian Exposition their goods will be displayed in Section H, in the Manufactures Building. The company have erected a small structure and covered the roof with Victoria shingles made of copper, while on the sides are the company's metal slates 7 x 10 inches in size.

AN OBLONG PAMPHLET, bound in firecracker paper, is the attractive illustrated catalogue and price-list issued by Thomas Lee, Cincinnati, Ohio. In presenting this annual catalogue to the trade, he announces to his patrons that he has added to his other specialties the manufacture of corrugated and plain conductor pipe, both round and square. An important feature to which he directs attention is that the area of the square conductor pipe is exactly the same as corresponding sizes in the round. On the first page are illustrations of various forms of eave troughs, the price-lists being printed in an irregular panel set in the center of the illustrations. A dozen pages are given up to different forms of gutters, the latter ones being of elaborate design. Next come cornices in the various forms in which they are made; then skylights. The division following relates to conductor pipe, round and square, corrugated and plain. At the close, attention is given to Lee's filtering joints, eave-trough hangers, ridge rolls and conductor-pipe elbows.

WE HAVE RECEIVED from W. J. Burton & Co., Detroit, Mich., a descriptive catalogue of metal shingle roofing and tiles which they manufacture. In an introductory note to the trade they say that in presenting their sixth annual catalogue they would call attention to the increased sales of their Eastlake shingles, there having been used in six years 12,434,000 square feet without a leaky roof. During the present year they have been obliged to enlarge their floor space and put in extra machinery to meet the increased demand for their goods. The catalogue, which is square in shape, contains some 30 pages, and begins with a general account of the Eastlake shingle, describing its special features and including directions for laying shingles, in connection with which cuts are presented. Following this are illustrations of a variety of styles, including the octagon fluted pattern, special valley for Eastlake and octagon, gothic tile, diamond tile and the Spanish tile. In a similar way sheet steel pressed brick is described, also ridges and finials, as well as their roll cap steel roofing. At the close are various illustrations of corrugated pipes and stamped corrugated elbows and shoes.

THE WORLD CRIMPING COMPANY of Penn Yan, N. Y., have just issued from the press a very neat catalogue and price-list of roofing, siding, ceiling and ridging, with which they are prepared to furnish the trade. The goods referred to are illustrated and accompanied by ample descriptive letterpress, which will enable the reader to understand the several merits claimed for the goods shown. Diagrams are also given, together with directions to be followed in ordering corrugated sheets. The company state that they carry in stock all gauges of these sheets from No. 16 to 27, inclusive, in 6, 7, 8, 9 and 10 foot lengths, and of a width to lap one corrugation and cover 24 inches. Brief attention is given to roofers' tools, a comparison of steel and iron roofing with other materials is made, and remarks relating to elastic roofing cement presented. The publication is bound in colored paper covers and is likely to prove an interesting addition to the trade literature bearing on roofing matters.

C. E. HOLLEY of C. E. Holley & Co., Johnson Building, Cincinnati, Ohio, and party of architects, including Col. C. S. Crockett of the United States Sub-Treasury, were taken on the 20th inst. to the quarries located at Rock Castle Springs, Ky., and operated by the company, for the purpose of inspection. Colonel Crockett went on behalf of the United States Government, with whom the company have several extensive contracts pending.

WORLD'S FAIR NOTES.

Battling with the Elements.

The work of preparing for the exposition has been a continuous battle with unpropitious circumstances. It would seem as if the elements had conspired to resist the most heroic efforts of man to complete the greatest undertaking in the history of universal expositions. There has been very little favorable weather for work of this character from the time the first sod was turned in Jackson Park. Last summer was a period of tropical storms, heavy rainfalls alternating with fierce winds, often developing into actual tornadoes, which not only checked work, but sometimes damaged what had been done and necessitated its complete reconstruction. The preceding winters had been comparatively mild, but last winter was the most severe and prolonged that was ever experienced in the Northwest. Only a few days of spring-like weather have smiled upon the workmen even in this month of April. As if to test the stability of the World's Fair structures to the utmost, a three days' storm of unusual severity raged last week. The wind blew with almost the fury of a tornado, shifting to every point of the compass during that time, apparently in search of points of weakness, while torrents of rain fell. For a few hours winter returned, with snow and freezing cold. The local signal service officer reports that at 3 a.m. Thursday the gale was blowing 72 miles an hour, and that the barometer was 28.92, the lowest Chicago has known since the office was established. When he says that the vibration of the Auditorium tower was so great that three of his observation clocks stopped running, the officials of the fair may well feel that the solidity of the fair buildings has been established. And not only did the immense structures of steel and glass stand the test, but State and foreign buildings, and even the nondescript structures on Midway Plaisance, weathered the storm. Most remarkable of all, the statuary, with a few unimportant exceptions, was not damaged. The worse feature was the renewal of leaks in the roofs, which, it had been supposed, were at last in good condition. Some of the large panes of glass in the roof of the Manufactures Building were broken by the force of the wind. This has developed a new source of anxiety, as visitors may be endangered during the fair by a similar occurrence, and the officials are now making

Plans to Catch the Glass.

Director of Works Burnham decided last Friday to let a contract for 1,045,000 square feet of wire netting to be placed under the glass roofs of four of the main buildings. By reducing square feet to acres it will be found that Mr. Burnham's contract will be equal to 24 acres. This is not regarded in the wire trade as a very large contract, however, as it will require only about 1500 rolls.

F. D. Millet, the director of decorations, has made a test of the kind of wire netting needed to protect visitors to the exposition from injury by falling glass in the roofs. The roofs are so lofty and the panes are of such weight and size that, should they strike a man's skull, they would crush it. Inasmuch as the Exposition Company cannot control the wind, Mr. Burnham decided to control the fall of glass.

The netting to be used will have a 2-inch mesh and consist of No. 18 wire. Mr. Millet stretched a sample of this size over a wooden frame and then, mounting the scaffold, let fall a piece of glass containing four square feet and sharp pointed on the netting. It dropped 12 feet and made no perceptible effect on the wire screening. Then he dropped two other pieces, also sharp pointed, without effecting any indentation. The wire netting will be placed 1 foot below the glass roofing, and Mr. Millet thinks that there will then be no possibility of accident by falling glass. The construction department has figured out that there are 47 acres of glass in the roofs of the main buildings. The wire netting, however, will not be placed under this entire surface. The roofs of four of the main buildings only will be cared for, and the following table shows the exact number of square feet which is to be protected by the netting:

Manufactures and Liberal Arts Building.

	Square feet.
Main court	295,000
Side galleries	305,000
Total	600,000

Machinery Hall.

	Square feet.
Main domes	45,000
Main clere-stories	125,000
Total	170,000

Agriculture.

	Square feet
Main building	145,000

Fine Arts Building.

	Square feet.
Central pavilion	53,000
Galleries	45,000
East and west pavilions	32,000
Total	130,000

Underneath the netting will be stretched an equal number of acres of cheesecloth to soften the direct rays of the sun and diffuse the light.

The Big Gun in Place.

On Friday the great Krupp gun was safely deposited on the carriage which it will occupy during the fair. So perfectly have the polished balls of the turntable revolved, so smoothly has every part of the Titanic apparatus done its work that not a single block of wood is disturbed in its place.

Standing with their feet deep in the moist sand of the floor, the German workmen from far off Essen saw the completion of their work. Herr Gillhausen, personal representative of the great gunmaker, looked on in triumph from his high stand on the carriage of a 75-ton giant. Back of the huge steel barrel, spotted now with the stains and rust of the long journey, lie the huge wipers and rods which are used in the loading and cleaning of the gun. Still further back on the sand lie samples of the great projectiles which this monster carries.

The carriage on which the great gun rests is built of steel, the different parts revolving on ball bearings. Cog wheels, levers and multiple chains are so arranged that it is easy work for the gunner to raise or lower, or turn in any direction the long barrel of shining steel. At the rear there are steps leading to the platform on which the gun crew is placed when the piece is in action.

Herr Krupp's agents do not hail the story that the great gun is to be presented to Chicago when the fair is over with any display of enthusiasm. If their chief has any such idea in view they know nothing of it. The specially built cars on which the monster was brought here have been switched out of the Krupp pavilion and on to the transportation tracks, where they will remain as a permanent exhibit until the fair is over. Then they will be brought into service again for the transportation of the gun back to New York, whence it will be returned to the works in Essen.

Three Men Killed While Installing Exhibits.

Three men were crushed to death while installing exhibits on the 16th. Two, James W. Warwick, a sergeant of ordnance, and Corporal M. J. Kernies, were killed by a heavy mortar gun which was being raised in front of the Government Building. The third was killed in Machinery Hall by a falling gang plank.

Warwick and Kernies were, with a number of other men, raising a 14-ton mortar to its carriage on the plaza east of the Government Building. When the mortar had been raised free from the supports upon which it rested there was a hitch of some sort and Warwick crawled under the gun to remedy the trouble. Just how the accident occurred is not known, but in some way he loosened a part of the hoisting tackle, which allowed the gun to slip from its fastenings and fall, crushing him and Kernies. Warwick's body was crushed flat and death was instantaneous. Kernies was at first not thought much hurt, but he died four hours later from internal injuries.

James Conway, check clerk in the employ of Superintendent P Healy of the installation department at Machinery Hall, together with a gang of workman under Foreman M. J. Dugan, was engaged in unloading some heavy machinery in the annex to Machinery Hall when a heavy platform or gang plank used in transferring machinery from the car fell upon Conway and crushed him.

Cunard Ship Models.

The Cunard Steamship Company's unique and historic exhibit in the department of transportation exhibits will consist of a fleet of full-rigged models showing the development and growth of this line, from the "Britannia," built in 1840 (their pioneer ship), 207 feet long, 2000 tons, 400 horse-power, down to their latest leviathan, the "Campania," the largest steamship in the world, 620 feet long, 13,000 tons and 30,000 horse-power. This is but 60 feet shorter than was the "Great Eastern." These models have been in course of construction for over a year past at the company's yards in Liverpool by their own naval architects, and are drawn on a scale of ¼ inch to the foot. The Cunard Company's joiners are now engaged in the work of installation.

The models are inclosed in handsome glass cases, and rest upon elaborately carved tables of natural oak; an ivory tablet giving full description is attached to each case. In addition to the models it is intended to display photographs of modern ships, including their latest additions, the "Campania" and "Lucania," upon screens provided for the purpose.

Veteran Engines and Coaches.

A train that is a relic of the check apron period of railroad existence arrived last week over the Pennsylvania road. The train consists of a 60-year-old engine, "John Bull," and two passenger coaches 57 years old. One of these coaches was discarded 25 years ago by the old Camden and Amboy road and purchased by a farmer at South Amboy, who took it a short distance from the rails and converted it into a chicken coop. An agent for the Pennsylvania road out hunting for relics, discovered this chicken-coop coach and purchased it for the purpose of exhibiting it at the fair. The history of the other coach is somewhat similar. It was rescued from a Jersey City lumber yard.

The train was manned by veteran railroaders. The conductor, W. T. Bailey, has been a passenger conductor since 1859. The brakemen, Jonas Hagar and Thomas Gallagher, were brakemen in 1849. The engine driver, A. S. Herbert, drove the John Bull in 1852. J. W. Sanford, the fireman, was such in 1855. Car Inspector D. H. Baker, who accompanied hem, has been foreman of the Jersey City car shops since 1849. Acting Assistant Superintend-

ent James R. Smith, who directed the running of the train, has also been a railroad man over 50 years.

The New York Central Railroad Company have completed for the fair an exact reproduction of the "De Witt Clinton," and the coaches it drew on its first trip. The original "De Witt Clinton," the first locomotive run in New York State, was built at the West Point foundry at the foot of Beech street in 1831. The coaches are diminutive affairs compared with the modern Wagner palace cars and resemble in size and shape the old-fashioned stagecoach. They are hung on immense leather straps instead of springs and when in motion rock like ships at sea.

Alongside of this train at the fair will be exhibited a modern passenger locomotive, just built to draw the Empire State express. With this will be five new Wagner palace cars. The engine, which is No. 999, was built at the New York Central shops, at West Albany, under the supervision of James Buchanan. The designer claims that the engine is capable of drawing the five coaches at a rate of speed close upon 100 miles an hour.

The old locomotives mentioned above will not be the only antiquities in the railroad line at the fair. The province of Nova Scotia will send the "Samson," an engine built in Durham, England, early in the '30s. It made its first journey on the 7-mile railroad of the Mining Association in the Pictou coal region in Nova Scotia in 1838.

The "Samson" has a triple set of driving wheels, all of the same size. The tender is in front of the engine and the fuel is fed into the furnace directly beneath the smokestack, which is the biggest thing about the old machine. The engineer sits on an elevated and uncovered platform back of the boiler, and the fireman stands on a footboard between the engine and tender.

Condition of Machinery Hall.

Just now it is a debatable question around Machinery Hall as to the condition that the display will be in at the date of pressing the button. Lieutenant Robinson, who is in charge of the building, says that they could close the doors now and place what is already on hand in position and have a better display of machinery than has ever before been attempted, and that by May 1 the display will be far beyond anything that has ever been seen in that line.

The shafting for the motive power is nearly ready, one of the four lines being fully completed and another nearly so. The other lines can be made ready in three or four days, and will easily be in working order as soon as needed. Pulleys are not yet adjusted and will not be until the machinery to be served is located, when the pulleys can be quickly placed in position where they are needed. The portion of the building which appears to be the most nearly in order is the power plant, occupying one-quarter of the floor space and filled with engines of the most approved pattern.

With the exception of one battery of Stirling boilers, the boilers are all in place and have all been steamed up. They are a formidable looking row, comparing favorably in size with a row of cottages along a village street. The appearance of the boiler room will be surprisingly neat and clean to those who are accustomed to seeing coal used for fuel in such places. The heat for these boilers will be obtained by burning crude petroleum.

Engineer Wilkinson, who has charge of the mechanical department of all that Great Britain will exhibit at the fair, has been placed at a great disadvantage by delays of the railroads in delivering his freight. For ten days the Englishmen have been waiting and saying tart things about the delay in receiving their goods, but Mr. Wilkinson is confident that by putting on a large force of men he can have his work done in time to be in order May 1. The appearance of the space devoted to the British exhibit is a bit forlorn just at present and has been commented on by those who are anxious to prove that chaos and Jackson Park will be synonymous terms on the day set for the opening of the fair, but when those exhibits do arrive there will be a tremendous lot of work done in that corner of the building, and the fact that there are 24 hours in a day and 60 minutes in each hour will be demonstrated.

The Frenchmen are also far from being ready to receive company, but they, too, think that as soon as the delays of transportation which now surround them can be overcome they will make up for lost time and report their display as being completed when the time comes for opening the fair.

Happiest of all the people whose interests are in Machinery Hall are the Germans, who are pleased to think that by the provident disposition which is a characteristic of their race, their display is now very nearly ready and they can complacently smile and say "Gesundheit."

Another nation which is slow in getting its display in position is Austria, and it is said that some of the exhibits for which space was engaged will not materialize, and that others will not arrive in time to be seen on May 1.

American exhibitors have, as a rule, made ample preparations for getting their displays in place, and many of the machines are now in position and ready for exhibition. Perhaps the most forward of the exhibits is that of the different loom manufacturers of Worcester, Mass., in which city a very large percentage of all the looms used in America is made.

Working by Night.

Electric lights, sufficient to allow the work of installation to proceed by night, have been placed in most of the great buildings. It is a matter of the utmost importance to those who are responsible for having the exposition ready on schedule time The electrical engineering department has been anxiously watched and hurried onward by those in charge of the fair, for until the lights were up nothing could be done after six o'clock toward placing exhibits and building pavilions.

The main point is the Manufactures Building. That is the largest space to be covered with exhibits and the most important to complete. The lighting of this building has been a study. It will alone contain more electric lights than the entire Paris Exposition contained.

Arc-light Engineer G. B. Foster has had charge of the work. The equipment consists of 1196 arc lights. Besides these there will be myriads of incandescent globes and innumerable lights for exhibits. The 1196 lights are for the Exposition Company and are deemed necessary for the permanent lighting of the building. This equipment is divided into 24 sections, each operated by a switch, which can be shut off and opened at will. The side aisles and outside colonnades are provided with diverging rows of 50 lamps each. The galleries are supplied in the same manner.

The main hall between the great steel trusses will contain five immense crown-shaped coronas, or "electroliers," as they are called. They are swung from the rafters and are 140 feet above the floor. Four of the huge chandeliers contain 78 lamps each, and the center one has suspended from it 102 lamps. The central electrolier will encircle the apex of the clock tower. These lamp holders are 68 feet in diameter and are constructed of steel latticed work. Each lamp is of 2000-candle power, making the lighting power of each corona equal 156,000 candles.

To supply the current for the Manufactures Building's plant requires 24 dynamos, each of 1200 horse-power. These have been put in place in Machinery Hall.

Partial light will be furnished in the Agricultural, Mines, Transportation and Machinery buildings. All these lights belong to the permanent plant. Hereafter the electrical department will put in no temporary lights, but will push forward its work of permanent lighting.

The Ferracute Machine Company of Bridgeton, N. J., have recently shipped two full carloads of machinery for their exhibit at the Columbian Exposition. This machinery consists of 12 power presses, the largest weighing about 12,000 pounds, 4 foot presses, 3 spinning lathes, polishing machinery, several smaller machines for beading, trimming, threading, &c., and about 40 pairs of dies. They have secured an excellent space, 30 x 25 feet, on the corner of two principal aisles and under one of the electric cranes, in Section 13, columns I J. 42 and 43, in the center of Machinery Hall Annex, near the large engines. This will be handsomely fitted up with a line of shafting, an engine of their own, counters, benches, an office, and with a large line of samples showing every kind of sheet-metal work. All of this machinery will be kept running with a number of operators, and several different articles will be manufactured in tin, brass, aluminum, &c., in order to show the practical working of their presses, dies, &c. They have made a contract with the Pittsburgh Reduction Company to manufacture all the articles from their metal which are made in sheet aluminum in the exposition grounds, and this in itself will be an interesting object to visitors, as aluminum is now being used for so many household articles, in addition to fancy goods, &c. Among other articles manufactured by the Ferracute Company will be pie plates, pans, skillets, drinking cups, fancy plaques, jewel boxes, napkin rings, puzzles, &c., and their exhibit will illustrate a complete metal-working establishment. Fred. F. Smith, secretary of the company, will be in charge of the exhibit, assisted by the foreman of their press shops, Edmund Hoffman, with one or two assistants from the factory and others which they will secure in Chicago. Nearly all of the machinery exhibited will be from new designs recently brought out and will show all the latest developments in sheet metal presses and dies.

Items.

The Electrical Forging Company of Boston have 1955 feet of space on the first floor of the Electrical Building at the World's Fair. They will put in a 200 horse-power heating plant driven by two 100 horse-power motors. They will exhibit an electrical cooking process and machines for rolling metals and making forgings, &c.

The Joint Committee of Ceremonies of the World's Columbian Exposition, through Secretary Culp, has notified A. J. Dowd, chairman of the Columbian Associated Travelers, that the Committee on Ceremonies has decided that there will be but one day set apart for the commercial travelers of the United States and the world. That date has been heretofore set apart by the Director General, and is July 26.

The General Electric Company have received a 25-car train, which was started from Schenectady on the 19th in charge of a special messenger. The train contains the armatures for a 1500 horse-power Edison lighting generator to furnish light for the Electricity Building, two carloads of electrical material for the electrical fountains, nine carloads of exhibits, and two of the large generators for the intramural railway. The estimated value of this consignment is $225,000.

TIN PLATES.

Irondale Rolling Mills and Tin-Plate Works.

Located at Irondale, Ohio, on the main line of the Cleveland & Pittsburgh Railroad, 55 miles from Pittsburgh, are the Irondale Rolling Mills and Tin-Plate Works of Wallace, Banfield & Co., Limited, with branch offices at 106 Third avenue, Pittsburgh, Pa. From a small beginning the plant has grown to be one of the largest and best equipped in this country for the manufacture of black sheets and tin and terne plate. The firm of Wallace, Banfield & Co., Limited, were organized in 1885, and in October of that year the new firm secured possession of the plant of the Pioneer Iron Company at Irondale, which had been in litigation from 1873 until 1885, and the name was changed to the Irondale Rolling Mills, which has been retained ever since. The plant consisted of a muck and bar mill driven by a double-balanced poppet valve engine. It was the original intention of the firm to wreck the mill and remove it to some other location. However, it was decided to keep the plant at Irondale, and the wisdom of this decision has since been fully demonstrated.

Immediately after it was decided not to remove the plant, the muck mill referred to above was dismantled and a 22 x 48 inch sheet mill was erected, the product for the first year being about 2100 tons of black sheets for galvanizing purposes. From the commencement of operations, the product of the firm was disposed of as fast as made, and for the purpose of keeping pace with their growing business a second sheet train 22 x 38 inches in size was added, increasing their capacity to about 4000 tons of black sheets per year. Upon completion of the this second train, the manufacture of fine sheet steel for stamping purposes was commenced and carried on successfully. At this time the firm decided to go into the manufacture of galvanized sheets, and for this purpose the property of the Morgan Furnace Company, consisting of casting house and about 4½ acres of ground, was purchased, the property lying just across the tracks of the Cleveland & Pittsburgh Railroad. The casting house was remodeled and necessary machinery erected, and was operated as a galvanizing department until July, 1892. However, on account of the very low prices ruling for galvanized sheets, but principally on account of the passage of the McKinley bill, the firm decided to go into the manufacture of tin and terne plate. In April, 1891, the erection of two tin mills was commenced, both mills being driven by the same engine. These mills are 23 x 32 inches, and contain three sets of cold rolls, necessary heating furnaces, pickling vats, &c. Included in the equipment was a Mesta pickling machine furnished by the Leechburg Foundry & Machine Company of Pittsburgh and six Morewood tinning pots, the first sheet being tinned on February 24, 1892.

These two tin mills were erected under the immediate supervision of William Banfield, treasurer and manager of the firm, who has been connected with the manufacture of tin plates in various capacities from his boyhood. Mr. Banfield came to America in 1872, and was employed in the first tin-plate mill built in this country, that of Rogers & Burchfield, at Leechburg, Pa. For many years Mr. Banfield made a thorough study of the manufacture of tin plate by the methods then in vogue in this country and in England, and decided that by making certain changes in the machinery much of the laborious work could be done away with, and at the same time the tonnage could be considerably increased. When the erection of the two tin mills at Irondale was begun, instead of proceeding according to methods in use in England in the equipment of tin-plate plants, some radical departures were made, by which much of the hard labor has been dispensed with and the output very largely increased.

As is well known, under the old practices it was the custom to roll down from one bar at a time, breaking down on one train and finishing on the other. This, of course, meant additional trains, and consequently increased breakage in rolls. Mr. Banfield adopted the plan of rolling down from two bars simultaneously, breaking down and finishing on the same train. In the old practice the dimensions of the rolls were as follows: Necks 14 inches in diameter, body 18 inches and length of rolls 26 inches. The rolls as erected in the original tin-plate mill at Irondale measured as follows: Diameter of necks 18 inches, body 23 inches and length 32 inches. The increased size of the rolls enabled the firm to considerably increase the output over the old method and as stated above made the work much easier for the men.

The very gratifying success met with by the firm in the manufacture of tin and terne plate, from the time operations were commenced, and the fact that their plate was being sold as fast as made, induced the firm to considerably enlarge their capacity, and in June, 1892, the two original sheet mills were changed into tin mills. The furnaces were rebuilt, rolls changed from 22 x 48 inches to 24 x 32 inches and a second Mesta pickling machine was added. When these changes were completed the output of the firm amounted to about 3000 boxes per week, of which the firm tinned about one-third, the balance being sold to other manufacturers for tinning purposes. The demand for their tin and terne plate having largely outgrown their capacity for production, the firm decided early in this year to tin their entire product of sheets, and a contract was let for the erection of two Thomas & White automatic tinning machines, which have been built in the old galvanizing department. These two machines were put in operation a few days ago and are working very successfully. The entire output, amounting to about 3000 boxes per week, is now being tinned, the firm having retired from the market as sellers of black sheets. Of this output 2500 boxes per week are bright plate of the various grades and the balance are terne plate.

In September, 1892, the frame building containing the two new tin mills was destroyed by fire and has been replaced by an enlarged iron building, built by Riter & Conley of Pittsburgh. The main building is 90 x 160 feet in size, with wing 32 x 160 feet. These two mills were idle only two weeks, that being the time required to clear the *débris* away, as the firm erected temporary sheds over the men while the new building was in course of erection. During the two weeks ending on April 8 last the output of black sheets for tinning purposes was considerably larger than the output for any previous two weeks in the history of the firm, the output for the period in question being as follows:

	Pounds.
IC sheets	446,960
IX sheets	123,650
IXX sheets	14,630
Total	585,240

A circular just issued by the firm gives a complete list of the various kinds of plates which they make, and the various uses to which they are particularly adapted. The list, as given in the circular, is as follows:

Bright Charcoal Plates

IRONDALE AAA.—A perfect plate, selected with great care; oil process; extra heavy coated; silver finish in finest quality palm oil. Packed in tissue paper. Just the plate for special work. Made to order only in 20 x 28.

IRONDALE AA.—An exceedingly fine plate; oil process; made with great care; heavily coated; fine palm oil finish; thoroughly inspected. An excellent bright charcoal plate for fine work.

IRONDALE A.—A carefully selected and very well and evenly coated bright charcoal plate. oil coated and oil finish.

IRONDALE B.—A clean, bright, finely finished charcoal plate; inspected with care. Oil finish. Unsurpassed at the price.

Coke Plates (Bright).

IRONDALE C.—A First-class coke plate; well coated; thoroughly annealed; excellent working qualities. Suitable for ordinary stamping work.

Charcoal Plates (Ternes).

IRONDALE AA.—An extra heavy coated rolled plate. Best possible that can be produced on patent rolls. Palm oil coated and oil finish; thoroughly assorted. Very soft and pliable, of exceptionally fine working quality.

IRONDALE A.—An excellent plate in every respect, equal to IRONDALE AA, except in amount of coating. Palm oil coated and oil finished.

IRONDALE B.—Working qualities equal to above; differs only in manner of coating. A good, reliable plate. Oil finish.

The shipping facilities of the firm are all that could be desired, being located on the main line of the Cleveland & Pittsburgh Railroad and only a few miles away from the main line of the Pittsburgh, Fort Wayne & Chicago and the Pittsburgh, Cincinnati, Chicago & St. Louis (Pan Handle route) Railroads, and having the same rates of freight as prevail from Pittsburgh. On one side of their plant is a switch, on which all fuel and stock is received and discharged into the works, while on the other side another switch extends to the shipping department, on which all shipping is done. Coal is used exclusively for fuel and is obtained at a very low cost, as the firm own about 720 acres of coal lands, and in addition to mining all coal needed for their mills, are extensive shippers of this fuel as well. In conclusion it can be said that Wallace, Banfield & Co., Limited, have a most complete plant in every respect for the manufacture of tin and terne plate, and

under the careful, efficient management, which prevails in every department of their business, continued success is assured. Of the many thousand of boxes of their product which have been sent to all parts of the country, not a single box has been returned to the firm on account of defective quality. The main offices are at Irondale, Ohio, with branch offices at 106 Third avenue, Pittsburgh, Pa. The officials of the firm are as follows: John C. Wallace, chairman; H. T. Duff, secretary, and William Banfield, manager and treasurer.

SCRAP.

A CURIOUS INDUSTRY is said to have lately arisen in the Punjab, India. Large quantities of kerosene are imported from Russia and America, and the tin cases containing the oil are sold cheaply when empty, and eagerly purchased by the whitesmith, who manufactures from them a number of articles, both fancy and useful, including lanterns and lamps, dispatch boxes, bird cages, watering cans, kettles, and last, but not least, jewel boxes for native ladies. Packing cases, which frequently arrive from Europe with tin linings, are also utilized in the same way.

THE FALCON TIN PLATE & SHEET IRON Company, Niles, Ohio, have been incorporated with a capital stock of $300,000. The incorporators are Warner Arms, M. I. Arms, C. D. Hine, W. P. Arms and W. D. Knowlton. The Board of Directors and officers will, it is said, be practically the same as those who have had the management of the late Falcon Iron & Nail Company. When fully completed it is reported that the company's mills will have a capacity of 10,000 tons of finished light plates and sheet iron annually. The tinning plant will probably be in operation about the middle of May.

THE AMERICAN TIN PLATE COMPANY at Elwood, Ind., are at present crowded with orders, and it has been decided to double the capacity of the plant. They are producing weekly 2000 to 2200 boxes of bright and terne plates and cannot keep pace with the demand. They are building a bar mill to make their own billets, and expect to have it in operation about May 1. The capacity of the black sheet mill will be increased from 2000 to 4000 boxes per week, so as to equal that of the tin house. They report their business as being entirely satisfactory barring lack of capacity, and no complaints have been had as to the quality of their plates.

THE WORKS of the Morewood Tin Plate Company, Elizabethport, N. J., are reported to be in full operation. The average weekly output at present reaches 3000 boxes of bright plates and 2000 boxes of ternes.

THE MILLS of the Indiana Tin Plate Mfg. Company, at Atlanta, Ind., were opened on April 5, with a capacity of 1800 boxes of tin and terne plates per week. The first shipment was made on the 21st inst., when two carloads of plates were sent to Tanner & Sullivan, Indianapolis, Ind. They are at present coating black sheets, of both home and foreign make, the construction of their rolling mill having been delayed by the recent bad weather. The sheet mill is being rapidly pushed, and will be in operation not later than July 1 next. The present capacity of the tin house will be increased to 2400 boxes per week just as soon as the pots can be added. These are being rapidly placed and will be ready in about two weeks. Atlanta is in Tipton County about four miles south of the county seat, and is at the outer edge of the strongest flow of natural gas. These works when completed will be most thoroughly equipped, and it is expected that the plates produced will rival any in the market.

BUILDING is going on actively at the large plant of E. Morewood & Co., Gas City, Ind. The tinning portion of the works is said to be well forward, and it is hoped that some of the pots will be in operation in about six weeks' time. The rolling mill plant will be installed as soon as possible.

PROSPECTS are thought to be good for the tin-plate trade this year. Although the backwardness of the season has been felt by a dull market of late, it is expected that, with the advent of settled weather and a general resumption of building operations, a large demand for roofing plates will develop during the next month or so. Indications point also to an exceptionally brisk demand for bright tin for canners' uses during the season.

A MEETING of the Tinned Plate Manufacturers' Association will take place at Pittsburgh on Tuesday, May 2, when it is expected that important questions in relation to the wages of tin-house operatives will be brought forward for consideration. Rumors are prevalent that a demand for an increase of 25 per cent. has been decided upon by the skilled workmen in tin plate factories, to take effect from July 1.

A. A. THOMSON & Co. of New York are calling attention by circulars to their Puritan roofing plates, a high grade handdipped terne, which is claimed to approximate in quality to old style imported plates. Messrs. Thomson & Co. report a very wide demand for these plates, which they are able to place on the market at the same price as Worcester grade. The firm's tinning establishment is kept in full employment in order to meet current orders.

A PROMINENT New York importer of tin plates has recently returned from a Western trip, in the course of which he visited some of the new tin-plate factories where the plates are made from start to finish, rolled and coated, by the same concern. He expresses himself as surprised at the excellence of the product he saw, both in bright and roofing plates. The domestic black sheets used he pronounces to be fully equal, if not superior, to any imported sheets he has ever seen, while the quality and coating of the finished plates compared favorably with that of the best Welsh brands. The only question in his mind is whether American manufacturers will be able to continue to afford making such a high quality of plates and selling them at present prices, even if the protective tariff were to remain intact. It is, however, beyond question that American tin-plate makers have succeeded in turning out genuine American plates which cannot be beaten by anything sent to this country from abroad.

JOHN HAMILTON of Pittsburgh, manufacturer of Hamilton's best redipped American roofing plates, recently supplied the Pittsburgh Locomotive Works, Allegheny, Pa., with 150 boxes of 20 x 28 inch plates of the above brand.

Galvanized iron is said, by the *Australasian Ironmonger*, to be in considerable demand for school buildings in the country districts of Australia where the population is not altogether fixed. Its advantages over stone and wood for this purpose have been proved by experience. Stone buildings of the cheapest kind were found very costly, the dwindling of the popula tion often leaving the stone schools a worthless asset on the hands of the Government. Wooden schools lined with wood required paint every now and then, and besides, through shrinkage of the timber, the dust, as well as hot and cold winds, entered between the boards, to the discomfort of the children. Of late years galvanized iron, whitewashed outside and lined with wood inside, has been resorted to, and it has now been found more satisfactory to use galvanized iron solely. Instead of using wood lining, 28-gauge small fluted corrugated iron is used, the building being sun-proofed internally and externally with a preparation of lime, sugar, salt and boiling water to prevent the absorption and subsequent radiation of the sun's rays. An experiment has been tried with two iron schools, one sheathed with wood and the other with iron, with the result that the former has been found to get two or three degrees warmer during the day than the iron-lined room. Besides its sanitary advantages, the cost of an iron building is considerably less than a stone or wooden structure, and if the population moves the school also can be moved without material detriment.

Employers' Association of Tin and Sheet-Iron Workers of Cook County, Ill.

The above association held a meeting at the Builders and Traders' Exchange, Chicago, Tuesday, April 18, at 2 p.m., for the purpose of effecting an organization for mutual benefit and protection. About 80 per cent. of the trade in Cook County was represented and a spirit of unanimity was shown by all present. At a previous meeting the following officers were chosen: George D. Hoffman, president; F. F. Porter, vice-president; B. F. Rubel, secretary, and A. A. Spear, treasurer. The committee appointed at previous meeting to draft constitution and by-laws reported, and after general discussion the constitution and by-laws were adopted without material change. This association proposes to treat with the Tin and Sheet-Iron Job Workers' Union as an association instead of individually, and deems it necessary to adopt this policy, owing to the fact that the union referred to has presented to the employers an agreement which in their opinion contains many arbitrary provisions to which the employers seriously object, holding that the signing of that agreement would virtually take the management of their respective businesses out of their hands. The disposition on the part of the association was one of fairness toward their employees. With the prospect of a quiet year, and a superabundance of labor, owing to the flocking to Chicago of large numbers of tinners for the purpose of working on the World's Fair buildings, this is considered a very inopportune time for the union to ask exorbitant wages. A committee appointed at a previous meeting presented articles of agreement which the employers considered just, and which it was proposed to submit to the union and the committee was continued and clothed with power to act, and also instructed to advise the union of the organization of the Employers' Association.

The International Sanitary Congress was opened at Dresden, on March 11. About 60 delegates attended its deliberations, the object of which is to determine messures for bringing into harmony the interests of international communication and to obtain mutual information as to the best methods of preserving the public health. The debates are to be kept strictly secret, and the results will not be published until the congress is closed.

On page 40 of *The Metal Worker* of April 15 was a cut illustrating the warming of a church, showing the furnace-pipe plan. The smoke pipe, as some of our readers may have noticed, was there given as 2 inches. It is hardly necessary to say that this was a mistake of the engraver. It should have been 8 inches, the size given in our correspondent's sketch.

THE RETAIL STORE.

How to Avoid the Accumulation of Dead Stock.

THIRD ARTICLE.

BY W. T. WARSOP.

Buy Lightly of goods not yet introduced, for when put in stock they may prove unsalable.

Where the price is equal, or nearly so, buy goods of established reputation in preference to those said to be just as good. Salesmen soon become tired of trying to sell the new goods and hand out the goods already introduced, leaving the others to be invoiced as dead stock at the yearly inventory.

Change Samples often, selling old ones as soon as possible; even, if necessary, make a discount to induce buying.

Buy as nearly as you can only what your trade demands, thus avoiding a surplus which is liable to become damaged or soiled. But one of the firm should buy the same kind of goods.

Display Goods, making a point to have each article kept for sale sampled. Customers will always choose clean, bright goods, leaving the soiled ones to become more unsalable.

Exercise great care in selecting goods, offering the best you can at a fair price.

Advertise specialties in your local papers, being particular to call attention to special goods.

Keep a good assortment, but do not try to keep everything called for, as that impossible and unprofitable.

Keep good help, as a good salesman will sell poor or unsalable goods better than a poor one.

Take inventory as often as once a year, noting if goods have been long on hand.

In ordering goods be explicit, thus avoiding getting goods you do not want.

When marking remnants make memorandum of size, kind or other necessary information on tag, and attach same to remnant, so that salesmen can see if it will meet the wants of customer.

When improved goods come out to take the place of others, make a price on old style that will sell them.

Before replenishing goods take a memorandum of what you have on hand, you will then know sizes or kind wanted.

Do not allow help to use new tools or other articles about the store as it injures the sale of same.

Repairs ordered but not called for or taken by customer for any reason should be tagged with name, date, size, &c., so they can readily be seen by salesmen who may offer it for sale.

Keep bargain counter for damaged articles in stock, goods to be cleaned out, or odd things disposed of. If for any reason the articles cannot be placed on counter have card printed naming article and price of same.

Damaged Goods should be put in as good order as possible and sold at less than regular price.

Seasonable goods should be displayed a little in advance of the season, thus being brought to the notice of customers.

Old stock should not be pushed back on the shelves, but should be brought to the front, making an effort to sell it first.

Goods of the same kind should be kept as near together as convenient, for if kept in several places salesmen may report none in stock, and the proprietor thinking it necessary buys more.

Don't pay too much for goods. But if you find you have done so, make a point to sell as cheaply as other dealers.

Have a regular place for surplus stock, so that when those exposed for sale are all gone salesmen will know where to look for more.

Special prices should be made on seasonable goods near the end of the season to close out.

Goods sent wrong, such as wrong in size, kind or quality, should be returned. This is better than to hold them, thinking you may sell them some time.

The Kempshall Hose Mender.

Underhill, Clinch & Co., 94 Chambers street, New York, as agents for the E. Kempshall Company, New Britain, Conn., are introducing the mender illustrated in Fig. 1. It is made of refined malleable iron, and in use requires no straps. It is simply screwed into the hose, and the levers hammered down, as in Fig. 2. The manufacturers claim that they will never work loose.

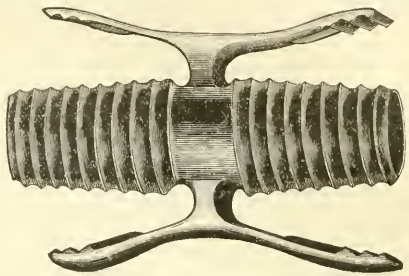


Fig. 1.—The Kempshall Hose Mender.

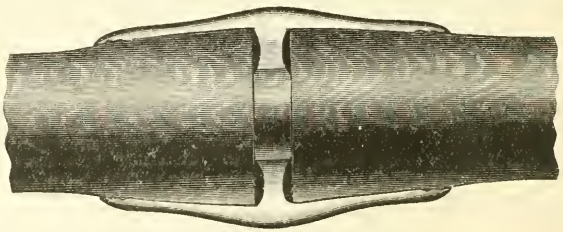


Fig. 2.—The Kempshall Mender Applied.

MEMORANDA.

EDWARD AUSTERMUHL, a stove dealer and tinner at 525 Market street, Camden, N. J., who resides in one of its suburbs, has been elected as a school trustee for the Rosendal district to serve three years. An appropriation of $6500 has been made for the use of the schools. This is an evidence that these people knew in which trade to find a man to look after drafts and stop leaks.

WILLIAM H. TEFFT, formerly of Saratoga, N. Y., died at Denver, Col., April 18, aged 30 years, of consumption. For several years he was employed in the hardware store of William Waterbury at Saratoga. He was an Odd Fellow and a Mason.

THOMAS COFFIN died at Brooklyn recently, aged about 80 years. He was one of the old business men of Poughkeepsie, N. Y. Having been a member of the firm of A. J. Coffin & Co., stove dealers, who kept on Main street, that city. He was at one time a member of the board of trustees and was also a member of the Board of Aldermen in the early days of the city. His business history was associated with the early days of Poughkeepsie.

THE HARDWARE STORE on East Water street, Elmira, N. Y., formerly conducted by C. W. Young & Co., is now under the management of John E. Stowell & Co. The business has been established 25 years, and the new management will undoubtedly continue it successfully. Mr. Stowell is of the firm of Babcock & Stowell of Binghamton, N. Y. W. P. Chase will manage the Elmira house.

The new annual Tax Rate bill in New York State fixes the rate at 2.24⅜. Last year the tax rate was 1.98.

Sultana Sad Iron.

William Vogel & Bros., selling agents for H. Clayton & Co., 37–47 South Ninth street, Brooklyn, N. Y., are offering the sad iron shown herewith. In Fig. 1 the iron, with stand, is illustrated, and in Fig. 2 the operation of heating the iron by alcohol. The top of the iron is provided with indestructible packing, which in operation is saturated with alcohol, lit, and the top turned down. The top and bottom of the iron are fastened together by turning the thumb-piece near the front of the iron, and the flame striking against the bottom heats the iron for use. The stand is so arranged that when placed in position, as shown in Fig. 2, with the handle, they form a three-legged base to hold the iron in position while being supplied with alcohol and being lit. The openings around the sides of the iron provide ventilation for the flame. The iron is also provided with an opening at the back suitable for admitting a gas jet, and gas may be used for heating the iron in place of alcohol. The iron is nickel plated and may be heated, the makers claim, in either way in from seven to ten minutes. They also state that the iron is perfectly safe.

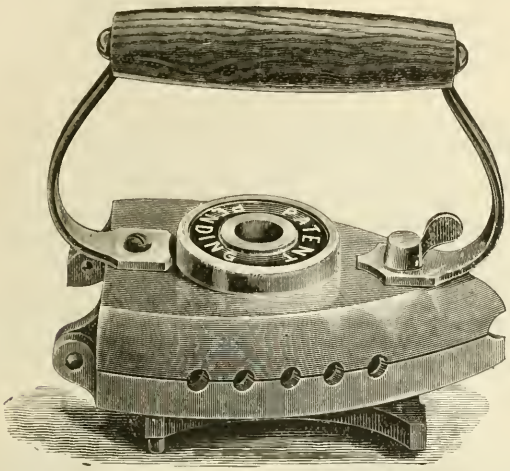


Fig. 1.—Sultana Sad Iron.

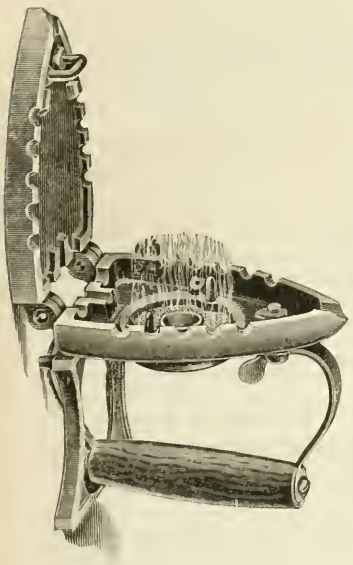


Fig. 2.—Sultana Iron Heated by Alcohol.

What Retailers Say in Regard to Sales to Their Customers by Manufacturers and Jobbers.

The articles which we have published in regard to the manner in which manufacturers and jobbers encroach upon the legitimate trade of retail merchants have attracted a good deal of attention and called out many responses from the trade. Some of the prominent jobbing houses express their gratification that the matter has been taken up by members of the retail trade, and allude to the question thus brought up as rapidly becoming a very serious one, not only to retail Hardware merchants, but also to jobbers. They specify cases in which manufacturers in certain lines sell to jobbers at fixed prices, and bind them by agreement to sell at other fixed prices to their customers. It is stated that then the manufacturers accept orders from large grange supply houses and sell to them at a rate which enables them to retail the goods at relatively low figures.

In the letters which are given below it will be observed that our correspondents refer to the condition of things as seen from their standpoint. It will be seen that reference is made to the fact that the trouble in question is not confined to the manufacturers, but that in some cases jobbing houses are referred to as dealing with consumers in a way that is troublesome to the retail merchants. The whole question is one of very considerable interest and apparently of growing importance as there appears to be an increasing tendency in the direction of transactions between consumers and both manufacturers and jobbers. We invite a thorough discussion of the question in its different aspects, and shall be glad to hear from any of our readers in regard to the matter. The letters printed below are written from the retailer's point of view. There is obviously something to be said also in regard to the interests of jobbers and manufacturers in the matter. In the letters we omit the names of our correspondents and indicate simply the State in which they are located:

ILLINOIS.—We have trouble with the jobbers in the West, especially with the Gun, Ammunition and Binding Twine trade, and this has gone to such an extent that the Gun trade is nearly ruined. We have had no difficulty so far with manufacturers.

GEORGIA.—We are annoyed and lose considerable trade by both manufacturers and jobbers selling direct to consumers, especially the jobbers, and this practice we are sorry to say is on the increase.

ALABAMA.—We have felt some inconvenience from this practice. Both jobbers and manufacturers put men in our territory and sell to the trade that by right belongs to us. We trust you may be successful in overcoming this practice to a certain extent if not entirely.

ILLINOIS.—We lose some trade by jobbers and manufacturers pricing and selling to our best contractors. The most of our trouble is with jobbers from the small cities like Peoria, Quincy and Burlington. We are continually having their prices quoted to us by contractors and it seems to be growing every year. These small jobbers claim that they should have some of the trade and if they cannot get it through the merchant they must go to the contractor or consumer. The contractor will go to these jobbers and buy a bill and pay spot cash for it and then ask us to duplicate it and wait for payment until the job is done, or from three to six months.

ALABAMA.—We are troubled to some extent with jobbers, some of the smaller of whom visit our blacksmiths and a few of the factories.

ARKANSAS.—There is a great amount of business that is done direct with the jobber, and the worst feature of the matter is that their trade is of course all cash, while all of the time trading is done with the home dealer. We do not patronize a jobber who sells direct, if we know it, and think all other business men should do the same.

ILLINOIS.—There is a tendency in the direction of manufacturers and jobbers selling to consumers in their territory, both from Chicago and St. Louis, but the retail dealer appears to have no redress in the matter.

ARKANSAS.—We are annoyed considerably by jobbers selling in our territory to consumers.

INDIANA.—With some of our customers manufacturers and jobbers are our worst competitors. The jobbers in our neighboring city will solicit our trade at a named price and then turn around and sell to our customers at the same price. We have some customers that from three to five years ago we sold, say, from $50 to $150 worth of goods a month, who today buy only $10 to $20 worth of goods a month. It is a question with the retailers here as to what will be the outcome of it all unless we retire from the field and leave it to the jobber. We think that this tendency to deal with consumers is growing and will soon have to be met by some means, for we do not think the consumer can do without the retailer.

CONNECTICUT.—We see a growing tendency on the part of both manufacturer and jobbers of going to the consuming trade in our vicinity, and we are sorry to see some of the large manufacturers of New Britain coming here and selling, if at all possible, to the manufacturers, sending one drummer to the factories and another to the Hardware trade.

DELAWARE.—We consider the complaints referred to as likely well founded, and that circumstances here would justify a similar statement, though we would not specify cases or enter into particulars.

ILLINOIS.—There seems to be an increasing tendency in this direction. Especially is it the case with jobbers. It interferes with my trade to a considerable extent, besides being a great deal of annoyance.

CONNECTICUT.—We are more or less annoyed by manufacturers quoting prices and selling goods direct to our customers, as is probably the case with every wholesale house. In some lines of goods we think the manufacturers are pushing for the smaller trade, but generally we find very little difference as regards our trade.

DELAWARE.—The trade has suffered annoyance and very great loss by the practice of manufacturers and large jobbers in catering directly to the consumers. The epidemic of pool and trust organizations which has been prevalent during the past three or four years, we think, has been the chief cause of bringing the manufacturer and consumers together. For example: The manufacturers of a certain line of goods would organize and agree to the same price, without regard to the quality of the goods, thus, of course, obliging the middleman to buy the best quality, and the manufacturer of the poor quality, not being able to move his goods through the jobber, was driven to sell directly to the consumer, and the consequence was that soon all manufacturers were obliged, for their own protection, to work directly with the consumer.

Another very serious cause has been the matter of urging sales by dating the invoice from one to three months after the shipment of the goods.

The grestest injustice of this system is shown in the fact that we are obliged to carry a large stock and meet the low prices named our trade by the manufacturers, sell in small quantities at these cut prices and take notes in settlenent, renewing them from time to time, while the manufacturer sells our trade for cash and in large quantities, leaving the paper here and sending the cash away.

We believe that if there is not a change made that eventually the manufacturer will have to add another department to his business—that of jobbing.

ALABAMA.—We have noticed a growing tendency in this direction, but it is hard to estimate amount of damage done. We, of course, do not suffer as much as those of the trade located near the manufacturing centers.

INDIANA.—Of late we have been bothered more or less with manufacturers, and especially jobbers, selling to consumers in this part of the State. This is done more particularly in Barb Wire and Merchant Iron.

FLORIDA.—The practice of manufacturers selling their goods direct to the consumer is in our case probably a matter of greater annoyance than any one else in the country. We are situated in a section of the country that is a great resort for overworked and elderly people and many of the manufacturers who come during the winter in search of rest and health endeavor to unload a sufficient quantity of goods to make expenses; this they generally do at a less price than we would care to sell, which has the tendency of fixing the price for future transactions. We think it is an evil which if properly called to the minds of the manufacturers would be very quickly remedied.

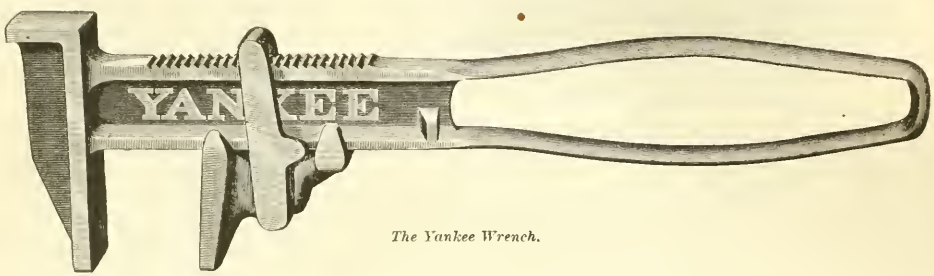
INDIANA.—We have been very much annoyed by the practice of manufacturers and jobbers selling to our trade, and ever since the F. M. B. Association was organized in our State the tendency has been more in that direction. Feeling ourselves unable to do anything to counteract it we have patiently endured.

ILLINOIS.—We have found an increasing tendency in this direction. We have had several very extraordinary instances of jobbers selling direct to consumers. One we have in mind is that of a large Paint firm of Chicago going to the trouble of hiring a team and going ont in the country to sell a job of Paint. But we beat them by selling at their prices, or cost to us. In some lines we think that the fault is in the retailers forcing them to sell so cheap that they have to sell wherever they possibly can, making them a larger aggregate of sales.

If there was concerted action taken on the part of the retailer and jobber to stop the manufacturer from selling direct to the consumer, it would probably stop the jobber from doing the same thing.

CONNECTICUT. — We are annoyed by manufacturers and jobbers (particularly the latter) quoting consumers lower prices than to the dealer. Many consumers do not fully appreciate the retailer carrying a stock to order from when needed, but will buy of agents or direct from the manufacturers, many times paying more for goods than the regular retail prices.

ALABAMA.—Regarding the practice of manufacturers and jobbers selling goods to consumers, the only trouble we have had in this direction is with jobbers of Firearms and Sporting Goods in St. Louis and Philadelphia—St. Louis more especially. There is a certain large jobbing house there in this line that regularly send circulars with their lowest prices to men, women and children all over the country regardless of their "race, color or previous condition." All such firms should be systematically boycotted by the trade.



The Yankee Wrench.

The Yankee Wrench.

The Gwinner Mfg. Company, Hamilton, Ohio, for whom Harmon & Dixon, New York, are agents, are offering the above wrench as shown herewith. The wrench is 9 inches long, weighs 12 ounces and is made entirely of malleable iron. In adjusting it the lower jaw is slipped along to the required position, when the yoke drops into one of the notches at the top, holding it firmly in place. It is quickly adjusted and, the manufacturers claim, never slips.

Two large deposits of nickel have been discovered in the Kootamie district of British Columbia, easily accessible, but the ore has not yet been assayed, and it is not known if it can be worked at a profit.

STOVE TRADE NOTES.

The Stove Manufacturers' Convention.

Preparatory to the annual convention of the stove manufacturers, to be held the end of next month in Chicago, the secretary, D. M. Thomas, issues from his office, 80 Broadway, New York City, under date of April 24, a series of circular letters to the Manufacturers' Association, the Defense Association and other stove makers. The following letter is addressed to the members of the National Association of Stove Manufacturers:

The twenty-second annual convention of the above association will be held at the Palmer House, Chicago, on Wednesday, May 31, 1893. Proceedings will commence at 10:30 a. m. sharp. The change has been made from Detroit to Chicago in accordance with the authority given to the Central Executive Bureau. The president trusts that every member will be present, and as he has given a general invitation to all stove manufacturers, he hopes that you will make it your business to see that his invitation is widely accepted, and bring your neighbors with you. Efforts have been made and will be made to provide such a programme as will be interesting, instructive and profitable. Subjects will be considered that concern every stove founder alike. Please advise me of your intention of being represented by filling out and returning the inclosed form. Firms wishing to be represented by employees, must furnish them with credentials addressed to me.

The next letter is the announcement of the annual meeting sent to the members of the Stove Founders' National Defense Association:

The eighth annual meeting of the Stove Founders' National Defense Association will be held at the Palmer House, Chicago, on Tuesday, May 30th next. Proceedings will commence at 1.30 p. m. sharp. The president hopes that each member will be present without fail. If there are any stove founders who would be desirable members that are not now on our rolls, it would be well that they should be influenced to send their application to me at least two weeks before the meeting. Please inform me of your intention of being present by filling out and returning the inclosed blank.

The third communication, which we print below, is a general invitation addressed to stove manufacturers, that they will attend the coming convention:

The twenty-second annual meeting of the National Association of Stove Manufacturers will be held at the Palmer House, Chicago, Wednesday and Thursday, May 31 and June 1 next. The president instructs me to give you as non-members a most cordial invitation to attend and participate in our deliberations. We shall be glad of such advice and information on all subjects discussed as you may seem fit to impart. Strong efforts are being made to prepare such a programme for the convention as will render it profitable to all in attendance. As the Columbian Exposition will then be in full blast and there will be no better time to visit it your attendance in Chicago will be most opportune. It will afford me pleasure to engage hotel accommodation for you on the same terms as made for our members, particulars of which will be found in the inclosed circular. Please advise me promptly of your intention of being present by filling out and returning the inclosed form.

Those who are concerned as to the accommodation that will be offered at Chicago at the time of the convention, will be interested in the following letter from Secretary Thomas, addressed to stove manufacturers:

The Palmer House Company have agreed to reserve rooms for attendants at our Convention at their usual rates, which are,

For rooms without bath, with meals, $3.50 per day.

For rooms without bath, without meals, $2.00 per day.

For rooms with bath and meals, $4.50 per day.

For rooms with bath, without meals, $3.00 per day.

And upward, in each case according to size and location of room. As the Columbian Exposition will cause the Chicago hotels to be all crowded with guests at the time of the convention, and the Palmer House perhaps most so, the proprietors ask that such of our members as are sufficiently intimate with each other to do so will occupy rooms jointly, so that by placing two beds in a room their power to accommodate the general public will be correspondingly increased. They do not stipulate for this in their agreement with me, but simply ask it, when unobjectionable, as a matter of convenience. To insure satisfactory accommodation, it will be necessary that immediately on receipt of this you inform me how many and what price rooms you require, how many will be in your party, and from and to what date you require the rooms. For parties who make application on the inclosed form I will engage such accommodation as they desire. Application may be made direct to the Palmer House Company, but our members will probably be better served, if made through me. Do not delay application. I cannot guarantee good service much later than May 1.

Our readers have been informed of the action taken at the conference between the committees of the Stove Founders' National Defense Association and the Iron Molders' Union, at which an advance of wages was requested and refused. The following letter from Secretary Thomas, addressed to all stove founders, will be read with interest in this connection:

I am instructed by the president of the Stove Founders' National Defense Association to inform you that at the recent conference between the committees of that organization and of the Iron Molders' Union, to consider the request for an advance of 15 per cent. in wages, the molders' representatives declined to take "no" for an answer, and it was determined to give their committee an opportunity to appeal in person to the stove manufacturers at large on the occasion of the annual conventions of the two national associations, which occur May 30, 31 and June 1 next. You are therefore invited to attend a special meeting of stove manufacturers, to be held at the Palmer House, Chicago, at 10 o'clock on the morning of Thursday, June 1, at which the matter of an increase of wages will be considered, and, if possible, finally decided. The officers of the Molders' Union will be present. This is an occasion of great importance to you personally. The demand is made and insisted upon. No decision that is not concurred in by the whole trade will be satisfactory. You are earnestly requested to be present and lend the weight of your influence to the verdict, whatever it be. Please advise me on the inclosed form of your intention to be present.

Accompanying these letters Mr. Thomas has sent out blanks to be filled out by those who propose to attend the convention of manufacturers or the meeting of the Defense Association. There is likewise a blank on which to make request for hotel accommodation.

The Milwaukee Gas Stove Company.

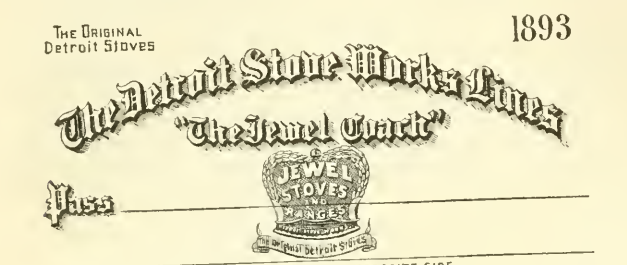
The new catalogue of the Milwaukee Gas Stove Company of Milwaukee, Wis., is a handsome publication of 26 pages. Special care has been taken in its preparation. The cuts are of a high order of excellence, and all other details indicate perfect taste in catalogue work. The goods made by this company are all put on the market under the brand Perfection. The burner used is of a distinctive type peculiar to this company. Large sizes for top cooking are made in the shape of a seven-pointed star, in the arms of which there are holes drilled for the passage of gas. An ingenious cleaning device is a permanent fixture. This consists of a light frame running under each arm of the burner, with a needle projecting upward under each hole. A lever projecting a short distance outside the stove operates all the needles simultaneously, forcing them up through the holes. The oven burners are telescopic, being so constructed that they can be drawn out of the stove to be lighted and then pushed back in place, thus doing away with the necessity of the operator stooping and also avoiding all danger of explosions from gas suddenly filling the oven. Special burners for ironing are 6 inches long and of oblong form, while small ones are provided for simmering. The Perfection valve has a double gas way. One is operated by a small wheel and regulates the amount of gas passing, in the usual way, while the other is controlled by a set screw, which permanently regulates the supply of gas according to its pressure. This peculiar construction enables the valve to be used for either natural or artificial gas.

The largest sized Perfection range is a six hole range 35 inches high, with a top-plate 50 by 30 inches and four compartments. One of these is for baking and roasting, one for broiling, one for warm-

ing and one for the water heater. The ovens are very large, and the broiler is on the same level as the baking oven. Much attention has been given to the design of this range, to secure a fine appearance as well as perfect adaptation to the purposes sought. All parts are made on the interchangeable plan. The weight of this range, crated, is 600 pounds. It can be used for natural, artificial or gasoline gas, and is furnished with or without the water heater. The water heater is of special construction, which is worthy of note. It consists of coils made of heavy drawn copper tubing, which are tested to 75 pounds steam and 200 pounds cold water pressure. Being made of copper, which is the best conductor of heat, and having an even thickness throughout, the manufacturers claim superior advantages for this heater. The next size is also a 6-hole range, but the top is 40 by 25 inches. The next has a top also 40 by 25 inches, but differs in having four cooking holes. Another class of ranges has tops 43 by 24 inches, four cooking holes, two compartments only (one for baking or roasting and one for broiling) and the water heater on a bracket at the side with two holes over it which can be used for cooking while water is being heated. Another 4-hole range has a top 33 by 23 inches. A still smaller range has three holes and a top 33 by 24 inches. A new 4-hole range, 40 by 24 inches, which has just been brought out, is of a very handsome pattern, the cast front, doors and base being molded in artistic designs of scroll and fluted work. The Perfection water heater is for independent water heating, cylindrical in form, 20 inches high, and fitted with a telescopic burner, which can be pulled out, lighted and pushed back in place. A line of Perfection gas heaters is made in three styles, one being cylindrical with round reflectors, the second also cylindrical with asbestos fronts and the third square with either reflectors or asbestos fronts. The company also manufacture hot plates or portable stoves with one to three burners, small single burner stove, tailors' iron heaters, soldering furnaces, coffee roasters, candy heaters for manufacturing candy and gas kilns for firing china and glass.

Pass for the Jewel Tally-Ho Coach.

In our issue of last week we called attention to the invitation extended to the friends of the Detroit Stove Works to ride on the Jewel tally-ho coach, which it is proposed to run between the Chicago headquarters of the company, on South Canal street, and the World's Fair grounds. In connection with each invitation is a pass which entitles the holder to transportation on the coach during the progress of the Columbian Exposition, provided it is first duly presented for registry at the Chicago headquarters of the company and countersigned by the second vice-president. A *fac-simile* of the front of this pass is presented in the accompanying engraving, the opposite side carrying a list of officers of the company, and the statement that the pass is not transferable, but will be honored upon compliance with the conditions above stated.



Fac-Simile of Front of Pass for Jewel Tally-Ho Coach.

directly over the center of the furnace and the hottest portion of the fire, thus warming the air with great rapidity and economy.

J. M. Kelly, secretary and treasurer of the Lexington Foundry Company of Lexington, Ky., has invented a detachable sheet-steel oven, which is to be employed in connection with the stoves turned out by the company named. Among the advantages claimed for this form of construction is the uniformity of thickness of the material, which renders baking more satisfactory, its durability and the saving of fuel. The oven is furnished with cast braces under the front of the plates, while stay bolts extend vertically through the lug on the bottom strips and thence through the extreme bottom, thus securing it against buckling or warping. By the simple removal of the thumb screw from a horizontal rod, which extends through the opposite side, and unscrewing the nuts from the stay bolts, the oven can be taken out entire, thus admitting of the cleaning of the interior, or the repairing of any portion of it. At present the ovens are being made of No. 16 gauge metal, although heavier can be substituted when so required. It is also claimed that it is unnecessary to alter any patterns in order to adapt the oven to use. We understand that the Lexington Foundry Company have completed arrangements for the exclusive manufacture of stoves with this feature, intended for the South and Southwest, as well as such other territory as they may see fit to cover. The company are daily receiving orders for stoves embodying this feature and which are sold at a slight advance over the price of those carrying the old style of cast oven.

ODD PLATES.

The Fox Furnace Company, 28 Vincent street, Cleveland, Ohio, send us a circular showing a broken view of the Fox furnace which they manufacture. We understand that this construction is the result of many years' experience in this line of business and combines, it is claimed, the vital points of "great economy and capacity, durability and simplicity." The furnace is provided with triangular bar grate, heavy double corrugated fire pot, dust flue, double casing and steel plate radiator. There is a series of air tubes which conduct the air to be warmed

William Dengel of Salina, Kan. has recently brought to the attention of the trade a stove designed for cooking and heating purposes and embodying several features of novelty. The idea is so to place the stove that it will occupy a portion of two rooms and be so constructed that it can be operated from either or both apartments, as circumstances may require. It is provided with the usual boiler holes, ovens, hot-water reservoir, &c. The work of attending to the fire, cleaning out the soot from the hot air passages, removing the ashes, &c., is intended to be done from that portion of the stove which projects into the kitchen. The other portion of the stove is adapted for the removal of cooked foods ready for the table, the rewarming of different foods, as desired, and the heating of the room in which that portion of the stove projects.

The Huette-Barler Mfg. Company, 111 and 113 Lake street, Chicago, send us samples of circulars which they are now distributing. They comprise a four-page illustrated treatise on the Ideal oil heater, a four-page collection of testimonials, a leaflet on the Ideal roller base for the heater, a circular describing Barler's shine cabinet for a shoe-blacking outfit, and a colored picture of Horticultural Building at the fair, with an advertisement of the shine cabinet on the reverse side.

The Bennett & Peck Company, Cincinnati, Ohio, have been awarded a contract for the heating and ventilating and dry closets for the new school building at Sewyckley, one of the suburbs of Pittsburgh.

It having been learned that the family of M. P. Low were in straitened circumstances, Walter Slade of the Barstow Stove Company very efficiently undertook the raising of a subscription for their benefit. He canvassed the trade, and, being very kindly received, a substantial proof of their appreciation of his efforts was tendered him. Mr. Slade is an indefatigable worker in any undertaking he enters, and in this instance raised about $300. On behalf of the family he tenders to the trade and friends generally their sincere and heartfelt thanks for their kindness.

The Marion Stove Company, at Marion, Ind., report an active demand for their Retort stove, which has been improved for the 1893 trade. They now make this stove to the exclusion of all others. They make also a full line of hollow ware.

What is known as an air pump attachment for cook stoves and furnaces has been patented by George Samuel Boyler and Frederick Rothwell, Havelock, Canada. The object of the invention is to provide a cheap and simple means for feeding a continuous blast of air to the fire box when the fire is started so as to promote combustion. This object is accomplished by placing under the hearth in a horizontal position a compressed-air reservoir leading from which to the fire box or fuel chamber is a feed pipe. The arrangement is such that the compressed air is forced into the fuel chamber of the stove, suitable means being provided for replenishing the reservoir as circumstances may require. A stop cock is provided for controlling the flow of air from the reservoir to the fuel chamber.

The Excelsior Steel Furnace Company, 110–114 South Jefferson street, Chicago, have taken advantage of the dull season just closing to thoroughly overhaul and enlarge their manufacturing plant, taking out much of their old machinery

and substituting new and faster machines wherever possible, and, as a result, they have fully doubled their capacity. All machinery in their factory has either been built by them or after designs furnished by them, and the only exception to this is the new lock-seaming press which they have just received from the E. W. Bliss Company, Limited, of Brooklyn, N. Y., which is a special press recently added to the Bliss line, the one sent the Excelsior Company being the first, it is understood, to be sent West. In response to a demand from the trade for a convenient order sheet, price-list and descriptive circular combined, the company have just issued a four-page circular, on the first and second pages of which they illustrate their furnace fittings and specialties. The third and fourth pages give full lists of these fittings, every size included, with blank spaces in which to fill the quantities ordered. Prices are also attached in connection with every size. The whole arrangement is exceedingly convenient for the company's customers.

THE TROY OIL STOVE COMPANY of Troy, N. Y., are directing the attention of the trade, by means of illustrated circulars, to the Genuine Beauty oil stove, which they state can be procured from H. Rendtorff & Co., Chicago, Ill.; F. M. Borden & Co., Philadelphia; C. B. Corby, 117 Beekman street, New York; H. T. Whitten, Boston, and B. C. Bibb Stove Company, Baltimore. In directing the attention of the trade to this stove, the makers state that the great success which the Beauty has met in years past has this season induced several so-called manufacturers to put on the market a stove so nearly like the company's No. 12 that they are compelled to think one of the stoves has been filed up for patterns. They therefore caution all dealers to examine carefully all new stoves before purchasing. The Troy Oil Stove Company state that they have good valid patents on their stoves, particularly the hinge upon which the body swings, and that they will make every effort to protect their rights.

THE ART STOVE COMPANY of Detroit, Mich., have just issued a catalogue relating to the Laurel oil heaters, adapted to the season of 1893. These goods are illustrated and carefully described, the principal features being referred to in a manner calculated to interest the trade. The Laurel heaters, we understand, have met with a very gratifying success during the past year, and the demand for them in the present season is far in excess of that experienced in 1892. The company attribute this fact to the beauty of the design of the 1893 goods and to their superior construction.

AN APPARATUS for heating and ventilating rooms is the subject of a patent granted on April 18 to William H. Stiverson of Brookline, Mass. The device is intended to be placed next to the window or other opening, and in operation it introduces the warmed pure air from outside into the room without interfering with the use of the window. At the same time the inventor claims the foul air is conducted from the floor of the room together with the products of combustion to the outside. By means of the arrangement employed it is claimed that the air in the room is not vitiated, and at the same time that fresh air is being taken into the room the foul air is being discharged from it. Among the advantages to which reference is made are quickness of operation, cheapness of construction and the large amount of heat thrown out.

THE SYRACUSE STOVE WORKS, Syracuse, N. Y., state that the production of Welcome stoves and ranges for the first three months of the year was more than double that of the corresponding period of last year. They report the outlook for 1893 as very encouraging, and suggest to intending purchasers the wisdom of placing orders early, so that shipments can be promptly made and disappointment avoided when the fall trade opens. The company state that on their Model and Magic Welcome six and four hole ranges they are behindhand with their orders, while the demand for parlor stoves, including those for burning wood as well as those for coal, is greater than ever before at this season of the year.

UNDER THE EFFICIENT MANAGEMENT of Samuel E. Dickinson the trade of the Lehigh Stove & Mfg. Company of Lehighton, Pa., has grown until a new addition to the foundry 64 x 74 feet has been erected to meet the requirements of their business. The improvements will be completed, it is now hoped, by the middle of May. Late productions which have been favored by the trade are the 5 hole range Gem Lehigh, which appears in a new dress, and the handsome square range known as the Valley Lehigh. The latter has high shelf, skirting and reservoir when desired; ventilated oven, pedal door opener, and an excellent duplex grate. The design, mounting and trimmings make it first-class in appearance and quality. A pertinent sentence in their circular lithographed in colors with the Lehigh trade mark prominent, says: "The dampers and flues being the same as in our Popular Lehigh guarantees the operation."

THE BUSSEY & MCLEOD STOVE COMPANY of Troy, N. Y., in conjunction with the Chicago Stove Works of Chicago will make an interesting display of Gold Coin stoves at the World's Columbian Exposition. The demand for space in the Manufactures Building is said to have been so large that the amount allotted to each exhibitor has consequently been small. In fact, the company state it is too small to show anything but sample stoves. The company, therefore, extend to all patrons and friends who may visit the city a most cordial and urgent invitation to inspect their display and visit the Chicago office and salesroom at the corner of Blue Island avenue and Twenty-second street. In this connection the company state that the electric street railroad company have just completed the Hoosick street extension, by which passengers are now landed within a few feet of their foundry in Troy, N. Y.

THE HOWARD FURNACE COMPANY have removed their New York branch, of which W. B. Wilkinson is manager, to 210 Water street, near Fulton street, where they have increased sample and office room. The company show a new line of single radiator furnaces, comprising fifteen sizes of hot air and ten sizes of combination hot water and hot air. They also have storage and shipping facilities for carrying a full stock of castings, casings, registers, fittings, repairs, &c.

THE TAYLOR & BOGGIS FOUNDRY COMPANY, Cleveland, Ohio, are the assignees of a patent recently granted to William H. Clemes for a combined wick tube and burner plate for oil stoves. The device is formed of one piece of stamped sheet metal, is of simple construction and can, it is claimed, be manufactured at a comparatively low price.

JAMES LAMB of Detroit, Mich., has patented a heating stove in which the air may be conducted through a central portion, above the fire, whereby the rising hydrogen gases from the burning fuel may be thoroughly mixed and a more perfect combustion obtained than results in stoves as ordinarily constructed. The invention consists of an annular chamber arranged close to the mouth of the feeder, or forming a part of it, and provided with one or more air supply pipes, arranged to receive the air from the room through the walls of the stove. The annular chamber is provided with jets for discharging the air toward the burning fuel for the purpose of promoting combustion.

PERHAPS it may sound funny to those uninitiated, says a correspondent, but I saw two of the prominent officers of a big stove company the other day baking bread and potatoes with all the anxiety of a model housewife. It was in the test room of the stove plant. This test room is a prominent feature of some manufactories where stoves are made. It is the practice nowadays to give heating goods a severe experimental trial and discover, if possible, any deficiencies of the article before it begins its career as a public servant. One of the above-mentioned stove company officials had his watch in hand and the other paced up and down nervously, examining now and then the fire, the drafts and all of the salient points. Just as 20 minutes was up the oven door was flung open and a sweet-smelling loaf of bread pulled therefrom. It was examined most carefully. A wire penetrated its interior to see if it were done evenly and all through. Every side of it was scanned with as much care as the *chef* of a big hotel examines the products of the *cuisine* which are to feed his particular guests. The stove company officials smiled at the result and seemed highly pleased. The bread was undoubtedly good, a novice could tell that. I verily believe that, had the stove not been hot, they would have patted it in commendation of its baking powers. And in a book of tests the details of the operation were put down with great care. Surely, stove making to-day is a great science.

AMONG the recent improvements made at the plant of the Perry Stove Company, Albany, N. Y., is the addition of a small dynamo to furnish 25 lights and a donkey engine to run part of the machinery. These have been put in by the company for night work, as they are obliged to operate until 9 or 10 p.m. to keep abreast of orders.

A NEW RANGE has been got out by the Perry Stove Company, and is known as the Glen Argand. It is a four-hole stove, has nickel trimmings and numerous practical features, and comes in four sizes. It can be had with or without reservoir, pipe shelf, &c.

JAMES BOYLE & Co. of Salem, Ohio, are getting out for the fall trade a neat heating stove, in four sizes, which will be known as the Perfect Oak. The second stove which they mounted was teated, a fire being built on a perfectly clean grate, which was heated until red hot. The fire was then covered and kept, we understand, for 47 hours, all with 24 pounds of coal and 15 pounds of slack, the coal used in starting the fire being included in the 24 pounds. The new stove is provided with all the modern improvements, having cone grate, double fire pot, wedge draft slides, lap joints and handsome ornamentation, in which is involved the use of more or less nickel work. One of the features to which special attention is invited is the solid ash pit and large ash pan. The company state that the stove is first class in every respect, and are confident they will sell all their foundry can produce.

SOMERSWORTH MACHINE COMPANY with plants at Dover, Great Falls and Salmon Falls, N. H., and employing a force of 300 men, are producing a large number of stoves annually which are sold principally in New England, although the business is by no means confined to that section. The company are preparing to push the Somersworth Prize parlor stove, which, it is claimed, has a flue arrangement different

from any other. It is made with two Russia iron back pipes, connecting the base with a cast-iron damper-box. When the damper is closed the heat passes down one pipe, entirely around the base, then up the second pipe to the chimney. Cold air is admitted through an opening in the base and by this means perfect ventilation as well as uniform heat is secured by circulation. Another feature is a patent damper which is designed to avoid all danger from ignited gas, the expansion of which will instantly open the damper and allow the gas to escape up the chimney, which being accomplished, the damper closes automatically. A full line of parlor stoves and ranges is made by this concern; also sinks, lawn vases, door hangers and hollow ware. The business is under the management of E. H. Gilman.

FRANK A. MAGEE of the Magee Furnace Company of Chelsea, Mass., has recently been granted a patent for an improvement in cook stove construction. Heretofore the Magee stove has been provided with a grate of peculiar construction, the same comprising two horizontal shafts parallel to the frame, geared together at one end, and having short curved, laterally extending grate bar sections. The shafts are carried by the frame, which has formed an integral part of the stove, a construction which has rendered repairing of the grate somewhat difficult, as it has been necessary to remove the brick from the fire pot in order to reach the grate frame The objections have now been overcome by forming a support or frame work for the main portions of the grate, which is independent of the frame of the stove, being supported by it, but not forming an integral part of it. The end of the stove is so constructed that the grate and frame may be moved latterally upon the frame support below the fire-brick entirely through the end of the stove, a section of the front wall of which is detachable.

THE PERRY STOVE COMPANY, Albany, N. Y., have started in on a most successful season. The shipments of oil goods, of which the company carry a large line, are said to have been five times as great as they were last year for the same period; in other words, where the company had sold 2000 lamp stoves up to this date last year, they have disposed of 10,000 this season. The inventive genius of Superintendent R. Z. Liddle is constantly at work conjuring up new features and improvements in the oil-stove line. His simplification of the burner, so that it easily comes apart and admits of being thoroughly cleaned, was brought out last season and is now bearing good fruit. The orders are very large. His device for making the wick always turn up evenly is a valuable feature and has evidently been appreciated by the trade, if large sales are any criterion. The company have for this season an entirely new line of oil stoves and ranges, embodying all their latest improvements. The Royal C has a two-hole top, with extension shelf, and can be fitted with all convenient furniture, such as oven, flat-iron heater, &c. It has 4 inch burners and the stove is entirely nickeled. It is of a handsome design throughout. The Royal D is a larger one of the new series and has a three-hole top. It also can be fitted with all the furniture. The Royal E has a four-hole top and is as handsome as the others. This line is already beginning to have a decidedly prosperous run. The doors of the three new stoves have three mica windows and are of a very handsome design. They are fitted with the patent burner. There is also a larger line of oil stoves and ranges known as the Royal 33, 44 and 55. These have three, four and five 5-inch burners respectively. They are of a most elegant and pleasing pattern. They are furnished with three and four hole tops, and also any furniture desired. The Royal range No. 44 has been placed on a neatly designed new stand, which has rollers. It makes a convenient and handsome outfit. Besides the new features mentioned, the company have the same attractive line heretofore offered to the trade.

STOVE MANUFACTURERS have been so dilatory in effecting their arrangements for World's Fair exhibits that we are unable this week to delight our readers with descriptions of the grand effects in black and nickel that will make the stove section of the exposition conspicuous. At present writing some of the booths have not been completed, and there will have to be a tremendous concentration of skill, muscle and energy to be able to present much of an appearance on Monday, the opening day. Some very prominent stove houses, which had intended to exhibit, surrendered their space within the past two weeks, but this has pleased other exhibitors, among whom such unappropriated space has been divided, thus giving them more than they had ever hoped for. Thus those who have held out to the end have been rewarded for their perseverance, and there will consequently be a number of very fine stove displays that will reflect credit on the trade. The space finally assigned runs from 800 square feet to 400 feet, quite a number having 700 feet, or 20 x 35. The pavilions erected are separate constructions, involving considerable outlay.

JAMES BOYLE & Co. of Salem, Ohio, have issued a very neat salesmen's card, ornamented with a panel picture and provided with a silken cord for hanging. The scene depicted is a landscape having in the foreground two setters which, from their actions, have evidently discovered their game. Beneath the picture is the inscription: "The dogs 'point' the fact that Keystone stoves are the best you can handle, and I will call on you soon prepared to 'back' their 'stand.' Please wait and see what I have to offer. Yours truly, T. C. Read." Diagonally across the upper left hand corner of the card carrying the picture are the name and address of the company, while at the left are the words: "Keystone stoves are the best."

THE DETROIT STOVE WORKS have just completed a fine woodcut, giving an excellent view of their foundries at Detroit, Mich. The buildings are shown to be of great extent, covering a very large inclosure, and stretching out an almost interminable distance. The warehouses, running six stories in hight, are in the foreground, with the molding shops running far out in the rear. Signs bearing the words "Jewel Stoves and Ranges" are conspicuous on the fence surrounding the works and on the tops of buildings. Over the engraving is the legend "Largest Stove Plant in the World," which we are not disposed to question after seeing the character of the buildings here portrayed, which look extensive enough to form almost a city by themselves. The new trademark of the company embellishes a corner of the cut, with its conspicuous statement "The Original Detroit Stoves," something to be very proud of at this day, since Detroit has won such distinction in the stove trade as a stove center.

THE MICHIGAN STOVE COMPANY are sending their friends and patrons throughout the country circulars giving full particulars how to get good accommodations at reasonable prices in Chicago during the World's Fair. The company had received so many letters in reference to securing quarters for their friends that they took the trouble to investigate the subject, and found that the best way to accomplish this purpose was by each person corresponding direct with the Bureau of Public Comfort, Rand-McNally Building, Chicago. A circular fully describing the plan followed by this bureau has been sent to no less than 13,000 people by the Michigan Stove Company. It is an official appendage of the World's Fair, organized for the special purpose of directing inquirers to suitable hotels and rooms as well as looking after their interests in other ways. These circulars are so full of the very information that intending visitors to Chicago are in search of that they are well described by the company as "worth their weight in gold."

THE MOLDERS' STRIKE in Chicago, which was ordered by the union on the 24th inst., covered only the machinery and jobbing foundries, and did not include the stove foundries. The strike is to enforce a demand for an advance of 25 cents per day on time workers' wages and 10 per cent. advance on piece work, with a minimum of $2.75 per day. It is understood that the stove molders have not abandoned their purpose of securing an advance in wages, but are waiting for the outcome of conferences between committees representing themselves and the manufacturers. Nothing definite may be accomplished until the annual convention of the National Association of Stove Manufacturers meets in Detroit on May 31.

THE FIRST SATURDAY IN MAY will start the summer half holidays for the stove houses on Second street, Philadelphia. Some will extend them to the middle of September.

AN AIR SUPPLYING DEVICE for use with stoves or furnaces forms the basis of a patent granted not long since to C. K. Killie of Mooreatown, N. J. The object of the invention is to so construct a device for supplying air to stoves and furnaces that the air will be projected into the gases as they rise from the fuel in a manner calculated to promote combustion.

Major M. P. Low.

The members of the stove trade, especially in the Eastern section of the country, will learn with deep regret of the death of the well-known veteran of the trade, Major M. P. Low, which occurred on Monday, April 17, of cerebral hemorrhage. He was stricken early in the day and became unconscious, remaining so until evening, when he passed quietly away. Major Low was regarded by his friends in the trade as a high authority on matters past and present relating to the stove trade, and his letters and reminiscences, published a short time since, were widely read and appreciated. He was a native of Dutchess County, where his parents were early settlers. During the war he was largely engaged in supplying the Government with stoves, but later met with reverses by reason of indulging his friends. The Major was held in high esteem for his pleasant ways, his genial manners and his charitable disposition. His face will be greatly missed from the haunts which for many years knew and felt his presence, and the trade at large will feel that it has lost one of its best members. Major Low was 78 years of age at the time of his death. The interment took place in Greenwood Cemetery on Wednesday, the 19th inst.

The high prices paid for cotton seed at the oil mills have caused a scarcity of seed for planting purposes. A few years ago the seed was burnt as refuse.

New Orleans papers encourage the erection of cotton mills in that city, arguing that it is the greatest market in the world for the raw material, enjoys unrivaled shipping facilities for the export trade and would be able to undersell Lancashire in all foreign markets.

TRADE REPORT.

The Iron Market.

The events of the past week in Eastern markets have not been such as to give much comfort to those who have been looking for favorable developments in the Iron and Steel trades. On the contrary, the feeling has become one of extreme depression, and it is a question now whether it will be possible to maintain even the present unsatisfactory position. It is not a question of business so much as a question of prices. The volume of business is large enough—almost, if not quite, the largest on record, yet manufacturers all say they are making no money, and as there is neither a prospect of lower cost nor of higher prices, the situation is indeed gloomy. Naturally the question arises, "Why don't manufacturers get better prices?" It is easy enough to ask the question, but not easy to answer it. In the first place, the capacity for production has expanded enormously, and in the next place, the demand, while large, is in some lines from 20 % to 30 % less than productive capacity. On an average, the capacity actually in operation may not be more than 5 % to 10 % in excess, but it is the 5 % or 10 % excess, or whatever the amount may be, that makes the price for the entire product. Some people think the only way out of the difficulty is to pattern after the Steel Rail arrangement, and something of the kind is said to be under consideration as regards Plates and Shapes; 10¢ or 15¢ ℔ 100 lb extra would be a wonderful advantage to manufacturers, without being any detriment to consumers. As matters stand to-day the outlook is very unsatisfactory, although, as we said before, there is business enough—what is wanted is better prices.

During the week under review there were some heavy transactions in Bessemer Pig and Steel in the Pittsburgh market, but at prices considerably lower than have been touched for several months. From the fact that these transactions were brought about largely by reason of concessions on the part of sellers it cannot be claimed that there has been any general improvement in the situation. News of the financial troubles of the Pennsylvania Steel Company was received on Friday, 21st inst., and created considerable surprise in business circles, as the concern were supposed to be in good condition. As far as known, no Pittsburgh firms are affected, but the failure has added considerably to the feeling of uneasiness which prevailed there before it occurred. Loans are negotiated with more difficulty, the banks drawing the credit lines tighter than for some time past. There has not been a business failure of any consequence in Pittsburgh for a long time, and this is considered remarkable, when the low prices at which materials of nearly all kinds have been selling are taken into account.

At Chicago the unseasonable weather is affecting all classes of business. A very few days of spring have been followed by a recurrence of genuine winter, and the season is now fully a month later than usual. The failures in the Eastern Iron trade cause an uneasy feeling here, but no worse effects have yet shown themselves. The strike epidemic is now in full vigor, and considerable disturbance to trade is due to this cause.

Pig Iron.—Current business in New York is generally reported quite light. So far as buyers are concerned there is absolutely no snap in the trade. During the last few weeks considerable quantities of Charcoal Iron have been distributed throughout this territory and Connecticut, some of the Iron going as far South as Richmond and Roanoke. It represents a part of a stock of 9000 tons held for a good many years by a Lake Superior furnace, for which at one time $34 was offered and declined. This Iron is now selling on the basis of $15.75 @ $16, Buffalo, for the chilling numbers. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13 75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14.25 @ $14.50 for No. 1; $13 @ $13.50 for No. 2 and $13.25 @ $14 for No. 1 Soft.

From Philadelphia we learn that, in spite of all unfavorable influences, Pig Iron is beginning to attract attention because of its statistical position. Good Irons are scarce, scarcer than they have been for months past, and those who are bound to have first-class brands are lucky if they can get what they want at quoted rates. There is Iron enough, of course, but after making all due allowances, there is less Iron to be had to-day at a given price than there has been at any time since last summer. Business is not in such a condition as to warrant holders in asking higher prices, but they won't shade quotations, and in some instances are not taking all the orders that are offered even at their own prices. They are under contract for about all the Iron they can make up to the middle of July or August, and under present conditions are not disposed to engage beyond that. From present appearances it is probable that business will be somewhat curtailed until it is seen what will turn up within the next 30 or 60 days. There is plenty of room for improvement, and very little chance of anything less favorable as regards this particular interest, but with so many contingencies to meet in the very near future both buyers and sellers are inclined to restrict operations within the narrowest limits possible. Meanwhile, the usual asking prices are about as follows for Philadelphia and equivalent deliveries, with 25¢ @ 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X.....	$16.00	@ $16.50
American Scotch, No. 2X.....	15.00	@ 15.50

The molders in the jobbing foundries at Chicago were called out by the union on Monday to enforce a demand for an increase of 25¢ per day to day workers and 10 % advance on piece work. Some employers have yielded to the demand, but the great majority are allowing their foundries to stand idle. This has caused considerable falling off in the Pig Iron demand, and there is much uncertainty for the future, as it is not known how long the strike may last. Local Irons have been quiet, but prices are unchanged. A great variation is perceived in quotations on Southern Coke, there being a spread of at least 75¢ ℔ ton between the figures asked by the leading companies and those quoted by small concerns, which are still anxious for business. Our quotations represent the medium prices asked by representatives of Southern companies, which are shaded from 10¢ to 25¢, according to circumstances. Quite a number of orders are in sight from outside buyers, but they are holding off at present in the expectation that existing conditions may lead to still lower prices. It will, perhaps, be well for the foundry trade if the strike should last for a little time, as competition for business among the foundrymen has been so keen that unusually low prices have been made for Castings. It is reported that $28 ℔ ton has been named on Castings not of the simplest form. Lake Superior Charcoal Iron is quiet in this immediate vicinity, but some good-sized sales are reported in outlying districts. A 1000-ton lot was sold at a price equivalent to $16.75, Chicago, and another lot of nearly the same size brought about $16.50. Small transactions are occurring at our quotations. Collections are slow, and generally speaking the condition of business is unsatisfactory to sellers. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal.....	$16.50 @	$17.00
Local Coke Foundry, No. 1.....	13.75 @	14.25
Local Coke Foundry, No. 2.....	13.00 @	13.25
Local Coke Foundry, No. 3.....	12.75 @	13.00

In Southern markets there has been a fair demand for Pig Iron from consumers during the week, and the market may be called a steady one, although there

have been rumors of cutting in prices, which, if it has been done, as is not improbable, for there are frequently some furnaces making concessions to effect sales, is exceptional. The standard Iron companies in the Tennessee and Alabama districts are firmly adhering to the price of $9 for No. 2 Foundry and $8 for Gray Forge, f.o.b., Birmingham. Orders are freely taken on this basis for delivery up to September, and it would not be difficult for buyers to secure any delivery this year at these rates. Further sales of Mottled Coke Iron have been made at $7.90, f.o.b., Birmingham, at which price there appears to be a demand for all offered. Charcoal Iron is in rather better demand with favorable prospects of further buying by car works. There has been considerable Southern Iron taken for Eastern shipment, and although the buying is generally in small lots and seldom runs over 1000 tons in any one order, yet the aggregate is of considerable proportions. There is no longer any apparent anticipation of better prices during the summer and the trade seems to have settled down to a willingness to sell at current rates, but not to make concessions. Quotations are as follows:

Foundry.

Southern Coke, No. 1	$13.25 @ $13.50
Southern Coke, No. 2	11.75 @ 12.00
Southern Coke, No. 3	11.00 @ 11.25
Ohio Soft Stone Coal, No. 1	16.00 @ 16.25
Ohio Soft Stone Coal, No. 2	15.00 @ 15.25
Mahoning and Shenango Valley	14.75 @ 15.00
Hanging Rock Charcoal, No. 1	19.00 @ 19.25
Hanging Rock Charcoal, No. 2	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 1	15.50 @ 15.75
Tennessee and Alabama Charcoal, No. 2	14.50 @ 14.75

Metal Market.

Copper.—All reports are to the effect that business has been slow in the local market and that the general situation is quite as cloudy as it has been at any previous time since the beginning of the year. As far as the reduction in the output is concerned there seems to be no force except, possibly, in checking a more or less serious depression in values. In any event it is the fact that 11¼¢ has become a common selling price for Lake Superior Ingot, while occasional transactions at a shade less have been noted and offers made to sell at 11.15¢ for distant future delivery on the Metal Exchange. Casting brands are also somewhat irregular, with 10½¢ the top quotation, and more than a vague possibility that really desirable orders would be taken at ⅛¢ @ ¼¢ less by some smelter. At the close there were rumors to the effect that one of the prominent Lake Superior producers has recently closed contracts with American consumers at 11¢ ℔ lb.

Pig Tin.—Prices were held quite stiffly by the "bull" interest during the early part of the week under review, on the basis of about 20¾¢ for spot stock. Speculation, however, figured less conspicuously than clever work in the direction of quietly moving out as much Tin as possible into the hands of interior dealers and consumers. Importations of 365 tons in a few days caused an accumulation that proved rather burdensome, however, and in connection with lower prices from London, led to a decline in prices to 20.60¢ for prompt and current month delivery. At the lower prices over 200 tons changed hands, chiefly for prompt and April delivery.

Pig Lead.—Owing to freer offering, along with manipulation by operators who wish to lower prices and rumors of some sales of foreign Lead on the basis of 4.17½¢, landed here, the market has weakened perceptibly. A few carloads were placed at 4.15¢; subsequently more went at 4.10c, and later on some lots at as low as 4.05¢. The latter price is below the importing point and buyers therefore manifest rather more interest again, although Western markets show some response to the late depression here.

Spelter.—Business in this metal has been very slow and the position of the market is practically the same as it was at the date of our last review. Western brands may be secured to a limited extent at 4 40¢, delivered, but most holders want 4.45¢ upward, and the offering at present is very moderate.

Antimony.—Outside of routine jobbing trade there has been little doing and prices remain almost stationary at 10¢ @ 10½¢ for Hallett's, 10¾¢ @ 10½¢ for L.X. and 10¾¢ @ 10¾¢ for Cookson's.

Tin Plate.—The market has remained stationary, that is to say, business in both spot goods and forward shipments has been on strictly conservative lines, while the movements in prices were confined almost wholly to special figures secured by energetic brokers on what are commonly termed "snap" lots.

Coal.

At the meeting of sales agents on Tuesday the Western trade made a reduction from $1.90 to $1.75, equal to 15¢ ℔ ton, to conform to the previous reduction in the Eastern market made last March. Eastern prices remain unchanged. The company prices are firm at the adopted schedule, but trade is very slow, as usual at this season. Free Burning is quoted $4.15 alongside, and Hard Lehigh is 15¢ @ 25¢ ℔ ton more. Pea Coal is $2 50 @ $2.75, and Buckwheat is so scarce as to be scarcely quotable, but is about $2 @ $2.25. Cumberland Coal is $3.10 @ $3.15, f.o.b. Lower tolls on the Pennsylvania Railroad places Clearfield at a disadvantage where tolls remain the same. The Eastern demand is good.

The week's production of Anthracite is 800,000 tons; for the year, 11,614,903 tons—increase this year, 1,029,068 tons. Reading tonnage, 405,000 tons. Pennsylvania tonnage, 307,266 tons Coal and 104,482 tons Coke. An accumulation of interior and tide-water stocks is in progress. Mill and factory requirements are quite large, and small steam sizes are moving quickly.

The Flat Top operators in Virginia agreed upon an output this year of 5,000,000.

The new shaft of the Lehigh & Wilkesbarre Coal Company at Ashley, Pa., will have 90 feet of coal.

Financial.

A notable event occurred during the week when the traditional "dead line" was crossed in disbursing gold from the United States Treasury, and the $100,000,000 reserve was invaded, as a consequence of another shipment to Europe amounting to more than $6,000,000. As high as $4.89½ per pound sterling was paid for demand bills, entitling the holders to payment in gold in London, and rates for call loans suddenly advanced to 10 @ 12 %. On the part of some there was a disposition to construe the conditions prevailing in the sterling exchange market as a premium on gold. Simultaneously Secretary Carlisle issued a statement of his policy with reference to the payment of notes given in payment for silver bullion, to the effect that those payments would be made without discrimination so long as there was gold available for that purpose. He said: "The purpose of the Government to preserve its own credit unimpaired and maintain the parity of the two metals by all lawful means will not be abandoned under any circumstances," and, as if to silence conjecture, President Cleveland authorized a statement substantially reiterating the language of the Secretary. The feeling of anxiety in monetary circles was in a measure allayed, bankers and others conversant with the situation becoming assured that the Government could deal successfully with the grave financial problems awaiting a solution. Moreover, the inroad upon the gold reserve was soon made good by tenders from Western banks. An unexpected feature was the active buying of stocks on foreign account, after which the rates for sterling and call loans both declined.

On Friday, following the Treasury statement, quotations were generally ½ @ 2 % higher than on the previous day, which was considered a favorable omen considering the fact that the $100,000,000 reserve had been encroached upon for the first time since the resumption of specie payments. The threatened cataclysm having been averted, the presumption was that further withdrawals of specie for export would excite little apprehension. In any contingency the parity of gold and silver would be preserved. But it was not until Tuesday morning that the financial sky began to clear. Then the fact was given publicity that on the previous day the newly appointed Sub-Treasurer Conrad Jordon, just from Washington, had submitted at a conference of leading bankers and financiers a definite proposition from President Cleveland for a gold loan to the Government of $50,000,000, secured by a 3 % bond redeemable at the option of the United States Treasury. With some proposed modifications the scheme was cordially indorsed and now awaits the approval of the chief executive. Half of the amount named, it is conjectured, will at once be put upon European markets. Thus reinforced the Treasury will be equal to any emergency until Congress shall apply a permanent remedy.

The stock market on Monday, influenced

by the statement by President Cleveland to the effect that there would be no change in the policy of the Treasury Department with respect to the Treasury notes of 1890, and that the parity between gold and silver would be maintained as contemplated by the act of July, 1890, opened strong and there was good buying for arbitrage account and to cover short contracts. The strongest were the industrials, the grangers, Missouri Pacific, Louisville & Nashville, Reading, Lackawanna, the Vanderbilts and Chicago Gas. Later news of the engagement of over $3,000,000 gold for export to Europe and Canada brought about an irregular decline. Toward noon it was reported that the Boston banks had offered $4,250,000 gold to the Government.

The Government bond market during the week was heavy for the Ext. 2s and 4s, but steady at unchanged prices for the currencies. Closings compare as follows:

	April 24.	April 15.
Ext. 2s, reg	99 @ ..	99⅝ @ ..
4s, 1907, reg	112⅝ @ ..	113 @ 113⅜
4s, 1907, coup	112⅝ @ ..	113 @ 113½
Currency 6s, 1895	105 @ ..	105 @ ..
Currency 6s, 1896	107½ @ ..	107½ @ ..

The merchandise markets are yet awaiting the spring revival. Wheat and flour are again lower, affected by large visible supplies and currency questions, and there is a fair export movement at the decline, which is expected to gain momentum on the arrival of the grain fleet, already started through the lakes. Provisions are dull and all pork products are dear on account of the scarcity of hogs. Cotton is weak and spot $\frac{5}{16}$¢ lower. Spot coffee declined about ½¢.

Chicago Report.

Scrap.—Wrought Scrap constinues quiet, but Borings, Turnings, Stove Plate and other cheap stock are in good demand. Dealers' buying prices are as follows:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$13.00	....
Machinery Cast	10.00	....
Malenble Cast	7.00	....
Stove Plate (free of burnt)	8.00	....
Burut Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.50	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	12 00	....
Old Gas-Pipe and Boiler Tubes	9.00	....
Cast Borings	5.00	....
Turnings	6.00	....
Horseshoes	12 50	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9⅛¢
Heavy Brass	....	8⅛¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	9 ¢

Anthracite.—In accordance with previous announcements, a new price liat became effective on the 25th inst., making a reduction of 50¢ ₹ ton. Carload lots of 12 net tons are now quoted as followa:

	Egg, Grate.	Sto. and Cb.
Chicago, Ill	$5.35	$5.60
Milwaukee, Wis	5.35	5 60
Kansas City, Mo	8 55	8.80
Council Bluffs, Iowa	8.55	8.80
St. Joseph, Mo	8.55	8.80
Leavenworth, Kan	8.55	8.80
Omaha, Neb	8.55	8 80
Burlington, Iowa	6.85	7.10
Des Moines, Iowa	8.30	8.55
Davenport, Iowa	6.65	6.90
Dubuque, Iowa	6.65	6.90
Madison, Wis	6.85	7.10
St. Paul, Minn	7.85	8.10
Lincoln, Neb	8.70	8.95
Sioux City, Iowa	8.55	8 80
Aberdeen, S. Dak	8.60	8.85

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

CONDITION OF THE

Hardware Trade.

WHILE the unfavorable weather has interfered seriously with business in some sections, on the whole it may be reported as very satisfactory in amount. There is, however, a slowness in collections, which is particularly noticeable in the South and Southwest.

Advices from Chicago.—Shelf Hardware is in reasonably good demand, but trade does not seem to be increasing, the weather cutting a very important figure in fluctuations in the volume of business. Last week snow fell throughout a large part of the Northwest, reaching a depth of 20 inches in some localities. This has not only checked seeding, but has also prevented most kinds of outdoor work. The season is believed to be fully a month late. Staple goods of all kinds are affected by the backwardness of the season, and weakness is visible in some unexpected quarters owing to the necessity of moving accumulated stocks. Wire Cloth is an exception to this condition, the price still climbing. Some of the trade are inclined to think that it will reach $2 before the upward movement is checked. A large order for Poultry Netting for the World's Fair buildings was placed with the Gilbert & Bennett Mfg. Company, the Clinton Wire Cloth Company and the New Jersey Wire Cloth Company, with one or two smaller concerns, amounting in all to about 1700 rolls of 48-inch netting. Considerable stir has been caused by this order, though the statement is made that it is not a full day's work for the factories, but it came at a bad season of the year, with light stocks in manufacturers' hands, and, therefore, had to be distributed among a number of concerns. The placing of this order has had no effect on prices. Heavy Hardware is moving very well. Jobbers report no particularly encouraging features except that a steady flow of small orders from day to day keeps the volume of business in fair condition.

Notes on Prices.

Cut Nails.—The mills are naming lower prices, although the demand is active and the volume of business large. We quote $1.15 for carload lots at mill, and in larger quantities this price is in some cases shaded. New York quotations are still $1.40 for small lots from store.

Advices from Chicago.—Factory lots of Cut Steel Nails are now selling at $1.30 to $1.35 here, according to the character of the order. Specifications are coming in freely to manufacturers on old orders, but the competition of outside mills keeps prices down, while new business is rather slow on account of the broken weather. Prices from store are $1.40 to $1.45, according to quantity.

Wire Nails.—The manufacturers held a meeting last week and after a full consideration of the condition of the market adjourned without making any change in price. The makers have all booked large orders which will absorb their production for several weeks and are therefore not anxious for orders. Jobbers being generally well supplied there are not many large orders on the market, although the goods are going off rapidly into general trade. We quote without change $1.55, f.o.b. mill, with Cleveland as the point of equalization for the West and Pittsburgh for the East. Small lots from store in New York are held at $1.80 @ $1.85.

Advices from Chicago.—The price of Wire Nails was not advanced by the manufacturers last week, although a strong sentiment existed among them in favor of an additional 5 cents. Some of the jobbers are still underselling manufacturers, and it was not thought expedient to make another advance until this condition of affairs should change. The opening of navigation and the establishing of lower freight rates by lake has made the factory price $1.62½ here. Manufacturers report carload orders coming in very well, but no heavy orders. Jobbers quote small lots from stock at $1.70 to $1.75, and carloads $1.65.

Barb Wire.—There is no change in the condition of this market except that, as is natural at this season, the demand is falling off somewhat. We quote $2 45 to $2.50 for Four Point Galvanized in carload lots at mill. Small lots delivered in New York are quoted at $2.70 for Galvanized and $2 30 for Plain.

Advices from Chicago.—Trade in Barb Wire is very disappointing, on account of the backwardness of the season. New business is coming in very slowly, and there would be little done if it were not for the quantity of advance orders entered during the winter, on which shipments are now being made. Prices are maintained, buyers not asking for lower rates, but paying the price asked on such new orders for small quantities as they are sending in. We continue quotations at $2.20 and $2.60 for carload lots of Painted and Galvanized respectively. Small lots from stock are quoted at $2.30 and $2.70.

Wire Cloth.—This article was already becoming scarce and prices were materially stiffening when, on the morning of the 19th inst., the works of the Clinton Wire Cloth Company, Clinton, Mass., were very seriously damaged by fire, which will still further lessen the supply for some time. Prices are in consequence very strong and holders of stocks are in many cases naming prices which under other circumstances would be unreasonably high. We hear of both jobbers and manufacturers who are now holding firm at 2 cents a foot for goods from stock. Regarding the fire at

their works, the Clinton Wire Cloth Company have issued the following circular under date of the 19th inst.:

GENTLEMEN.—A portion of our works were partially destroyed by fire this morning.

We desire to notify you that the Hex. Netting department, with stock on hand, is intact and there will be no delay in deliveries.

The looms for weaving Screen Cloth are uninjured, but the painting plant is totally destroyed, and we shall be unable to deliver painted Cloth until the building can be replaced.

The mill for weaving coarse Cloth is partially destroyed, but as most of the looms are practically uninjured, stoppage in this department will be for a short time only.

Very respectfully,
CLINTON WIRE CLOTH COMPANY.

Perfect Tack and Brad Hammers.—L. A. Sayre, Newark, N. J., is manufacturing these Hammers. The Perfect Tack Hammer is sold to the trade at $3 per dozen, and the Perfect Brad Hammer at $2.75 per dozen.

Evans Garden Cultivator.—The cultivator is manufactured by the Evans Garden Cultivator Company, Paris, Mo., and is sold to the trade at $10.50 per dozen.

Eureka Tea and Spice Scale.—John Chatillon & Sons, 85 to 89 Cliff street, New York, who are manufacturing this article, are selling it to the trade from the following list, which is subject to a discount of 40 per cent.:

	Each.
With Brass Scoops and Brass Bails, all Nickel Plated	$9.00
With Brass Scoops and Brass Bails	8.50
" Tinned " " Iron "	8.00

The Prescott-Stanyan Bread Mixer and Kneader.—This article is put on the market by Edwin Prescott, 8 Medford street, Boston. The device is made in two sizes No. 1 with 7-quart pan and No. 2 with 8-quart pan. The trade price on either size is $3, subject to a discount of 25 per cent.

Gem Cake and Batter Mixer.—This article is manufactured by North Bros. Mfg. Company, Philadelphia. It is sold to the trade at $1.75 per dozen, subject to a discount of 20 per cent.

Gem Cake Pans.—North Bros. Mfg. Company, Philadelphia, who are making this article, are selling it complete, including one loaf and three layer pans, measuring cup and recipes, at $1.25, subject to a discount of 20 per cent. to the trade.

Tin Plate Cleaning Bran.—J. Irving Rogers, 53 Newcombe street, Liverpool, England, issues a price-list of "Cook Jenkins" Tinhouse Bran. The following prices are per ton net, f.o.b., Liverpool:

Special Pure Rice Shude Meal	50/
X.W. Shudes No. 1, fine	45/
X.W. Shudes No. 2, rough	42/6
No. 1 Tinhouse Bran	40/
No. 3 Patent Tinhouse Bran	40/
No. 4 Tinhouse Bran	36/6
V.C. Tinhouse Bran	26/6
No. 1 Shudes	42/6
No. 2 Shudes	40/
Pink Cleaning Machine Meal	24/
Special Dust	20/

Glass.—The Glass market for the past week shows few changes, the demand being moderate, and prices firm. The recent storms by which quantities of Glass was broken in some sections have caused a perceptible increase in the requirements to repair the damage done; while the same storms have necessitated a discontinuance of building operations, and curtailed the demand for Glass to be used in new buildings. There are indications that prices are stiffening, and that desirable sizes of Glass are becoming somewhat scarce. It is reported that in the new list issued by the Chambers Glass Company, the bracket prices for Glass of first and second quality are quoted from $1 to $1.50 per box higher than formerly, with discounts as adopted by the National Window Glass Company. Meetings of the National Window Glass Company are announced to take place this week in Philadelphia and New York. It is rumored that a new Glass list is in contemplation, but no official announcement has yet been made. Quotations are as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔	....	@	$0.03½
Rubber Shoes, in ton lots ℔	....	@	.04
Large Hose, ℔ ton	....	@	9.00
Wringer Rolls, ℔	....	@	.04½
Wringer Wire Rolls, ℔	.01	@	.02
Syringes, ℔	....	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔	9½¢
Light and Tinned Copper	℔	8½¢
Heavy Brass	℔	7¢
Light Brass	℔	6¢
Lead	℔	3½¢
Tea Lead	℔	3¼¢
Zinc	℔	2¾¢
No. 1 Pewter	℔	14¢
No. 2 Pewter	℔	7¢
Wrought Scrap Iron	gross ton,	$13.00
Heavy Cast Scrap	gross ton,	9.00
Stove Plate Scrap	gross ton,	6.00
Burnt Iron	gross ton,	4.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags	℔		4 ¢
No. 2 White Rags	℔		3 ¢
Mixed Rags	℔	1½ @	1⅝¢
Blues and 3ds	℔	1¾ @	2 ¢
Hard Sized White Shavings	℔	2¾ @	3 ¢
No. 1 White Book Shavings	℔	2½ @	2⅝¢
No. 2 White Book Shavings	℔	1½ @	1⅝¢
Light Book Shavings	℔	⅞ @	1 ¢
No. 1 Mixed Shavings	℔		1¼¢
No. 2 Mixed Shavings	℔	¾ @	⅞¢
No. 1 Printed Books	℔	1⅝ @	1⅞¢
Ordinary Mixed Books	℔	¾ @	⅞¢
Newspapers	℔		⅝¢
No. 1 Manila Paper	℔	1⅛ @	1¼¢
No. 2 Manila Paper	℔	⅞ @	1 ¢
Bogus Paper	℔	⅝ @	¾¢
Common Paper	℔	¾ @	⅞¢
Straw Chips	℔	½ @	⅝¢
Binders' Clippings	℔	½ @	⅝¢
Jute Butts	℔		1¼¢
No. 1 Jute Bagging	℔	1¼ @	1⅜¢
Mixed Bagging	℔		1 ¢
No. 2 Bagging	℔		¾¢
Hemp Twine	℔		2½¢
Manila Rope	℔		2¾¢
Jute Rope	℔	1⅞ @	2 ¢
Mixed Rope	℔	¾ @	⅞¢

Curtis & Curtis, Bridgeport, Conn., manufacturers of Pipe Threading and Cutting Machines, will add to their plant a new building 33 x 55 feet, two stories high, to be completed in July

Trade Notes.

E. T. BARNUM of Detroit, Mich., has issued an invitation to his friends in the trade who contemplate visiting the World's Fair, to call and examine his exhibit of a Wire house. This is made entirely of Wire and filled with Ornamental Wire and Iron goods. The exhibit is located in Section H, Block 3, No. 11, in the extreme northwest corner of the Manufacturers' Building, near the United States Government Building.

WILLIAM T. HAIN, Reading, Pa., issues a neat illustrated circular and price-list of William T. Hain's New Keystone Roasting and Bake Pan, for poultry, meats, fish, bread, cakes, puddings, &c. A cut shows the appearance of the Pan and its special features are fully described.

WE HAVE BEEN FAVORED with a circular from Armbruester Brothers' Art Smithery and Iron Works, Frankfort-on-the Main, Germany, which gives a view of the handsome Wrought-Iron Gates made by the firm for the main entrance to the German division of the Manufactures and Liberal Arts Building at the Columbian Exposition. The Gates are very elaborately wrought after designs of their own. Armbruester Bros. announce that they will be represented at the World's Fair by a large collection of artistic Wrought Iron goods, including some fine Locksmiths' work in various styles.

THE ANNOUNCEMENT this week of Haydock & Bissell, 12 Murray street, New York, relates to a sale that will interest many of our readers. On May 2 and 3 they will sell at auction several thousand cases of Agate and Granite Ware and Blue and White Ware by order of the Lalance & Grosjean Mfg. Company and the St. Louis Stamping Company. In the announcement elsewhere in this issue all the necessary particulars are given respecting this sale.

THE COMMON SENSE TEA KETTLE, manufactured by the Common Sense Tea Kettle Mfg. Company, Mount Morris, N. Y., is illustrated in their announcement elsewhere in this issue, and the advantages of the construction are alluded to in the text of the advertisement.

WE ARE INDEBTED to Hammacher, Schlemmer & Co., 209 Bowery, New York, for a copy of a very attractively arranged catalogue of Drawer Pulls and other Brass Trimmings furnished by them. The publication bears date of April, 1893, and presents within its covers a large assortment of the class of goods mentioned. The printing is in two colors, and the illustrations are supplemented with a price-list and index. Accompanying this volume is another pamphlet showing illustrations of an odd stock of Drawer Pulls and fancy Brass Trimmings which the firm are closing out at low prices. The goods embrace Drawer Pulls, Escutcheons, Knobs, Hinge Plates, Umbrella Arms, Hat Pins, &c., &c.

A. L. BURTIS, Lockport, N. Y., with whose name many of our readers are familiar, is an expert in all manner of sheet metal work. But his abilities are by no means confined to the manipulation of tin plate and galvanized iron. Like the tinners, or as they were then known the "tinkers," of the Middle Ages, he has much musical talent and has had many years' experience in the leading of orchestras.

M. STRANSKY, importer of German Enameled Steel Ware for culinary and kitchen use, is now in Europe looking after matters pertaining to his business. He is now expected back the middle of May, having sailed from New York April 4 on the "Aller."

THE GLOBE VENTILATOR COMPANY of Troy, N. Y., issue a couple of advertising cards that are got up in a very clever manner and in the line of humorous advertising are far in advance of the usual work of this kind. The cards are printed in white line engravings and letters on a black ground. One shows a section of a Globe ventilator with little winged skeletons escaping from the top and the accompanying text in rhyme is a lament of a consumption germ, who complains that business is dull now that the Globe ventilators are used. The second card carries the following verse with an appropriate illustration:

"Hot nights at the torrid Equator,
Kept sleep from a huge alligator;
Nor could he repose
'Till he rigged on his nose
An effective small Globe ventilator."

ASHLAND EMERY MILLS, Perth Amboy, N. J., after investigating the merits of Naxos Emery, have adopted it as a substitute for Corundum. This, they state, does not supplant their Turkish Emery, but with them will replace Corundum for all purposes for which Corundum is used. To avoid confusing it with their Turkish Emery, they have denominated it Naxos Corundum, which name, they remark, more fairly represents the article, as it carries a large percentage of Sapphire Corundum.

WASHBURN & MOEN MFG. COMPANY issue a neatly bound pamphlet containing handsome illustrations of the buildings at the World's Columbian Exposition, with a description of each. The illustrations include the Administration Building, Government Building, Art Palace, Machinery Hall, Agricultural Building, Manufactures and Liberal Arts Building, the Woman's, Transportation, Fisheries, Electrical and Horticultural Buildings, and the Hall of Mines and Mining. Useful information is given for visitors, also a list of the principal hotels, restaurants, railway depots, theaters, museums and fine buildings.

C. M. AVERY, Somerton, Philadelphia, Pa., has been appointed direct representative of N. R. Streeter & Co., Groton, N. Y. The sale of this firm's Sensible Cold-Handle Sad Irons is reported to have considerably increased during the past few months, an improvement being also noted in sales of their other goods. Mr. Avery has also been appointed direct representative of the Crandall Machine Company, Groton, N. Y., for the sale of their line of Standard Adjustable Chain Pipe Wrenches.

Prize Competitions

$25.00.

Prize Competition No. 22.

SUBJECT:

The Best Manner of Presenting and Collecting Book Accounts.

While circumstances must in many cases regulate the manner and time of presenting and collecting accounts in a retail business, it is necessary to have rules to be followed in the majority of cases. This competition is designed to draw out descriptions of methods which yield the most favorable results. Such points as the following may be touched upon:

Should accounts be collected at stated intervals?

How should they be presented to insure prompt payment?

If in person, who is the proper one to present them?

How can this best be done without giving offense?

With old accounts do collection agencies produce good results?

Is it desirable to have local organizations and black lists?

What percentage of accounts can a concern afford to lose per year?

This competition will remain open until May 20, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than May 20, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 Reade street,
New York.
Prize Competition No. 22.

The committee to whom the contributions in Prize Competition No. 8 were referred have awarded the prizes as follows:

First Prize of $50 to FRED. MACEY, Grand Rapids, Mich.

Second Prize of $25 to HENRY C. WISEMAN, Springfield, Ohio.

Third Prize of $15 to S. T. MOORE, Milroy, Pa.

Fourth Prize of $10 to F. W. HUFF, Philadelphia, Pa.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 19. Closing April 29.
Electrical Goods as a part of a Hardware Stock.

No. 20. Closing May 6.
A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

No. 21. Closing May 13.
The Safety Line in Credit Business.

No. 22. Closing May 20.
The Best Manner of Presenting and Collecting Book Accounts.

Another subject will be announced in our next issue.

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CHICAGO, APRIL 27, 1893.

Tin—

Straits pigs.....23¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland'and Meiyn Grade	IC, 10 x 14.....@ $6.75
	IC, 12 x 12.....@ 6.75
	IC, 14 x 20.....@ 6.75
	IC, 20 x 28.....@ 13.50
	IX, 10 x 14.....@ 8.75
	IX, 12 x 12.....@ 8.75
	IX, 14 x 20.....@ 8.75
	IX, 20 x 28.....@ 17.50
	DC, 12½ x 17.....@ 6.50
	DX, 12½ x 17.....@ 8.50
Allaway Grade,	IC, 10 x 14.....@ 6.50
"	IC, 12 x 12.....@ 6.50
"	IC, 14 x 20.....@ 6.50
"	IC, 20 x 28.....@ 13.00
"	IX, 14 x 20.....@ 8.00
"	IX, 20 x 28.....@ 16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14, 14x20.....@$6.00	
IC, 14x20, 90 lb.....@ 5.75	
IC, 14x20, 100 lb.....@ 5.85	
10 x 20.....@ 9.00	
20 x 28.....@12.00	
*IX, 10x14, 14 x 20.....@ 7.50	
BV Grade.—IC, 10x14, 14x20.....@ 6.00	

Charcoal Plates,—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—	
IC, 14 x 20 ...@ $5.62½	
20 x 28.....@ 11.25	
IX, 20 x 28.....@ 14.25	
Worcester Brand and equal.—	
IC, 14 x 20.. 6.12½@	
IC, 20 x 28..12.25 @	
IX, 14 x 20.. 7.62½@	
20 x 28..15.25 @	

American Tin Plates.

Charcoal Plates.—Bright.

Irondale, A, A.—IC, 14 x 20.....$7.00	
" " IX, 14 x 20.....9.00	
" " IXX, 14 x 20.....11.00	
" " IC, 20 x 28.....14.00	
" " IX, 20 x 28.....18.00	
" " IXX, 20 x 28.....22 00	
Florence.—	
IC, 10 x 14, 12 x 12, 14 x 20..$6.75	
IX, 10 x 14, 12 x 12, 14 x 20.. 8.75	
Palma.—	
IC, 10 x 14, 12 x 12, 14 x 20..$7.50	
IX, 10 x 14, 12 x 12, 14 x 20.. 9.50	

Each extra crop $2.00 and 20 x 28 double these prices.

Brilliant, Tissue Packed, IC, 14 x 20.$9.25	
Royal, extra, IC, 14 x 20..... 7.25	
Merion, IC, 14 x 20..... 7.00	
Almond, IC, 14 x 20..... 6.50	
Mint, IC, 14 x 20 ..... 6.25	

Coke Plates.—Bright.

Elwood.—IC, 14 x 20.....$6.00	
" IC, 20 x 28.....12.50	

Roofing Plates.

Arch (205 lb), 20 x 28.....@$12.00	
Palm (205 lb), 20 x 28.....@ 12.25	
Crescent, IC, 20 x 28.....@ 12.50	
Crescent, IX, 20 x 28.....@ 15.75	
Empire, IC, 20 x 28.....@12 75	
" IX, 20 x 28.....@ 16.00	
Hickory, IC, 20 x 28.....@ 14.00	
" IX, 20 x 28.....@ 16.10	
Alaska (heavily coated), IC, 20x28.@$14.50	
Alaska IX, 20 x 28.....@ 17.75	
Special, IC, 20 x 28.....@ 15.90	
" IX, 20 x 28.....@ 18.25	
Merchant's Roofing (extra coated), IC, 20 x 28.....@$17.75	
Merchant's Roofing (extra coated), IX, 20 x 28.....@$21.50	
Merchant's Old Method, (extra heavily coated), IC, 20 x 28.....@$19.75	
Merchant's Old Method (extra heavily coated), IX, 20 x 28.....$23.60	
Irondale A:	
IC, 14 x 20..... $6.25	
IX, 14 x 20..... 7.75	
IC, 20 x 28..... 12.50	
IX, 20 x 28..... 15.50	
Kensington:	
IC, 14 x 20..... $6.75	
IC, 20 x 28..... 13.50	
IX, 14 x 20..... 8.00	
IX, 20 x 28..... 16.00	
Westmoreland:	
IC, 14 x 20 ..... $6.25	
IC, 20 x 28..... 12.50	
June:	
IC, 14 x 20..... $5.75	
IC, 20 x 28..... 11.50	
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20 .....$9.50	
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20 .....11.00	
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28 .....19.00	
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28 ..... 22.00	
Neville, Stamped, IC, 14 x 20..... 6.25	
" " IX, 14 x 20..... 7.50	
" " IC, 20 x 28..... 12.50	
" " IX, 20 x 28..... 15.00	
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared).....$9.50	
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)..... 19.00	
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)..... 8.25	
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)..... 16.50	
Columbia, IC, 14 x 20 (Stamped)..... 7.25	
" IC, 20 x 28 (Stamped)....14.50	
Maple, IC, 14 x 20 (Stamped)..... 6.75	
" IC, 20 x 28 (Stamped)....13.50	
Willow, IC, 14 x 20..... 6.25	
" IC, 20 x 28..... 12.50	
Knoxall, IC, 14 x 20 ..... 6.00	
" IC, 20 x 28..... 12.00	
Globe, IC, 14 x 20..... 5.75	
" IC, 20 x 28 ..... 11.50	
Miami, IC, 14 x 20..... 6.00	
" IC, 20 x 28..... 12.00	
" IX, 20 x 28..... 15.00	
" (Redipped), IC, 20 x 28.....17.00	

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28.....	$13.00	$13.00
XX, 14 x 28.....	14.50	14.50
X, 14 x 31.....	14.50	15.80
XX, 14 x 31.....	16.50	17.50

	Per box of 50 sheets.	
X, 14 x 56.....	29.50	16.50
XX, 14 x 56.....	32.50	18.20
X, 14 x 60.....	31.50	17.65
XX, 14 x 60.....	35.50	20.90

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 16.....	℔ 3c 7-10¢	3 3-10¢
17 to 20.....	℔ 3 8-10¢	3 4-10¢
21 to 24.....	℔ 3 9-10¢	3¾¢
25 and 26.....	℔ 3¢	3 6-10¢
27.....	℔ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished.....℔ D A, 10¼¢; F, 9¼¢
dis. 5%

Craig Polished Sheet Steel.....℔ D 8¾¢

Galvanized.

List on following page.
Juniata or first quality.....dls. 70&2½%

Copper—

Ingot.

Lake.....13¢ @ 13½¢
Casting Brands.....12¢ @ 12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.

Copper, Bronze and Gilding Tube, 3¢ ℔ D additional.

Brazed Brass Tubing.

(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 D.

Bronze Tubing, 3c ℔ D more than Brass.....	35 @ 40%
Above 5-16 inch to 3 inch inclu.....35¢	
Plain, above 3 inch.....45¢	
Plain, 5-16 inch.....45¢	
Plain, ¼ inch.....60¢	
Plain, 3-16 inch.....$1.00	
Plain, ⅛ inch.....$1.50	
Fancy Tubing, Brass, to No. 20 inch.....43¢ D	

Roll and Sheet Brass

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 lb casks.....6¼¢
Less than Casks, ℔ D.....6½¢

Lead—

Soft Pig Lead.....4¼¢
Bar.....4½¢@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10%

Solder—

½@½.....13¼¢@13⅞¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....13¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain.....60&10%	
1¼ and under, Galv.....52½&10%	
1½ and over, Plain.....70&10%	
1½ and over, Galv.....60&10%	
Boiler Tubes, list Oct. 24, 1892...65@67½%	
Casing, list Nov. 16, 1892.....52½%	
Inserted Joint Casing, list Nov. 16, 1892.....47½%	
Steel Boiler Tubes.....27½%	
Cold Drawn Seamless Steel Tubing...50%	

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted.....55%
Austin's Corrugated.....60%
Gordon & Gilbert's Corrugated.....55%
Ritchie's (Galv. Iron only) Cor'd.....55%
Ritchie's Spiral Lock Seam, Galv'd....50%
Austin's Spiral Ribbed Pipe.....55%
Plain Adjustable Elbows.....55%
James A. Miller Bros. (Galv'd Iron only) Corrugated.....55%

Furnace Fittings—

Discount from Excelsior Steel Furnace Co's list.....50%

Steel Roofing—

Perfection.....$3.75 square
Climax.....$3.50 square
The Lloyd Spanish Tiling....$4.50 square

Metallic Shingles—

Cushman's.....$1.25 square
Merchant & Co.'s Spanish Tiles:
Copper, 14 oz.....$36.00 square
Steel, painted.....$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine.....7¼@8 ¢
Iron Paint, Bright Red.....℔ D, 2 ¢
" " Brown.....℔ D, 1¾¢
" " Purple.....℔ D, 2¢
" Ground in Oil, B. Red ℔ D, 6½¢
" Ground in Oil, Red..℔ D, 6½¢
" Ground in Oil, Brown ℔ D, 5½¢
" Ground in Oil, Purple ℔ D, 6 ¢
Linseed Oil, Boiled, in bbls.....53¢
Linseed Oil, Raw, in bbls.....50¢
Mineral Paints.....2@4¢
Orange Mineral.....10½¢
Pure White Lead in Oil.....6¾@7¼¢
Dry White Lead in bbls.....6¼@6¾¢
Red Lead, American.....7@7½¢
Red Venetian, English, dry...$1.65@$1.70
Red Venetian in oil; asst'd cans, 8¼¢; kegs.....7¼¢
Sperm Whale Oil, in bbls, ℔ gal.....85¢
Spirits Turpentine, in bbls., ℔ gal..35½¢
Asphaltum, Trinidad Refined, ℔ ton..$45
Coal Tar, Felt, 1 Ply, ℔ 100 D.....$1.65
Coal Tar, Felt, 2 Ply, ℔ roll 108 sq. feet.....$1.50
Coal Tar, Felt, 3 Ply, ℔ roll of 108 sq. feet.....$2.00
Roofing Pitch, ℔ bbl. of 300 lb.....$3.20

NEW YORK, APRIL 28, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots..℔ D, $0.75
No 1 guaranteed to be 98 % pure and over), in ton lots.....℔ D .90
Lots less than 1 ton, 10¢ ℔ D additional.

Antimony—

Cookson.....℔ D, 11½¢
Hallett's.....℔ D, 10¾@11¢

Brass—

Planished—

List on following page.....net

Roll and Sheet—

List on following page.....35@10%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per D.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive.....$0.35	35@40%
Plain, to No. 20, above 3 inch..... 45	
Plain, 5-16 inch to No. 20..... 45	
Plain, ¼ inch..... 60	
Plain, 3-16 inch..... 1.00	
Plain, ⅛ inch..... 1.50	
Fancy Tubing to No. 20, inclu... 43	

Copper and Bronze Tubing—

3¢ ℔ D more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¾ to 3½ inches inclusive....17¢ ℔ D
Over 3½ to 5 inches inclusive.....18¢ ℔ D

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ D
Over 3½ to 5 inches inclusive.....11¢ ℔ D

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $2.50 per doz.....40&10%

Conductors—

Corrugated. *Round or Square—*

Lists on following page.
Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—

List on following page.
Galvanized.....50

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.

List on following page.....15@25%

Ingot.

Lake.....12¢
Ansonia Grade Arizona.....11½¢
Ansonia Grade Casting.....11¢

Planished.

List on following page.....net

Sheet and Bolt.

List on following page.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering,* in Current Hardware Prices.

Damper Clips Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

List on following page.
Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

List on following page.
Lap or Slip Joint.....list, net

Elbows—

List on following page.

Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four-Piece.

4¼	5	5½	6	7 inch,
$0.78	.87	.90	.93	1.20 per doz...20 %

Elbows and Shoes—

List on following page.

Flat Crimp,

Tin.....35%
Galvanized.....35%

Corrugated.

Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—

Black.

	Common American.	R. G. Cleaned American.	Americao.
Nos. 10 to 16.....	℔ D, 2¼@.....	3¾¢	
Nos. 17 to 20	℔ D, 3 @.....	3¾¢	
Nos. 21 to 24	℔ D, 3¼¢@.....	3¾¢	
Nos. 25 and 26..	℔ D, 3¾¢@.....	3¾¢	
No. 27	℔ D, 3¾¢@.....	3¾¢	
No. 28	℔ D, 3¾¢@.....	4¢	
American B. B.....	℔ D, 4¢@4½¢		

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ D, 12@13¢
Patent Planished....℔ D, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ D, 8¾¢

Galvanized.

	B. B.
Nos. 10 to 16.....	℔ D, 4 2.10
Nos. 17 to 22.....	℔ D, 4¾¢
Nos. 23 to 24.....	℔ D, 4¾¢
Nos. 25 to 26.....	℔ D, 5¢
No. 27.....	℔ D, 5¼¢
No. 28.....	℔ D, 5½¢
Nos. 29 and 30.....	℔ D, 6¾¢

Filter Joints—

List on following page.

Lee's.....33⅓%

Lead—

American Pig.....4¾¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....10¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ D.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ D, .05¢, 10&5%
Sheet Lead in whole coils, ℔ D, .05¼¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing.....10%
Fencing, Painted Sheets.....20%
Netting, Painted Sheets.....20%
Door Mats, Galvanized.....25%
Window Guards, Panelled.....15%
Tree Guards, Paneled.....15%

Mitres Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.—

Lead, Ann. White, Dry or in oil:

Kegs, lots less than 500 lb ...	7 @ 7¼¢
Kegs, lots 500 lb to 5 tons	6¾¢ @ 6¾¢
Kegs, lots 5 tons to 12 tons..	6¾¢ @ 6¾¢
Kegs, lots 12 tons and over..	6¾ @ 6¾¢
Lead, White, in oil, 25 lb tin pails, add to keg price.....	@ ¼
Lead, White, in oil, 12½ lb tin pails, add to keg price.....	@ 1
Lead, Red, bbls. and ½ bbls...	6 @ 7
Lead, Red, kegs.....	6¾ @ 7¼
Ocher, American.....	2¾ @ 1½
Red, Venetian, American	℔ 100 D..1.00 @ 1.10
Linseed Oil:	
City, raw, ℔ gal.....	@ .50
City, boiled.....	@ .53
Western, raw.....	@ .50
Spirits Turpentine:	
In regular bbls.....	@ .84½
In machine bbls.....	@ .35
Putty:	
In barrels and ½ bbls.....	.03¾ @ .04¾
In tubs.....	.05¾ @ .04¾
In tin cans.....	.03¾ @ .02½
In bladders.....	.01¾ @ .02¾
Roofing Material, &c.:	
Asphaltum, Trinidad Refined, ℔ ton.....	$30.00@$35.00
Asphaltum, Rock, ℔ ton.....	$14.00
Coal Tar Felt, 1 Ply, ℔ D.....	.2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl.....	$2.24

Pipe, Drain—

List on following page.....50%

Pipe and Fittings, Cast Iron Soil—

List on following page.
Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive.....60@60&10%
Other sizes.....55@55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 inches.....60@60&10%
Other sizes.....55@55&10%

Pipe, Spiral—

List on following page.

Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

List on following page.

For discounts see Current Hardware Prices.

Rivets and Burrs—

List on following pages.

For discounts see Current Hardware Prices.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, May 6, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street
PHILADELPHIA.....220 South Fourth Street
BOSTON.....116 Franklin Street
PITTSBURGH.....Room 509 Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph
CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....312 The Cuyahoga

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

Opening of the World's Fair.

In accordance with the set programme the gates of the World's Columbian Exposition were thrown open to the public on Monday. Appropriate exercises graced the event. The President of the United States pressed the button which started the ponderous machinery, and numerous distinguished representatives of American official life, as well as of foreign powers, added impressiveness to the occasion by their presence. The managers of the exposition were complimented for the ability and energy they had displayed in making the stupendous preparations necessary for the reception of a very large part of the best the world can show in mechanical and artistic achievements. The people of Chicago were especially proud of the fact that their city was the favored location for the four hundredth anniversary of the discovery of America, and welcomed to their midst the Duke of Veragua, the lineal descendant of the great discoverer. In the heart of the continent, almost 1000 miles from the seaboard, he beheld one of the greatest triumphs of civilization, the creation of gorgeous palaces, in which, in honor of his distinguished ancestor, the finest universal exposition was to be held.

Condition of the Exhibits.

Theoretically, the exposition is now in full blast and ready for the inspection of the people of the world. Practically, as shown in considerable detail elsewhere, the fair is not in proper condition to be visited and will not be for several weeks. Those who live within easy reach of it and can afford to visit it frequently will even now find a very great deal to interest them, and local patronage may run up to goodly proportions while the exposition is in its comparatively raw state. Residents of more distant localities, who can conveniently wait for a time and who do not expect to pay more than one visit to Chicago to see the exposition, will act wisely in deferring such a trip until late in May or perhaps in June. The exposition will be open for six months, and it should be seen at its very best in order to carry away the best impressions of its beauty as well as its magnitude.

Not a Money-Making Scheme.

We are not in sympathy with those who decry the exposition as a mere money-making scheme, with the celebration of the discovery of America as a pretext. This criticism could be made of every enterprise ever started and of every institution ever founded, save, perhaps, asylums, hospitals and churches. If it were not for the possibility of lucrative returns in some fashion human enterprise would be slow to engage in any undertaking, however pleasing it might be in contemplation. Expenditures in new schemes are not made if there is no hope of financial profit. As well might a man refuse to avail himself of the conveniences of a railroad, on the ground that somebody built it to make a profit out of transporting him, as to scent a possible money-making scheme in connection with an exposition and decline to visit it on that account. The mingling of sentiment and business is not unnatural, but one is the ally of the other, just as Machinery Hall and the Fine Arts Palace both belong to and are indispensable parts of the Chicago Exposition.

The Fair an Educator.

As the Centennial Exposition in 1876 was of incalculable benefit to our people in stimulating their inventive and artistic faculties, causing wonderful progress to be made in the development of a higher order of productive activity, so may the Columbian Exposition of 1893 prove to be another powerful educator, imparting its stimulus just when new life is needed. The direction in which this will be shown cannot yet be indicated, but there will be thousands of visitors from every section of the country who have the quick eye, the retentive memory and the constructive faculty that will enable them to use to good advantage hereafter the lessons learned in a course of visits to the World's Fair this summer. Let us all join in wishing the exposition complete success. Chicago's glory is the triumph of America.

Sheet-Metal Workers.

If it is true, as many of our correspondents say, that the educated workman is becoming more scarce, is it not the employer's fault to a considerable extent? In the sheet-metal trade the conditions are very much changed from even a quarter of a century ago. Instead of the old-time apprentice taken to learn a trade because he was not quite competent to become a professional man, but could turn a crank and grind out tinware, the present need is for a class of young men educated fairly and able to use drawing instruments and above all possessing the mental ability and mechanical taste to enable them to work from drawings and do a different piece of job work every day in the month. Such a person can get familiar with the use of the tools and machines in a very short time and make himself profitable from the start. The conditions needed to bring this class of men into the trade lies very much with the employer. A pleasant workshop, light and clean, a foreman who will instruct, but who at the same time will give the boy to understand that he must use his own brains for all they are worth, and pay that is graduated with advancement, will attract the better class of young men into the trade.

Electricity in Metal Working.

No one can predict to what extent modern methods of metal working are destined to be modified by applications of electricity. Electric welding is now quite extensively practiced. Electric casting has been shown to be practically possible in the Taussig process, wherein iron melted by electric heat is run into a mold connected with the apparatus in which the metal is melted, the time required for the execution of the work after the molding is completed being, for small castings, extremely short. Upon this follows the announcement that electric hardening and tempering of steel has been successfully carried out by some French electricians, who find that they can localize the hardening and tempering and confine it to an extremely limited area, or that they can so operate as to produce a hard skin over any desired extent of surface. An example is named of a steel bar hardened over its entire surface, but remaining soft in the interior. The facility with which heat can be produced by the electric current and applied to limited areas leads to the belief that it may find a useful application in the process of soldering, rendering easy the soldering of joints that are extremely difficult to make with the ordinary tools, and being particularly useful in soldering iron joints where the parts to be joined are so heavy that a blow-pipe flame or other analogous means are required for heating the parts before the solder can be applied. The possibility of producing a cheap apparatus for this purpose, adapted to use in shops, does not seem yet to have received the attention it deserves from electricians.

Interest in Heating Goods.

One of the effects of the severity of the past winter is now being made manifest in the heating trades in the large number of inquiries received, and this, too, in spite of the fact that the spring work of the builders is reported to be delayed by the weather from four to six weeks. These inquiries are largely due to the previous mild winters, which have permitted many heating plants to render service which has not been unsatisfactory until the stress of a good old-fashioned winter discovered their inefficiency. It is gratifying to feel that 1893 will probably be a good year for stoves, furnaces, steam and hot-water boilers, and that there will be enough work to go around, so that the disposition to make low prices may be checked. Many buyers who have experienced the result of low prices will

not look so kindly on cheap work in the future, but will inquire more closely into the quality and character of what they are getting. The delay caused by the weather will afford an excellent opportunity for a more careful consideration of all the rules that may be applied to each case, with the probability of better work resulting and better service being rendered. More important still is the likelihood of a closer accounting of cost of erection, so that those who have quoted too low in the past may see their error and join in sustaining prices at a figure which is remunerative though only fair from an intelligent standpoint. That there will still remain among the bidders on all work one who is away below the average is probable, but the effect will be less annoying and demoralizing if the many inquirers of the present materialize as buyers during the season.

Growing Use of Domestic Terne Plates.

It is idle for opponents of the American tin-plate industry to continue blind to the fact that American tin and terne plates of an unsurpassed quality are now being turned out in quantities from domestic factories, and are being more extensively used every week. Dealers in almost every section of the country concur in reporting a marked growth in the demand for plates of native manufacture, particularly ternes, which are preferred by users, not because they are home-made, but on account of their intrinsic value. It was rather startling to be told, as we were told the other day by a New York tin-plate merchant of standing, that it has lately become the exception for the customers of his firm to call for imported roofing plates. The concern in question have until a comparatively recent date handled nothing but imported tin plates. They did not keep the domestic article until forced to do so by the requirements of their customer Now a large stock of American terne is carried, and, to use the expression of our informant, "they go like hot cakes." Another merchant recently gave it as his opinion that the bulk of the roofing tin now being used in the United States is home-made. In the Western States the demand for American plates is so great that they use up all the products of the Western makers and send their surplus orders into the Eastern market. Manufacturers throughout the country generally report a ready sale for all the plates they can make, and many are unable to keep abreast of orders. No stocks of domestic plates are being piled up. Tin-plate works are nearly all running to full capacity, and are turning out a large and growing product. In the face of these facts we can only conclude that the American tin-plate industry has the practical support of those most deeply interested in the matter—namely, the consumers.

The fire losses of the United States for March are reported to be in excess of $16,000,000. "If this record is kept up through the year," says *Fire and Water*, "1893 will be the worst year the insurance companies have ever known. Already the losses have exceeded those of the corresponding period of last year, and the cry is, 'still they come.'" Our contemporary thinks that with heavy losses and restrictive legislation in the various States it will be surprising if there is not a withdrawal of considerable insurance capital by the retirement of companies before the close of the year. The business has been unprofitable for several years, and the outlook for the future is not encouraging.

Carbonic Acid at the World's Fair.

A scientific friend, who once took a course in pharmacy and therefore knows a thing or two about chemistry and physics, is greatly alarmed over the prospect of serious atmospheric disturbances in Chicago this summer, as well as seismic phenomena in remote regions on the earth's surface, as a direct consequence of the World's Fair. He reasons that the concentration of a half million or more human beings within the exposition grounds will cause such an enormous consumption of oxygen in that limited space that the great reservoirs of nature in the boundless ether will be called upon to supply the deficiency and air currents of frightful velocity will be created, causing cyclones, tornadoes, whirlwinds and hurricanes. The atmospheric equilibrium thus disturbed will enable the pent-up gases in other parts of the earth to accomplish a vent, giving rise to earthquakes and perhaps to eruptions of volcanoes. The huge quantities of carbonic acid exhaled from the lungs of the people, driven by the in-rushing winds, will, however, promote vegetation in other sections, as it is so beneficial to plant life; but that will, of course, be a poor compensation for the valuable lives which may be lost by the atmospheric disturbances. Being the inventor of a machine for the rapid generation of oxygen, he suggested modestly that the only sure way to avoid such a terrible catastrophe as he points out is for the fair authorities or the Government to purchase a sufficient number of these machines to supply any deficiency in the atmosphere, and place them on the grounds. We may add that our friend, who is something of an alarmist, lives neither in New York nor St. Louis.

Anti-Pin Hole Tin Plate.

Our readers will recall the discussions respecting pin holes in plates that have occurred in *The Metal Worker* in the past, and will be interested to know that Gummey, Spering & Co., Philadelphia, Pa., have put a plate on the market under the name "Gummey's Anti-Pin Hole Bright Tin Plate" which they say obviates the pin hole difficulty. The following extracts from a letter relating to this subject will be read with interest:

For a long time we endeavored to get a plate that was made of hammered charcoal bars, the same as tin plates were made 30 to 50 years ago, and we were successful in finding a works which has an old charcoal forge which was simply kept as a kind of curiosity to show the way plates were made from hammered charcoal bars. As you are aware, plates made of these bars are worth considerably more money on account of the extra cost in making the bars, but we have these plates in stock and have sold largely of them and in every instance they have given satisfaction, and persons who have had merely a sample box are now ordering largely.

Light Welsh Tin Plates.

An American buyer of Welsh tin plates, who says that he believes his firm to be "the only house in the United States which have not sold American tin plates, and do not wish to do so," has been constrained to write to his business correspondents in Liverpool protesting against the irregular weights of the boxes of plates now being sent to this country. Accompanying his letter he transmitted a list of the weights of boxes supplied to him by various Welsh makers, taken at random, which showed a remarkable variation in the weights. He also said that his firm had had repeated complaints from their customers of the uneven thicknesses of imported plates supplied to them. In the interests of Welsh makers he therefore warned them against the practice, which he predicted would ruin their American trade if such a course was persevered in. Part of his letter—which was published in full in a number of English papers—contained some strong sentiments, of which the following extract is an example: "If they (the Welshmen) would be only one-tenth part decent and one-ninth part honest they would have a nice business; but they are like the old criminal, when he could not do anything else he picked his own pockets, and they are certainly picking their own pockets to perfection at present."

This naturally has roused the wrath of certain Welsh tin-plate men, in particular that of a correspondent signing himself "Tin & Co.," who wrote a long letter to an English trade journal traversing the statements of the American merchant and defending the Welsh makers from the imputation of unfair dealing. The correspondent suggested that the weighings of a parcel of American-made tin or terne plates should be obtained and the results published, the inference being that the Welsh material would be found to come out well in comparison. This being beside the mark, has called out a further letter from the American dealer—who offers that his letters should be printed over his own name, provided the brands he weighed were also mentioned—upholding his first statements that light plates are being sent into the United States and that the practice will, unless discontinued, ruin the Welsh tin-plate trade in this country. He also offers proofs of the correctness of his weights from boxes of tin plate in his store. Concluding his letter, he says: "We had nothing but the kindliest feelings for the Welsh makers, and we called their attention to a piece of folly, hoping that they would take it in the right spirit and correct the evil. Instead of that, they try to bolster up the wrong acts of a few makers."

The State of Washington is recognized by those who live there as possessing great resources, promising a grand development. In Tacoma, its principal port on Puget Sound, there are already 50,000 inhabitants, and in the State at large 120,000. A correspondent writes that nearly $3,000,000 of building was done in Tacoma last year, and he is informed that still more is projected for 1893. Another writer discourses with enthusiasm upon that great inland sea, Puget Sound, with its hundreds of safe harbors, "so deep that an ocean vessel can sail up to its shores and make fast to the fir trees that grow to the waters' edge." The people who are building up the country are reputed to be of more than the average intelligence of new settlers.

THE WORLD'S FAIR.

The Actual Condition of the Exposition.

For the benefit of our readers who may be contemplating an early visit to the World's Fair at Chicago we have caused a thorough investigation to be made of the exact status of the work of preparation. This has been done by our own representatives, who have been uninfluenced in any way and have only sought to secure actual facts. There is no question that the Chicago exposition will far surpass, both in magnitude and splendor, any of the international expositions thus far held. It will, therefore, be unfortunate if a very large number of persons from distant sections of the country should visit it too early, and finding it in an incomplete condition should represent it to their friends and neighbors as disappointingly crude. The managers of the exposition have been obliged to contend with the most formidable obstacles and to overcome the most forbidding conditions from the very inception of the enterprise, not the least of which has been the very unfavorable weather of the entire month preceding the opening day. This is the period in which the grand work of two years should have come to a successful climax, the culminating point being completed buildings, completed exhibits and completed grounds. That they have been disappointed in accomplishing the work in the time specified is not to their discredit, and reproaches do not lie against them. They have done nobly, but they could not accomplish the impossible. No previous international exposition had opened its doors with every nail driven, every display in place, grounds in perfect order and contractors out of a job, hence Chicago could not reasonably expect a different order of things to prevail. Exhibitors will fail to ship their goods in ample season for installation, and a thousand little delays aggregate a formidable mass of confusion at the wind-up.

Chicago push is proverbial, but even Chicago push cannot prevail in a contest with the rest of the world and the elements combined. The preparations for the exposition are not complete in many respects, and it is only just to our readers that we should say so. While visitors even now will see much that is interesting and instructive, if they would get the full benefit of the elaborate preparations to be made for their entertainment they should wait until May has pretty well run its course. Details of the condition of the buildings and grounds the latter part of last week are as follows :

Department of Machinery.

In the Palace of Mechanic Arts the situation is unequivocally one of incompleteness. As regards the building and its several annexes there is much still to be done in the way of finishing up, though the strictly constructive portion of the work has been completed for some time. But experience teaches that this final finishing up process consumes, almost invariably, more time than was originally allowed for the purpose, and these buildings are no exception to the rule. The mere matter of clearing away debris, sweeping and furbishing, to place the whole in presentable shape for the inspection of visitors, is a work of days. Exterior painting, decorating and repairing of staff work damaged by the weather and the constant procession of teams to and from the interior, will require at least a week, though at the present tardy rate of operations it must spin out much longer, and until it is finished the unsightly scaffolding must remain. The grounds immediately surrounding the buildings are in a chaotic state of litter from the piles of gravel, old lumber and unused building materials, and on the south and east sides the ground is ankle deep in loose sand still to be graded and paved, and upon which the work has been entirely discontinued for some time past. In the interior, the lobbies, galleries and offices may be considered in as good condition as is possible, until the entire installation of exhibits is completed and the final cleaning up can be done.

The condition of the main floor is necessarily an uncertain quantity and must so continue until all machines are in place on their foundations, and all pipe and belt holes provided. Three of the original railroad tracks—situated about 4 feet below the floor level—are still uncovered for a distance of several hundred feet from the west end of building and cannot be floored over so long as delayed exhibits continue to arrive. This, judging from the large amount of totally unoccupied space alotted to exhibitors, will not be completed for an indefinite time, unless the exposition authorities shall fix or enforce the limit for their admission. While there can be no doubt as to the justice of such action its effects might be disastrous and result in many extensive gaps, seriously interrupting the continuity of the display and the wasting of valuable space which would have been taken gladly by other manufacturers who were desirous of making extensive exhibits. Judging from present appearances the condition of affairs in this department will require some very energetic work for several weeks to come in order to complete the installation of exhibits and the subsequent general finishing touches necessary to a creditable display.

Outside of the power and electric plant and a few other conspicuous exceptions, it is no exaggeration to say that the buildings are in a chaotic state, which would admit of but little satisfaction to pay for the difficulties of an attempt at a general inspection of exhibits. So far as this department is concerned it will certainly be a great mistake for those who can devote but a limited amount of time to the exposition to make their visit earlier than the latter part of June. The display, when completed, will be most magnificent and well worthy of the attention of all who may have the opportunity of visiting the fair, but it should be seen in its normal condition and not during the transition period.

The Transportation Building.

The Transportation Building, which is one of the very large buildings of the fair, and is intended to present a display of exhibits which will be attractive, not only to those interested in methods of transportation, but to the masses generally, is in comparatively good shape. The inclosures of the different exhibitors are well completed, and exhibits are mainly in such shape that a very few days will enable them to be put in proper order. The opening day may not have seen everything in trim, but not many days will elapse until this building needs no further touches to make it complete. The full-size model of the great steam hammer of the Bethlehem Iron Company looms up in the center of this building completely finished. Around it are a great variety of displays of all kinds of exhibits covering both land and water transportation. The annexes are full of locomotives and all kinds of passenger and freight cars, from the earliest type down to the most finished constructions of this modern era. The visitor to the Transportation Building will be repaid in a very short time for the trouble taken to see its exhibits.

Outside of this building the roadways are not inviting; some of them are in very bad condition, having been cut up by heavy traffic teams. It would seem as though a week or two of good weather and a great deal of very hard work would be necessary to make them presentable and insure visitors against wading through mud or suffering from clouds of dust. And yet it is remarkable how quickly work of this character can be done with the energy shown by the management. Passing to the north entrance in the Mines and Mining Building in the morning a great waste of rough roadway was crossed, which in the afternoon was found to be covered by a smooth sheet of asphalt which had been placed in position and smoothly rolled during the short intervening period. Looking at such achievements it is not safe to indulge in unfavorable predictions as to length of time necessary to get the roadways in good shape.

Administration Building and Terminal Station.

The Administration Building is practically completed. This is the show building of the group, having been planned on a more elaborate scale of ornamentation and for a greater display of architectural effect than any of the others. Such slight finishing touches were being added last week as were of no special moment, but more in the nature of house cleaning and brightening up. The great dome which covers the interior of this building, starting from the ground floor, is finished and excites the admiration of all who see it when they gaze upward and examine the magnificent fresco work.

The Terminal Station within the grounds, intended for the accommodation of excursion trains on any of the railroads running into Chicago, is located a short distance east of the Administration Building. It is completed and ready for the accommodation of World's Fair traffic. Between this building and the Administration Building is a broad plaza which will be macadamized, the work now being well under way. So quickly is this done by a very large force of men who have all the necessary appliances for rapid work, including heavy steam rollers, that large sections are completed in hours instead of days, as is usually the case. One of the worst pieces of roadway in the grounds is that which extends north of the Administration Building between it and the Mines and Mining Building. This looks as if it would not be presentable until after all the heavy hauling ceases and several days can be taken for its complete reconstruction. This space is rendered the more uninviting by the erection of some pavilions for various purposes, which are as yet uncovered with staff and consequently present a forlorn appearance.

Mines and Mining.

In the Mines and Mining Building quite a number of exhibits were finished and ready for inspection last week. Among these may be mentioned that of Stumm Bros., the comprehensive display of New South Wales, the exhibits of the Cambria Iron Company, the Solid Steel Company, Wm. Jessop & Sons, the Gates Iron Works and the States of Missouri and Minnesota. The exhibit of Stumm Bros., who are prominent German manufacturers, was described to some extent in these columns about a month since. It occupies a very conspicuous position, and is all the more conspicuous by reason of the non-completed state of the exhibits surrounding it. The Cambria Iron Company make a very creditable display of their products, a prominent position being given among them to the original Kelley converter. Chief Skiff has pushed the work of installation in this building with unceasing vigor, but despite his utmost exertions the building will not be in good shape for certainly two or three week. Some of the exhibitors have but recently begun to erect their pavilions, and the aisles were

blocked by packages of goods, which could not be put in place until after the pavilions were ready to receive them. The cabinets in the galleries intended for mineral specimens were only partially completed last week, and the work of unpacking, placing and arranging the specimens will certainly take days, if not weeks of time. It is likely that everything will be in good shape here at an earlier day than is at present deemed possible, because in every direction work is being prosecuted with energy and everybody is evidently hurrying to make up for lost time.

The Main Building.

The great building devoted to Manufactures and Liberal Arts was last week a scene of almost indescribable confusion. Everywhere there were crowds of workmen bustling and hurrying, who were attacking huge piles of merchandise, packing boxes and all sorts of building material, trying to get matters into good shape, but making such slow progress that a day seemed to count for very little in getting things in good condition. Piles of lumber obstructed the aisles, innumerable pavilions were only in the early stages of construction, and in very few parts of the building could an idea be obtained as to the character of the exhibits to be made in that particular section. Some of the exhibitors have their pavilions and exhibits in perfect shape. Conspicuous among these are the English, German, French and Belgian sections. Our own people seem to be the most dilatory. Exhibits from Chicago houses were only arriving the latter part of the week, the people nearest the fair apparently having delayed their work the longest. The Russian pavilion, however, has just been begun. The section devoted to stoves and house furnishing goods would have been difficult to find had it not been for the huge pavilion of the Michigan Stove Company, built in the form of a cooking stove, standing 25 feet high and 30 feet long, which makes a striking landmark in the general chaos. The visitor who enters this building this week and expects to see a complete collection of exhibits will be very much disappointed. Two weeks at the very earliest will be required, and perhaps more time than that will be necessary from present appearances.

The Agricultural Building.

The Agricultural Building, which is another of the great buildings of the fair, presents a mere promise of what the display in it will be. Exhibitors were actively at work on their pavilions, but while some of these were completed and in full readiness for the opening day, others were comparatively unfinished and numbers of them had just been begun. Packing boxes filled up the aisles and in many cases were piled so high as to cut off the vision over a great part of the area. A month would seem to be none too much for the proper arrangement of exhibits in this building.

The Electricity Building.

In the Electricity Building, in which there are comparatively few exhibitors, who were therefore expected to get their exhibits in good shape at a very early day, much still remains to be done and the display could by no means be considered nearly ready. Packing boxes were as conspicuous here as in the other buildings, and days, if not a week or two, would be needed to enable the exhibitors here to get everything in presentable shape.

Other Buildings.

A ramble among the various buildings located in the north end of the grounds shows that much work yet remains to be done before they will be in a finished condition. The external staff work of Horticultural Hall plainly shows the effect of last winter's storms. In some places below the window belt the staff is broken away and must be replaced. Workmen are engaged on the exterior of the building making repairs. The staff is streaked with dirt and requires painting. The floral display in the rotunda is partly finished, workmen being yet engaged in placing plants and decorations. There are few exhibits in the galleries, as workmen are finishing the decorations. In the southeast part of the building the floral exhibit is about completed, while in other parts very little has been done at installation.

The Public Comfort Building is in an unfinished condition. The walls are only partly covered with staff, while floors are being laid and partitions plastered.

Puck Building shows a finished exterior. Printing presses are in position on main floor, but no exhibits are in the gallery. The staging is yet up for decorating the interior. The exterior of the Woman's Building presents a fair appearance, as do the surrounding grounds. An inspection of the interior shows that few of the booths are finished, and hardly any exhibits are in position in the Main Building, booths, or gallery.

While the Illinois Building is finished, few exhibits or decorations are in position. The grounds about this building are being improved. The exterior of the Indiana Building is being finished, and the same can be said of the interior and grounds. Old Point Comfort Building presents an unfinished condition, the scaffolding yet being up and men at work finishing the exterior. The roof of California Building is being finished. There are a few exhibits in the gallery, but none on the main floor. The grounds about this building are in an unfinished condition. The Wisconsin Building and grounds are completed. The interior of the building is finely finished in hardwood, but not furnished. Colorado presents a finished building, but not furnished. The grounds are being put in shape. The Michigan Building is in good condition and finished. The interior is not furnished. The Washington building is finished and ready for furnishing. The South Dakota Building is finished, and the grounds are being put in order. Minnesota presents a finished building, the interior being furnished and the grounds in order. The exterior and interior of the Louisiana Building are finished, but not furnished; a force of men is at work on the surrounding grounds. The exterior of the Missouri Building is being painted, as is the interior. The grounds are in an unfinished condition. Pennsylvania presents a finished building and grounds. The New York Building is in an unfinished condition, as are the grounds. The staff work shows the effects of the weather and requires painting. The exterior and interior of the Massachusetts Building are in good shape, while the grounds are unfinished. The Vermont and Maine Buildings and surrounding grounds are in an unfinished condition. The exterior of the Ohio Building is being painted. The interior is finished and ready for furnishing. The grounds are in an unfinished condition. The exterior of the New Hampshire Building is finished and the interior partly so, but the grounds are unfinished.

The Connecticut, New Jersey, Maryland and Kansas buildings and grounds are finished, and the buildings ready for furnishing. The Iowa Building is finished externally and the interior about finished. The decorations in the main room are about completed, but the grounds are unfinished. The Rhode Island, Delaware, Virginia, Montana, Utah and West Virginia buildings are finished ready for furnishing, but the grounds are not improved. The Idaho Building, which is built of stone and logs, is about half completed. The exterior of the Oklahoma Building is finished, interior partly so, but no improvements have been made to the grounds. Florida presents a building the exterior of which is finished, the interior partly so, while the grounds are mostly finished and ornamented with tropical plants. The Arkansas, North Dakota, Nebraska and Kentucky buildings are finished externally and interiors being finished. The grounds are unimproved. The staff work of the Texas Building is being completed, while the interior and grounds are in an unfinished condition.

The exterior of the Art Galleries shows the effect of the weather, as the staff work is discolored, although workmen are engaged in making repairs. A coat of paint is required to make the buildings presentable. The entrances to the buildings are in an unfinished condition, as are the surrounding grounds. An inspection of the interior shows workmen engaged in decorating walls and installation of exhibits. Among the countries most advanced in installation are the United States, Germany, Great Britain, Netherlands and Austria.

The staff work of the Fisheries Building is badly discolored, and anything but white. Grounds are in a fair condition. Only part of the exhibits are in place in the Main Building, and the same can be said of the west wing. In the east wing the aquaria are in place and the entire exhibit about completed.

The exterior walls of the Government Building are being painted and will present a handsome appearance when finished. The exhibit in this building is practically finished in most departments. The complete arrangement of the different Government departments with their independence of any outside force has enabled them to go ahead with their installation regardless of other exhibits, hence their advanced condition. In the National Museum Department most of the exhibits are in position, and the ceiling is gayly decorated with numerous flags. In the Departments of Justice and State pictures are in position on the walls and cases are partly filled. The Department of Agriculture is only partly finished, many packing cases being on the floor to be opened. In the Fisheries pictures are hung on the walls, and about two-thirds of the cases are filled with exhibits. In the Patent Office Department the cases are filled with exhibits and a good showing is made. The Geological Survey relief maps are in position and the cases are well filled with specimens and instruments. The Bureau of Education cases are filled with models of school desks, and the shelves with books. Photographs, examples of school work and plans of school houses are all in position. The large globe is not finished. In the Post Office Department is found the World's Fair Post Office, which is in running order; also a model postal car. While many cases are filled with exhibits, much remains to be done. In the Coast and Geodetic Survey very little has been done toward the installation of exhibits. Numerous cases are filled with Smithsonian specimens, yet much remains to be done. In the rotunda of the building the large redwood tree is in position and the decorations are completed. The staging is being removed. On the east side of the building a number of large guns are in position.

The staff work of the French Colony Building is nearly finished and some work is being done to the interior, while the grounds are unfinished. The Ceylon Building is not yet inclosed, although much fine building material is on hand. The north half of the German Building is being finished and decorated and the interior exhibits are being placed in position. The other part of the building is unfinished. No improvements have been made to the grounds. The Haytian Building is well advanced, as the exterior and interior

are about finished, but no exhibits are in place or improvements made to grounds. The New South Wales Building is finished, but no exhibits are in place and the grounds are unimproved. Victoria House is finished but the grounds are not. The same can be said of the Canadian Pavilion. The East India Pavilion has the staff work partly finished and the interior the same. Some exhibits are in place and the grounds are unimproved. The exterior and interior of the Swedish Building are being finished, but the grounds are unimproved. The framework of the Venezuela Building is up and being covered with staff. The Turkish Building has the exterior finished and the interior partly so. Some exhibits are being placed in position. The grounds are unimproved. While the exterior of the Brazilian Building is being covered with staff, little work has been done to the interior. The exterior of the Guatemala Building is being covered with staff, also the inner court. The frame work of the Colombia Building is up and the staff work just commenced. The Costa Rica Building is about finished, but no exhibits are in the cases and the grounds are unfinished.

Prize Competitions

$25.00.

Prize Competition No. 23.

In this series of competitions we are desirous of discussing subjects which will be of practical interest to the trade, with a view to drawing out suggestions and information which will be of service. We are desirous of hearing from the trade in regard to topics the discussion of which would be of interest to them, and we accordingly announce as the subject for Prize Competition No. 23:

Three or More Subjects for Prize Competitions.

We do this, hoping to receive from the trade at large many topics which might advantageously be discussed in this way. Many merchants or clerks who may not have the time to discuss trade questions can obviously suggest them, and we shall esteem it a special favor if our readers will mention freely any subjects which seem to them of trade interest.

Some of the subjects which have already been announced have been suggested by our readers.

This competition will remain open until May 27, 1893.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which in the judgment of the committee of award suggest three or more topics most suitable for discussion in this series of prize competitions.

We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than May 27, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 Reade street,
New York.
Prize Competition No. 23.

The committee to whom the contributions in Prize Competition No. 9 were referred have awarded the prizes as follows:

First Prize of $50 to Ross F. Rainey, Pittsburgh, Pa.

Second Prize of $25 to W. D. Parlin, Natick, Mass.

Third Prize of $15 to John F. James, Roanoke, Va.

Fourth Prize of $10 to Daniel P. Holmes, Norwich, N. Y.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 20. Closing May 6.
A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

No. 21. Closing May 13.
The Safety Line in Credit Business.

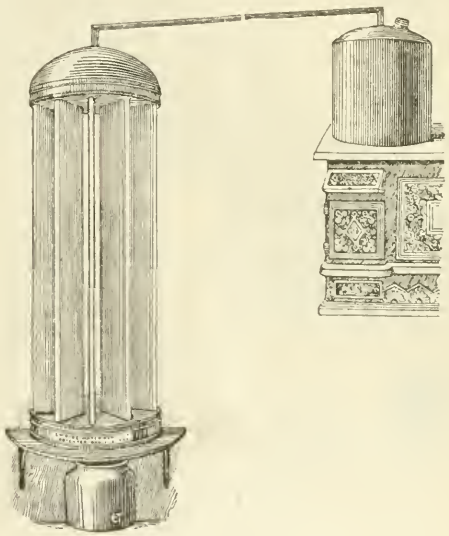
No. 22. Closing May 20.
The Best Manner of Presenting and Collecting Book Accounts.

No. 23. Closing May 27.
Three or more Subjects for Competition.

Another subject will be announced in our next issue.

Empire Water Purifier.

Pure water has been declared by an eminent physician to be that which comes nearest to a universal remedy for all diseases, and its value is being more generally recognized. It is claimed for the Empire water purifier, illustrated herewith, that it will furnish absolutely pure and wholesome water. The apparatus consists of a block-tin vessel—the boiler or vaporizer—which can be used on any kitchen range. This boiler is connected, as shown in the cut, with a condenser or purifier of novel form. It is a copper apparatus consisting of a hollow dome and base connected by a number of upright flat tubes. The mode of operation is simple. The steam from the boiler passing through the connecting tube into the dome condenses and falls downward through the flat tubes into the hollow base, cooling gradually in its descent. It is discharged from a tap at the base into the vessel placed to receive it. The purifier is made of copper coated inside with tin, the connecting pipe being also of copper, brazed, and tinned inside, exposing no metal which could be acted upon by the steam or water. All parts are readily disconnected, and as the purifier weighs but 8 pounds, it can be easily shifted about and removed when not required. It is also easy of operation; and can, if desired, be connected with the spout of any ordinary kettle. The capacity of the apparatus is 1 gallon each hour. Any description of water, even that of the sea, can be treated in this manner. This would adapt the purifier for use in sailing vessels where condensing facilities do not exist. The Empire Water Purifier is handled by the Empire Pure Water Supply Company, 203 Broadway, New York.



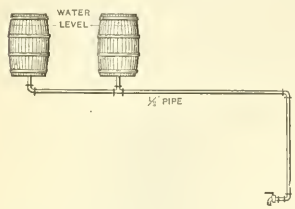
Empire Water Purifier.

The following recipe is said to make an excellent anti-rust paint for bright steel goods: To 1 gallon of gasoline add 6 ounces of pulverized resin, 3 ounces of pulverized borax and 4 ounces of pulverized alum. By adding 1 pound of fine ground black lead with 2 ounces of lampblack, an excellent stove polish is said to result. This polish is applied to the stove with a soft brush and polished when dry.

THE LETTER BOX.

A Question of Water Pressure.

From J. S., *Watertown, Conn.*—Please decide the following question in *The Metal Worker:* A connects two barrels of water as shown in Fig. 1; B claims that more pressure is to be obtained if the barrels were connected as shown in Fig.



A Question of Water Pressure.—Fig. 1.—*A's Method of Connecting Barrels.*

2. Does A get more pressure by having both outlets on the bottom than B with one outlet, as shown in Fig. 2?

Answer.—We assume that the water level in both cases is the same, and that the faucet is the same distance below the water. This being so, the pressure at the faucet will be the same in both cases.

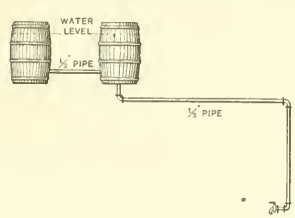


Fig 2.—*B's Method of Connecting Barrels.*

The pressure of water depends upon the head—that is, the hight of the surface above the outlet—and is not affected by the volume of water or the connection between the different reservoirs.

To Clean Out Smoke Pipe.

From C. H. M., *Otio, Mich.*—Can you tell me what will clear the smoke pipe of a furnace in which soft coal is burned of the excessive deposit of soot? The pipe fills up so in about three or four weeks time that the furnace will not draw.

Note.—The probable cause is an insufficient draft, due to a chimney that may need cleaning or which is smaller than is required to carry off the smoke quick enough to get the soot out of the top of the chimney. A general experience is that soft coal requires a larger smoke pipe than is found to be ample with hard coal. If the collar is 7 inches on a hard coal furnace many experienced furnacemen taper the first piece of pipe immediately up to 9 inches and run the larger size to the chimney and make a similar proportionate increase in size whatever the collar may be. This increase in the horizontal pipe carries the enormous quantity of smoke, made by a soft coal fire under some conditions, to the chimney quickly, where the rapid up draft disposes of it satisfactorily. If the furnace has a diaphragm in it to aid in realizing the heat from the smoke and gases, it should be cut off more or less when soft coal is used to permit their more rapid passage to the pipe. It is quite a common thing in sections where soft coal is used to put straw in the furnace and burn out the pipe, but this is only a temporary relief and must be applied with care. This suggestion may be most satisfactory to our inquirer, particularly if the pipe in question is good, but when it is to be renewed it should be given a generous increase in size.

Corrugated Fire Boxes.

From B. B., *Amherst, N. S.*—Please inform me whether a plain or a corrugated fire box for a wood furnace is the better form.

Note.—The advantage gained by corrugating a fire box is the increased heating surface, which is an important feature in all work where heat has to be extracted from the fire and has to be given to the air or other medium. An objection to this form is that the corrugations are lodging places for ashes and dirt, which act as non-conductors. If cleaned regularly, however, there is no reason why the deposit should seriously interfere with the heating power of the furnace.

Placing Rivets in Punched Holes

From M. T. C., *Riverside, Cal.*—Which is the proper way to place a rivet in a hole punched through light iron? Should the head of a rivet be on the burr side or on the side the hole was stamped from?

Answer.—The usual practice is to place the head of a rivet on the burr side if it is desired to flatten down the rivet so that it will be flush with the iron, as, for instance, on the small end of an elbow or a collar which is to fit into the large end of another elbow or pipe. The head of a rivet when put on the side from which the hole was started in punching can be drawn up tight against the iron, making a smooth, neat finish for the large end of elbows, pipes, collars, &c. Rivets placed in this manner, after being drawn up, are then hammered down and finished with a cup or cone-shaped rivet set on the out or upper side of the material. This leaves a smooth under side, which will not obstruct its ready fitting over another piece, which would be the case if the rivet was not perfectly flush on the under side or had been placed with its head against the burr of the punched hole. If it is desired to join two pieces of light material together, never place the iron or punch the rivet holes so that the rivet heads will come on the burr side, as the action of drawing, upsetting and heading the rivets tends to stretch the iron considerably. This trouble is not encountered if the heads of rivets are on the side from which the rivet holes have been started in punching. Another way is to have the rivet holes large enough, so that after they have been punched the burrs can be flattened down. By this method it makes no difference on which side the rivet is placed with its head. One disadvantage of this treatment is that it requires the utmost care to have the holes all come right and match each other. The operation of flattening down the burrs also tends to stretch the material to some extent, which is by no means a desirable feature in some classes of work.

Sharp Criticism on Boiler Connections.

From S. H. D., *Watkins, N. Y.*—Noticing the cut of the Perfection Water Heater in *The Metal Worker* of April 29 I wish to say that I think the manner of connecting the hot water service to the circulating pipe is wrong. The hot-water pipe should never be taken from the circulating pipe or the water will be drawn from the circulating pipe and not from the top of the boiler, and cold water will soon come from the bottom of the boiler through the pipe to the water back or gas-heater and will not be hot enough, from passage through them, to be satisfactory. Having changed a number of such connections that were unsatisfactory, with good results, I feel that I am right in speaking my experience positively. There is no objection to connecting the circulating pipe to the top of a boiler if all of the other connections are properly placed. Connect the cold water supply at the side opening in the boiler near the bottom, using one of the top openings for hot service, getting rid of the air at top of circulating pipe by an air valve or a vent to the tank, if there is one, and it will be all right.

Note.—Such an outspoken opinion and criticism, if received with a view of testing its correctness and making the result profitable, can only result in good to all interested. Many good plumbers differ on the point at issue, making it worthy of close investigation. Illustrations and comments on the same subject will be found in *The Metal Worker* of February 25, March 11 and March 25, 1893, giving question and answer and other comments.

In a recent article in the Letter Box "J. C. F.," Williamsburgh, Ohio, inquired for a sliding damper. We have received from W. B. Wilkinson, 210 Water street, manager of the New York branch of the Howard Furnace Company, a circular illustrating and describing Read's Patent Regulating Check Damper made by Josiah M. Read, 63 Blackstone street, Boston, Mass., and which the Howard Company carry in stock.

Time Report Cards.

From M. & T., *Clinton, Ia.*—We apply to the Letter Box for a good workman's report card, one that can be printed on a postal card so as to be mailed in every night when a workman is off or on a jobbing tour or engaged on an out-of-town job. To be complete for our use, it should be so that the time and material used and the name of the customer could be easily recorded. A card for each day, so that by providing the workman with a week's supply, the record of each day can be given in each night in person or by mail.

WORKMAN'S TIME REPORT.

For day ending.....189

Men must inform themselves on what portion of work they are engaged, and keep time carefully, under penalty of dismissal.

Time spent.	Description of work and account of materials.

Memoranda.....

Workman's name.....

Customer.....

WORKMAN'S REPORT.

Name, *Thomas Cooper.* .....Day Ending *April* 1, 1893.

Hours spent.	Customer's name.	Kind of work and material used.
1	J. Brown	Mending roof. Half pound solder and two sheets of 20 x 28 tin.
2	K. Smith	Cleaning smoke pipe. Two joints and one elbow, 7-inch, galvanized.
2	W. Jones	New waste pipe in sink. Three feet of $1\frac{1}{2}$-inch lead pipe.
2	Mary Thompson	Changing gas pipe. One pound fittings, one No. 2 double-joint bracket.
2	Saml. Robinson	Repairing copper pump. One bottom valve, new leather one upper.
1	Sara Johnson	One damper in smoke pipe, 6 inch.

Note.—One of the accompanying report cards may answer the requirements, or may suggest something suitable. The particular work done on any day can generally be recorded in full on the space which either card affords.

Metal Siding.

From L. F. S., *Jasper, Ind.*—Will you or some of your readers kindly inform me how rock-faced or galvanized clapboards will do for siding? How long will they last without paint? How long will paint last on them?

Note.—Galvanized iron has been found a first-class covering for the sides as well as the roof of the building. It is easily adapted to the various shapes of the building, and when carefully put up is durable and presents an attractive appearance. Its lasting qualities without paint depend somewhat on the climate and location as to dampness, but that it will last a long time can be readily seen by noting buildings where galvanized work has been exposed to the weather for a number of years. The change in color and unattractive appearance when exposed for a time suggests strongly the use of good paint, when not only the appearance but the durability is increased, so that it compares favorably with the materials in general use for the same purpose. The paint should be in two coats, and if of good quality, well put on, it will last as long as if put on any other material subject to the same exposure. The advantage of an iron siding in case of fire is so apparent that there is no restriction in its use in cities where wood would not be permitted.

Size of Pail for Stamped Cover.

From H. D.—Will the readers of *The Metal Worker* inform me if there is a definite rule for obtaining the length of bodies for pails or buckets when stamped covers are used? Supposing a pail is to be made for a stamped cover $9\frac{1}{4}$ inches in diameter, what should be the diameter or circumference of the body so as to fit the rim, a No. 10 wire being used for body and medium-sized burr on rim and cover?

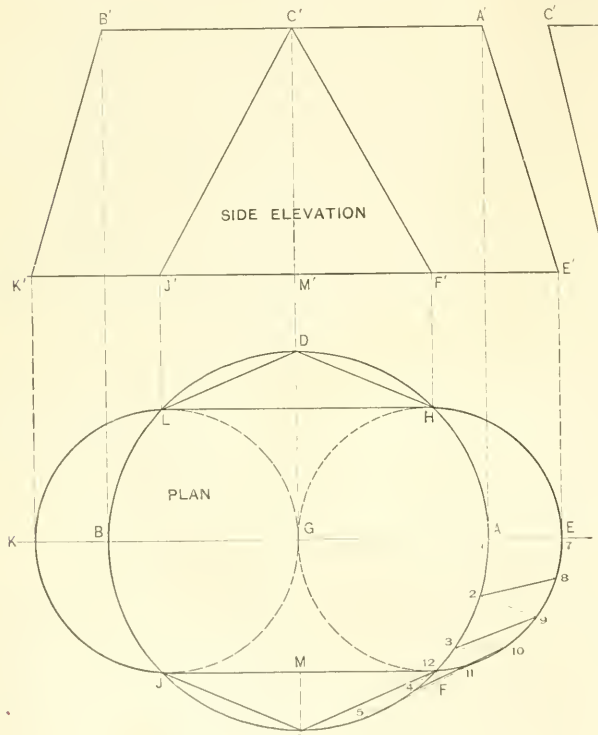
He Can Make Enameled Brick.

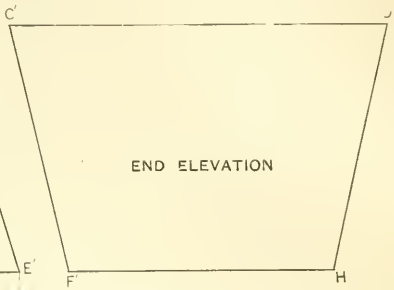
For 32 years, says a Chicago paper, American brick makers have been trying to make a true enamel surface to brick. If they will now visit Chicago they will find an establishment where the work is being successfully done. Heretofore all enameled brick have been imported from England at a cost of $125 a thousand. For years there has been a glazed brick made which cracks and peels off. Two years ago S. Linderoth built a factory at Fifty-second and Wallace streets and began experimenting with the clay and glazing. He now announces the success of his labors and claims to be able to furnish a purer enamel than the imported article. He ascribes his success to his knowledge of chemistry, which enabled him to discover the proper qualities of clay necessary. Capitalists are now being interested in the enterprise. "There are only six such concerns in England," said S. Linderoth. "The secret has been handed from father to son for centuries. Professors have been sent from America to Europe to work in the yards, but could not discover the process. Our clay has been different and the study has been a hard one. I believe the enameled brick can be made here much cheaper than abroad. I have had offers from several firms, but I believe there is a fortune in the discovery and will try to keep it for myself."

THE TIN SHOP.

Pattern for Article Round to Oblong.

From T. E. H., *Green Bay, Wis.*—I would like to see a method published in *The Metal Worker* for obtaining the pattern of a transition from round to oblong. In the plan, Fig. 1, B D A C represents a 36 inch round pipe that is to join the oblong K L H E F J The oblong is to receive K and K G C. Then the pattern for one of these parts will answer for the others. The method to be adopted in describing the pattern will be that of triangulation, and for this purpose divide A C of plan of top into any convenient number of equal parts, as indicated by the small figures 1 to 6. Also divide E F of plan of base into the same number of equal parts as was A measured on the finished article. To obtain a diagram of triangles represented by solid lines in plan, lay off at any convenient place the line N O, Fig. 2, equal to the straight hight of article, as shown by M′ C′ of elevation. From the point N, and at right angles to O N, draw the line N P, extending it indefinitely in the direction of P Measuring from N, set off





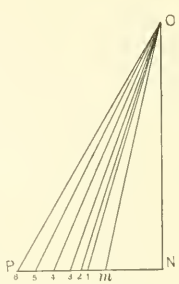


Fig. 2.—Diagram of Triangles Corresponding to Solid Lines in Plan.

Fig. 3.—Diagram of Triangles Corresponding to Dotted Lines in Plan.

Fig. 1.—Plan and Elevations.

PATTERN FOR ARTICLE IN SHAPE ROUND TO OBLONG.

two 25-inch round pipes, as indicated by K L G J and G H E F. In the elevation, B′ A′ represents the 36-inch round pipe, and K E the part of oblong corresponding with K E of plan. J C F is a triangle connecting base with top, as shown in plan by J F C and L D H. In the end elevation D C′ corresponds with the diameter of large pipe, as shown in plan by C D or B A. F H of end elevation also corresponds with F H or J L of plan.

Answer.—An inspection of the plan will show that the part of article contained in C G E, as represented by C M F A E, is similar to parts contained in E G D, D G C, as indicated by the small figures 7 to 12. Connect the points in A C with those in E F, as indicated by the solid lines. Thus connect 2 with 8, 3 with 9, 4 with 10, &c. Also connect the points in A C with those in E F, as indicated by the dotted lines. Thus connect 1 with 8, 2 with 9, 3 with 10, &c.

Our object will be to construct triangles whose bases are equal to the length of lines drawn from points in E F, and whose hypotenuses will give the distances from points in A C to points in E F as if the length of solid lines drawn between A C and E F of plan. Thus make N 1 of diagram equal to 1 7 (A E) of plan; N 2 of diagram equal 2 8 of plan; N 3 of diagram equal to 3 9 of plan, &c. From the points thus established in N P draw lines to O, as shown. Then the hypotenuses O 1, O 2, O 3, &c., correspond to the width of the pattern measured between points in A C and E F of plan, as indicated by the solid lines. In the same general manner we construct the triangles shown in Fig. 3, which correspond to sections on the

dotted lines of plan. Q R corresponds to the hight M C of the elevation, and Q S is drawn at right angles to the perpendicular Q R. On Q S, measuring from Q, set off spaces corresponding to the length of the dotted lines drawn across the plan. Thus Q 1 corresponds to A 3 of the plan, and Q 2 corresponds to 2 9 of the plan.

From the points thus established in S Q draw lines to R, as shown. The hypotenuses of the triangles in Fig. 3 are equal to the width of the pattern measured between points connected by the dotted lines in the plan.

We can commence the pattern at C M or A E of plan, as may be convenient. In the present instance we will commence at C M. Then at any convenient place, as T U in Fig. 3, draw a line equal in length to O *m* of diagram of triangles in Fig. 2. The distance O *m* is the same as F' C' or H' D' of end elevation. With U of pattern as center and M F (M 12) of plan as radius describe a small arc (V), which intersect the hypotenuses of the triangles in Fig. 2, corresponding to the solid lines in plan; and the stretchout of F E for the distance between points in V W of pattern. Trace lines freehand through the points in T X, V W, and draw X W. The T X W V U is the pattern of part of article shown on plan by C M F A E. The part of pattern represented by T U V' W' X' can be obtained by the same process or by duplication.

The Tinware Trade.

In speaking of the many changes which have occurred in the making and marketing of tinware since he first became connected with the business, Wm. Geuder of the Geuder & Paeschke Mfg. Company, Milwaukee, Wis., incidentally referred to the item of wash boilers as an apt illustration of his point. Said he: "It is not so very many years ago that the average tinner and hardwareman made all his pieced tinware by hand and prided himself, with much justice too, it must be admitted, on the quality and workmanship of

fied to and corroborated by many eye witnesses, will bear favorable comparison with those of their earlier fellow craftsmen, but their ranks are becoming thinned out more and more by the steady advance of factory-made goods, and soon it will be as much of an oddity to see a hand made wash boiler as it is now to see small wares produced in that manner.

"Where factories supplied only a comparatively small proportion of the wash boilers sold not longer than five or six years ago, the demand has become so large now that we are all obliged to produce enormous quantities of goods in addition to our other lines, and there are several firms in the country who devote themselves exclusively to the boiler business and doubtless find it profitable to do so."

Furnace Pipes in Chicago.

The following extracts from the building ordinance passed by the City Council of Chicago, March 13, 1893, sent us by a correspondent, may be of interest to many of the readers of *The Metal Worker*. It will be observed that all register boxes

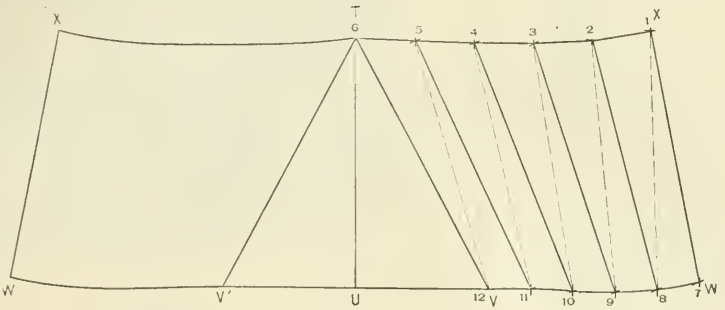


Fig. 4—One-Half of Pattern.

PATTERN FOR AN ARTICLE IN SHAPE ROUND TO OBLONG.

with one struck from T of pattern as center, with the space O P of Fig. 2 as radius, thus establishing the point V of pattern. Draw U V T. Then U V T of pattern is represented on plan by C M F. From T of pattern as center, with the space C 5 of plan as radius, describe a small arc (5), which intersect with one struck from V of pattern as center and radius R S of Fig. 3, corresponding to the dotted line 5 12 of plan, describe another arc intersecting the one just drawn, thus establishing the point 5 of pattern.

With V of pattern as center and 12 11 of plan as radius describe a small arc, which intersect with one struck from point 5 of pattern as center and O 5 of Fig. 2 as radius, thus establishing the point 11 of pattern. With point 5 of pattern as center and 5 4 in C A of plan as radius strike a small arc, which intersect with one struck from point 11 of pattern as center and R 4 of Fig. 3 as radius, thus establishing the point 4 of pattern. Proceed in this manner, using the stretchout of C A for the distance between points in T X of pattern; the hypotenuses of the triangles in Fig. 3 corresponding to the dotted lines in plan;

what he produced. The establishment of factories and the introduction of labor-saving machinery, however, by which the production of these goods in large quantities and at extremely low prices became possible, made it unprofitable for him to continue making his own wares, and now he sorts up his stock of tinware just as he does all his other lines when the representative of his favorite manufacturer or jobber calls on him.

"There is one item especially, that of wash boilers, which was dear to his heart, and to the making of which with his own hands he clung with the utmost tenacity, many even to this day buying all their other ware and making their boilers. There is a certain romantic halo thrown about this one item which appeals very strongly to the sentimental nature of the disciples of our craft. How well do we all remember listening with awe and secret envy to the narrator of the exploits of some venerable tinker, who in the good old days when the shear, stake and hammer were his only helpmates, and when such innovations as stamped bottoms and covers were still slumbering in the innermost recesses of the inventor's brain, had taken the tin out of the box, made up his bodies, made his own pits by hand and had finished up anywhere from 21 to 36 boilers in ten hours, without exerting himself the least little bit.

"And even to this day there are prodigies among us whose achievements, testi-

are to be made double, and the frames bedded in plaster of paris:

SEC. 146. Where pipes are used for the distribution of hot air in buildings, such pipes must be made of metal and double. The space between the two metal pipes shall be at least ½ inch and the two pipes shall be kept apart from each other by the insertion of metallic separators extending all around such pipes at distances of 3 feet apart, while the interior of the main pipe is to be provided with braces, one for every 3 feet in length of the pipe. Such pipes are to be made with air-tight joints and to be securely fastened to the partitions through which they pass.

SEC. 147. The openings in the floors for hot air registers shall be surrounded with borders of incombustible material not less than 2 inches wide, and firmly and securely set in place and bedded in plaster of paris. The register boxes shall be double, the distance between the two thicknesses of tin being at least 1 inch.

Where the air conveyed through pipes is heated in an ordinary hot-air furnace, or in any other apparatus by direct contact of the air with a fire box, the material used for these double ducts, pipes and register boxes shall be bright tin, and the joints shall be double seamed, but not soldered.

Where the air is heated by contact with hot water or steam pipes, any other sheet metal may be used for the pipes, and the use of double pipes is not obligatory.

STEAM AND HOT WATER.

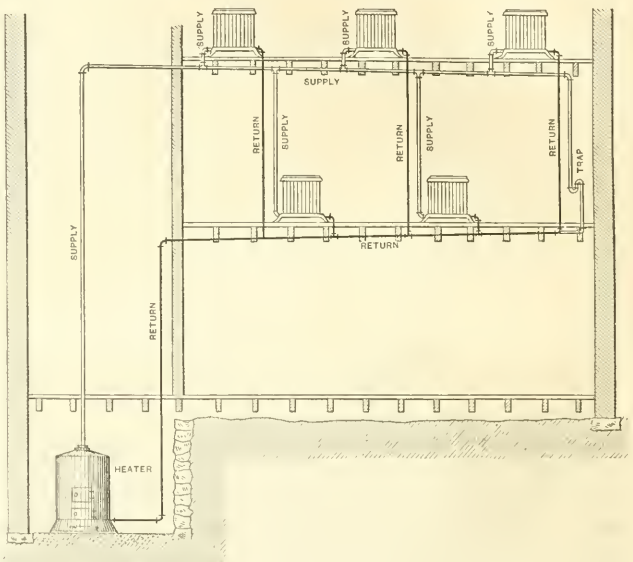
Radiator on Boiler Level.

From L. M. W., *New Haven, Conn.*—In your answer to "M. E. R.," Nashville, Tenn., in *The Metal Worker* of April 1, in my opinion you impress him that it is a difficult undertaking to heat a radiator on the same level as the hot-water heater rather than explain what must be observed to do it successfully. You fail to provide an air cock at the highest point, and you omit to provide an expansion pipe leading from the return somewhere near the heater to a tank located above the highest point in the system, which are very essential. If any one who attempts a similar job will, by test, see that there is an absolute and gradual rise in the pipes all of the way to the point where the return begins, and is equally careful to see that there is a gradual decline in the pipes running back to the heater, he will find no difficulty in driving any air that may be in the pipes to the highest point, and by locating an air cock there to be opened to let the air out, very little trouble will be found in securing a good circulation of water.

Steam-Heating Job.

From A. & B., *Burlington, Vt.*—Some time since we put a low pressure steam job in a building, the back part of which extends a long way over a cold open shed with no cellar under it. We were obliged to do the piping in a peculiar manner and it works very well. We inclose a sketch of the general run of supply pipes, but have not drawn in all the details. We desire the opinion of an expert upon this plan, including the trap, and wherein the arrangement of pipe could be improved without making a one-pipe job of it. There is a hall the whole length of this back extension in each of the two stories, but we could not run the pipes through the hall on account of the doors, and we could not place the supply under the floor with the return and get proper grade without cutting away too much of the joists.

Answer.—We are of the opinion that the trap on the drip pipe from the end of the main steam supply is of no use to the apparatus. It is placed by the fitter to prevent the steam from passing into the return pipe, yet no provision has been made for preventing the steam from passing through the first radiators connected to the steam and return mains and feeding into all the other radiators through the return pipe. There should also be drip pipes from the end of the down feed pipes to the radiators so that the condensation can drip out when the valve on the radiator is closed. As now arranged the valve on the radiator being closed for any length of time the down feed pipe will fill with water, lowering the water line in the boiler and causing a hammering noise when the valve is opened to feed steam to the radiator. In heating up this apparatus the steam will flow up through the main steam-supply pipe and feed into the first radiator, passing through it into the return main and feed from the returns into the radiators, causing the radiators to be air bound in the center, and it will take a long time to cause a complete and perfect circulation with low-steam pressure. The best way to have placed this apparatus would have been to run the main steam and return pipes as they now are, leaving out the trap on the end drip pipe. The returns from the raidiators should be run about 1 foot horizontal before they are connected to the main return. In this pipe place swing check valves, which will prevent any steam passing into the radiator from the return pipe, also drip each down feed pipe into the return. There should also be placed on the drip pipe, from the end of the main steam main and in the main return pipe above the water line at the boiler, automatic air valves to remove the air from the returns. If the radiation is connected up, as explained above, there will be a complete circulation throughout the apparatus without any pressure on the boiler.



Steam-Heating Job.

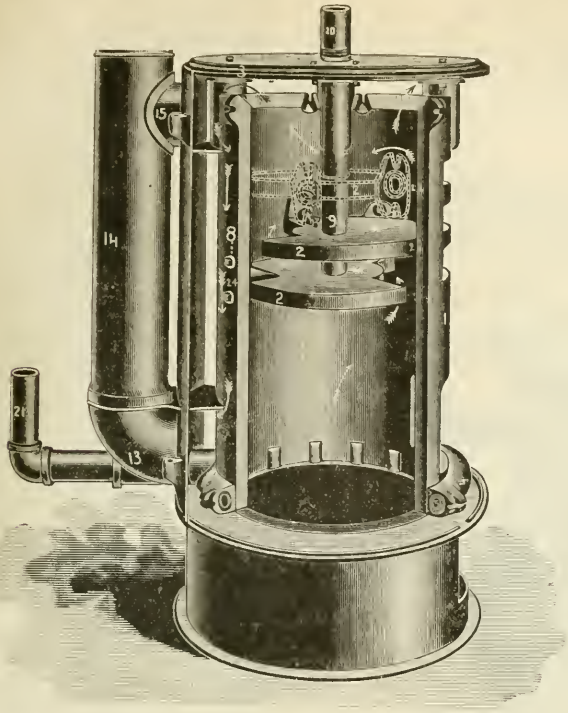
HEATING NOTES.

The erection of greenhouses and conservatories with their specially designed structural iron work adds largely to the demands on Hitchings & Co. of 233 Mercer street, New York, whose hot-water apparatus and system of heating horticultural buildings have been in use since 1844. Their hot-water boilers, however, are not confined to hothouses, many being used for heating residences and public buildings. In addition to their heating apparatus and structural iron work they make a complete line of hot-water fittings suited to their business. They have secured at the World's Fair a space of 60 x 75 feet on the grounds for a conservatory, and 20 x 25 feet in the buildings for exhibition purposes. At present they are completing for Geo. Pullman, at Pullman, Ill., a very large and handsome conservatory. The dome of the central section of the palm house will be 40 feet high, and all the rafters will be curved at the end, resting on the upright section, giving a very handsome effect. The house will form three sides of a square, and in one of the angles will be located the cottage of the florist. The entire conservatory and the cottage will be heated to the different temperatures required by their hot-water apparatus and system. One of their popular productions they call the amateur portable green house, which is 17 feet long and 9 feet 6 inches wide, and they make this so that it can be shipped complete, frame, glass, water heater, pipe and all, to be erected by local mechanics.

Sealed proposals will be received at the office of the custodian of the United States Custom House, Providence, R. I., until May 16, for the heating apparatus in the United States Custom House at Providence.

Lawrence Tivy has just moved to new quarters at 62 John street, New York, where he will continue to make a specialty of steam and hot water heating apparatus. He points with pride to the Germania Building, at William and Cedar streets, New York, which is heated by the indi-

rect system and proved a highly creditable piece of work under the severe weather of last winter. A reheating system in connection with a sugar manufacturing plant has recently been installed by him in Honolulu, Sandwich Islands.



Morgan Hot-Water Boiler.—Fig. 1.—Sectional View.

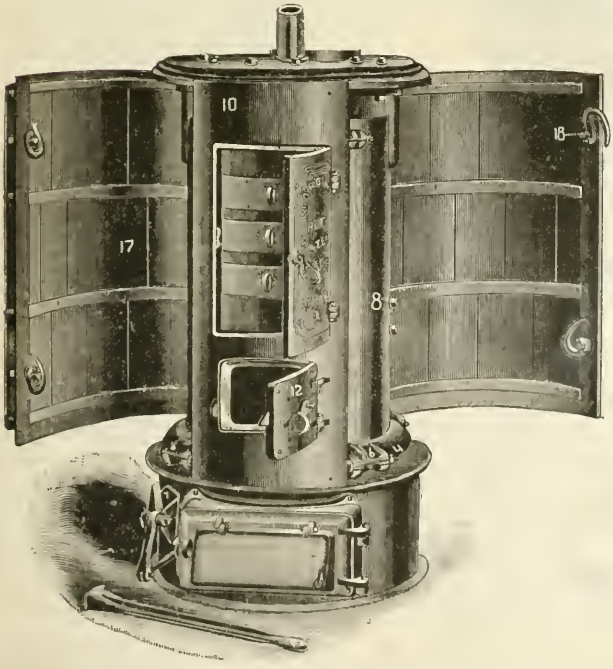


Fig. 2.—Morgan Heater with Swinging Jackets Open.

THE HANLON MFG. COMPANY, Pennington, N. J., distribute to the trade an illustrated and descriptive circular of the Hanlon automatic boiler feeder for low-pressure steam, which is the device that was illustrated some time ago in our columns. The present circular, containing some ten pages, is printed on a fine quality of paper. The illustrations show the boiler feed, also the valves connected with it, while the descriptive text gives a full account of the operation of the device. In the pamphlet there are also directions for placing the feeder, and a list of companies indorsing it is likewise presented.

SEALED PROPOSALS will be received at the office of the custodian of the United States Custom House, Detroit, Mich., until May 12, for labor and material required for repairs in the heating apparatus in the above named building.

THE GURNEY HOT-WATER HEATER COMPANY, 163 Franklin street, Boston, Mass., issue their annual trade catalogue relating to the various apparatus of their manufacture. The volume, with the general appearance of which the trade is familiar, is a square pamphlet, bound in red paper and with handsome gilt effect on the front cover. The printing is done in brown ink on a very fine quality of paper, showing the cuts and type to excellent advantage. In their introductory note addressed to the trade, they speak of the immense range of power secured by the Double Crown heater, and also refer to their Gurney No. 100 Series, as well as to the 300 Series. In the beginning of the catalogue is a careful account of the Gurney Double Crown heater, followed by general and broken views of the apparatus, together with illustrations of the separate parts. Then come lists of sizes and capacities. Cuts are presented showing the Double Crown set in brick for the purpose of indirect heating. Further on similar illustrations and descriptions are given of the 100 and 300 Series Gurney heaters, and the Defiance hot-water heater is noted. At the close of the pamphlet the Gurney hot-water radiators are illustrated, and tables of sizes, dimensions and prices presented. A specification for a hot-water heating apparatus is an interesting feature of the book, the specification, which defines all the work to be done, being accompanied by the floor plans of a house. An index and a number of useful tables complete the publication.

PIPER, DOREMUS & CO., 257 Greenwich street, New York, who import and manufacture bronze powder, metal leaf, brocade, gold paint and bronzing liquid make a specialty of radiator bronze and find a large demand for it in the steam and hot-water heating trade.

Morgan Hot-Water Boiler.

The accompanying illustrations show the new Morgan hot-water heater made by the D. F. Morgan Boiler Company of Akron, Ohio, and 85 Center street, New York. Features of the heater to which special attention is called are the quantity of water which the heater contains and the construction, which it is said effects a rapid heating and starts a circulation in the system at once. A free rapid upward passage is afforded for the water through the heater and a direct draft of but 9 feet, or a long indirect down draft passage of as much as 35 feet in some sizes, is provided for the smoke and gases. The sectional view, Fig. 1, shows the internal construction. The heater consists of a cylindrical water chamber composed of four upright independent sections, to which are connected three heat intercepting disks which do not form a complete circle, and are so arranged that their open spaces make an indirect passage for the gases. At the bottom of the back section the return enters and the water flows into each of the other sections at the bottom through a special waterway. This return waterway and those of the heat intercepting disks, all of which are short, are the only

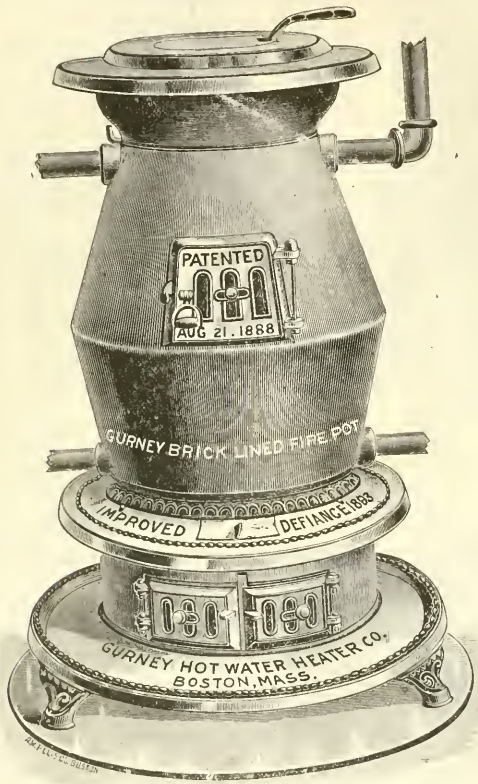
horizontal waterways of the heater, all the others being vertical facilitating circulation. The bottom disk connects with the back section directly over where the return enters, and having a pipe running direct from it to the dome immediately under the flow pipe, hot water is started through the system almost as soon as the fire is lighted. The two upper disks connect with the side sections and are so constructed that the water enters at one opening and passes all around the disk and back to the outer section through the other opening. An opening at the top of each outer section connects with the dome from which the flow pipe is taken. The outer shell or jacket is formed by a front and back section fastening securely to the base at the bottom and the dome at the top, the sides of the shell being formed by swinging jackets hinged to the back section. The front section has an ample feed door and a large door through which any accumulation can be removed. The back section has the smoke connections and to it are hinged two large swinging jackets which cover the greater portion of the circumference and are filled with a solid block of magnesia 1½ inches thick, forming an excellent non-conducting covering. The illustration, Fig. 2, shows the heater with these swinging jackets open exposing the interior. Between this outer non conducting shell and the water chamber the gases pass down when the direct damper is shut, their indirect passage being prolonged by baffle plates properly placed.

In the base which supports the upper parts is suspended a simple, labor-saving grate. The base also forms the ash pit which is provided with a door fitted air tight, which feature the manufacturers particularly emphasize.

The heater is made in five sizes, with grate surfaces from 1.5 to 6 square feet; fire pot 18⅝ to 36 inches in diameter, and a hight of 54 to 68 inches. The capacity of the boilers ranges from 400 to 2500 square feet of direct radiation.

Improved Defiance Hot-Water Heater.

The accompanying illustration shows the improved Defiance Hot-Water Heater, as manufactured this year by the Gurney Hot-Water Heater Company, 163 Franklin street, Boston. This heater is intended to meet the requirements of a first-class



Improved Defiance Hot-Water Heater.

heater; low in price. It is made in two sizes, No. 10 and No. 12. The No. 10 is said to be capable of heating 135 feet of radiation, and the No. 12, 200 square feet. This heater is furnished with the Gurney fire pot, with alternate brick sections. It is fitted with convenient shaking and dumping grate, has a 9-inch kettle hole on the top, and is provided with a combination deflector and check damper. It is specially adapted for use in small dwellings, offices, conservatories, stables, coach house, laundries, barber shops, bathrooms, restaurants and baptisteries, also for heating carving tables.

It is announced that O. Chan. Wells and Charles A. Coutan have retired from the management of the New York house of the Crosby Steam Gage & Valve Company, and have formed the Wells & Coutan Company, with offices at 29 and 31 Gold street, New York. The company will manufacture Standard Steam Vacuum and all other Gages and kindred goods, which department is added to their business. They have also been appointed sales agents of J. E. Lonergan & Co., manufacturers of Pop Safety, Water Relief and Snifter Valves, &c. William A. Locke, formerly salesman with the Ansonia Brass & Copper Company, has associated himself with the new concern.

The J. F. Pease Furnace Company, Syracuse, N. Y., have just issued from the press their 1893 (World's Fair Edition) catalogue of Economy low-pressure combination heaters, hot-water heaters and warm-air furnaces. The pamphlet is 7¼ x 10½ inches in size and is bound in tinted glazed paper covers, the design of the front cover being very tastefully executed. The interior of the pamphlet is in keeping with the decorations on the outside, for the cuts and letterpress are both excellent. Beginning with a general treatise on heating, followed by a short chapter on ventilation, the attention of the reader is directed to the Economy heaters and furnaces. Next comes an account of the Economy combination heater, a broken view of which is presented together with an accurate description, also table of sizes, &c. The Economy combination heater for steam and air, treated in a similar manner, follows, then the Economy combination heater for hot water and air. The Economy hot-water heater, which is next noted, is illustrated by a number of engravings, as is likewise the Economy all-steam heater. One full page illustration shows the Economy hot-water heaters in a triple battery as used in a school at Lowville, N. Y. The pamphlet then takes up the subject of warm-air furnaces, an introduction to the description of the several styles of furnaces being an account of methods of construction with reference to steel plate and its advantages. Small cuts also show the method of riveting the plates, while other illustrations show the form of fire pots. Six different furnaces are illustrated in this portion of the pamphlet, a couple of pages at the end being devoted to grates. A special feature of this publication is the testimonials which are interspersed between the different sections instead of being printed altogether at the end, many of the testimonials being accompanied by very pretty engravings of the residences heated. It is worthy of note that many of these testimonials were written after many years' experience with the heaters.

We are informed by Russell Wheeler & Son, Utica, N. Y., that owing to sickness in his family, which renders his presence at home necessary, C. S. Hopkins, who so satisfactorily represented the company in the West, has resigned his position, and the concern are now desirous of securing a competent man to fill the vacancy.

Ohio's building and loan associations, as shown by the report of the State Inspector, represent the savings of people in moderate circumstances, which exceed $74,000,000. This is over $11,000,000, or more than 17 per cent. greater than the aggregate capital of all the banks in the State, national, savings and private. In Philadelphia there are more than 400 of these institutions, and as good an authority as the *Public Ledger* says that "it is conservative to state that building society people here own at least a $2000 equity in 50,000 of the homes of Philadelphia."

The war vessels in the Naval Review in this port represented 117,720 tons, of which the new navy of the United States comprised 39,793 tons, or a little more than one-third. Great Britain alone had 19,320 tons, represented in four vessels—nearly one-half the tonnage being in the "Blake."

PLUMBING AND GAS FITTING.

How to Make a Wiped Joint.

The number of inquiries that are being continually received from our correspondents for information about joint wiping has prompted us to republish in pamphlet form two articles on the subject that appeared in *The Metal Worker*. The first of the two descriptions was published in *The Metal Worker* as a serial article April 4, 18 and 25, 1891. It was written by a practical plumber and was illustrated with half-tone engravings made direct from photographs of the work. The second article, illustrated by engravings made from photographs, showing the operation, was written by a prominent master plumber and was printed in *The Metal Worker* of June 11, 1892. These two articles give a very comprehensive account of the difficult work of joint wiping, and will, we believe, give as much information as it is practicable to put into print of this work, which requires so great a degree of manual dexterity. The pamphlet, which measures 5½ x 8 inches in size, will be furnished on receipt of 25 cents by addressing David Williams, publisher, 96–102 Reade street, New York City.

Laying House Drains Without Broken Joints.

From W. S., *Astoria, N. Y.*—You would help plumbers who have not much chance to learn the best way to do things if you would give in *The Metal Worker* an illustration of how to run a house drain in a cellar with a rocky bottom without breaking joints and by using Y branches and ⅛ bends. You printed something about it recently but I did not well understand it.

Answer.—In *The Metal Worker* of March 25 a question similar to the above was answered, but no illustrations were given. The main point of information sought for was how to get around an obstruction (such as a rock which could not be removed) when laying a house drain in a cellar without making what are known as "broken" joints. We pointed out that a house drain could be laid without "breaking" a single joint: 1. By the use of ⅛ bends and straight lengths of pipe. 2. By using ⅛ bends and Y branches. 3. By the use of ⅛ bends alone, either of which, according to circumstances, will accomplish the desired purpose. We present herewith, in Figs. 2, 3 and 4, illustrations of each of these methods, which should suffice for "W. S.," as they show how bends and branches may be used and the broken joints avoided. Figs. 5 and 6 show how to connect the soil pipe and house drain by means of a Y and ⅛ bend, and by the use of ⅛ bends alone. The rocky bottom of the cellar does not render the use of these fittings more imperative, but in the illustration an obstacle to the straight running of the drain is presented in the shape of a square slab forming the base of an iron pillar. To get around this it will be seen is very easy when one knows how. It will be easy also to judge, from the line of broken joints laid, Fig. 1, of all the obstacles presented to the free and unrestricted flow of sewage in a drain so laid, and the many chances for obstruction presented. We here repeat for our correspondent's benefit, that while ¼ bends are not allowed in good practice on horizontal draining, it is permissible to use two ⅛ bends instead of ¼ bend.

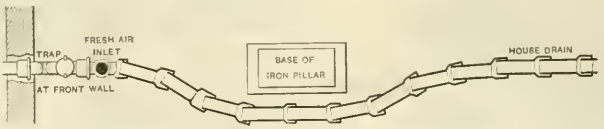


Fig. 1.—Sectional View of Drain, Showing Broken Joints.

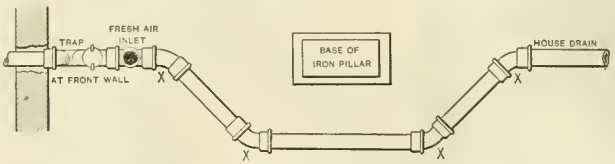


Fig. 2.—Drain Laid with Straight Pipe and One-eighth Bends.

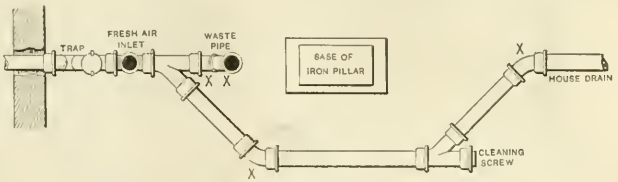


Fig. 3.—Drain Laid with Y Branches and One-eighth Bends.

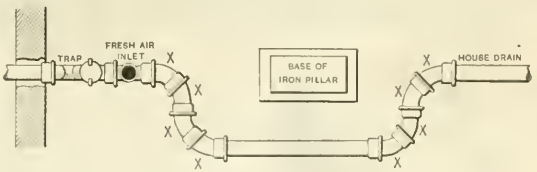


Fig. 4.—Drain Laid with One-eighth Bends.

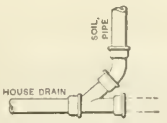


Fig. 5.—Soil Pipe and Drain Connected by Y and One-eighth Bend.

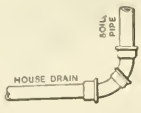


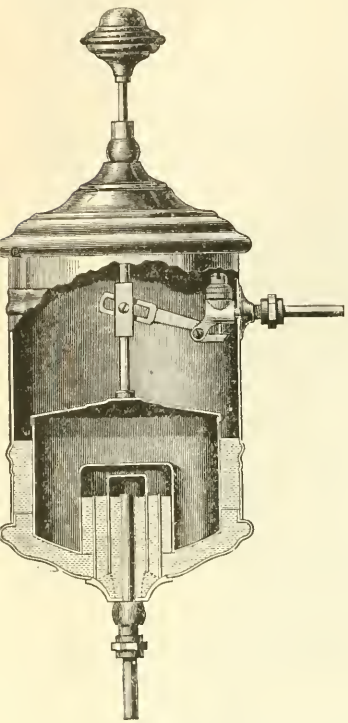
Fig. 6.—Soil Pipe and Drain Connected by One-eighth Bends.

The Hydromaze.

James P. Hyde of 44 West 125th street, New York, is manufacturing an apparatus which he has patented and calls the Hydromaze, for automatically filling with water the traps of a plumbing system that may have become empty from any cause. A sectional view is shown in Fig. 1, and Fig. 2 shows the manner of connecting it with the fixtures already in use. In appearance it is a nickel plated cylinder about 6 inches in diameter and not over 12 inches in extreme hight, and it can be placed in the most convenient location. A ¼ inch lead pipe supplies it with water and a pipe of the same size

LAYING HOUSE DRAINS WITHOUT BROKEN JOINTS.

leads to the various traps connecting with them on their top side at the lowest point. Since branching the pipe does not interfere with its operation, one Hydromaze may be used in connection with several traps regardless of their different hights, as shown. The sectional view,



The Hydromaze.—Fig. 1.—Sectional View.

Fig. 1, shows the device at rest with all of the traps full. It consists of an outer cylinder, a central outlet pipe over which, with a space above and all around the fall of the float. The opening through which the piston passes at the top of the chamber is large and exposes the water in it to atmospheric pressure. In operation, should the trap empty from any cause, the pressure at the trap end of the ¼-inch pipe would be relieved and syphonic action started, which would fill the trap in a few seconds by emptying the Hydromaze, when the float would drop, opening the supply valve to refill the water chamber. The Hydromaze is made in different sizes, the largest being ample to meet the requirements of a large building.

A Noisy Range Boiler.

From W. N. N., *Washington, D. C.*—I notice in *The Metal Worker* of April 1 a description of a noisy range boiler by "F. H. & N.," Dundee, N. Y. If your correspondents will change their boiler connections, as shown in Fig. 1 of the sketches I

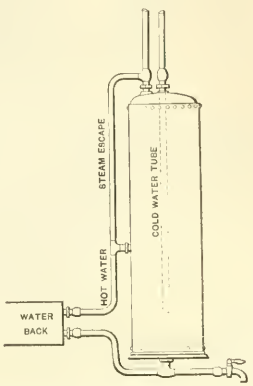


Fig. 1.—Remedy for Noisy Range Boiler.

send, I will guarantee that the boiler will be as gentle as a lamb. This connection was patented by John C. Ryan of Chicago about 1867, for a steam heating apparatus, and it is also a good arrangement for heating and small steam plants, it being steam heating this supplementary coil is not employed, the steam being taken direct from the top of the reservoir boiler. The

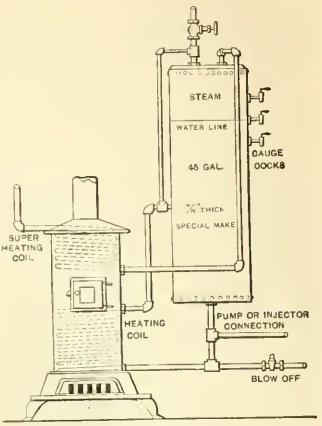


Fig. 2.—Ryan's Steam Apparatus.

lower coil contains 75 feet of 1-inch welded pipe.

TRAPS AND VENTS.

J. Toumey & Son, 132 East Forty-second street, New York, who make a specialty of wrought iron screw-joint pipe system of drainage, have work now in course of completion on a number of prominent buildings. They are placing about 400 plumbers' fixtures in the 11-story building of the Metropolitan Life Insurance Company at Twenty-third street and Madison avenue, and plumbing the office buildings at 10 to 16 East Twenty-third street, of which N. Le Brun & Son are the architects; the Lennox Library, Seventieth street and Fifth avenue, R. M. Hunt, architect; New York Society for the Prevention of Cruelty to Children building, Twenty-third street and Fourth avenue, Renwick, Aspinwall & Renwick, architects; Brokaw Bros.' new building, Eighth street, Astor and Lafayette place, Rose & Stone, architects; residence of E. W. Candee, Sixtieth street and Fifth avenue, John H. Duncan, architect.

As the result of the successful introduction of their goods into the New York market, through the persistent efforts of Manager John Pearce, Jr., the Wm. S. Cooper Brass Works of Philadelphia have set up a handsome line of samples at 43 Beekman street, which the trade is invited to inspect. A handsome enameled

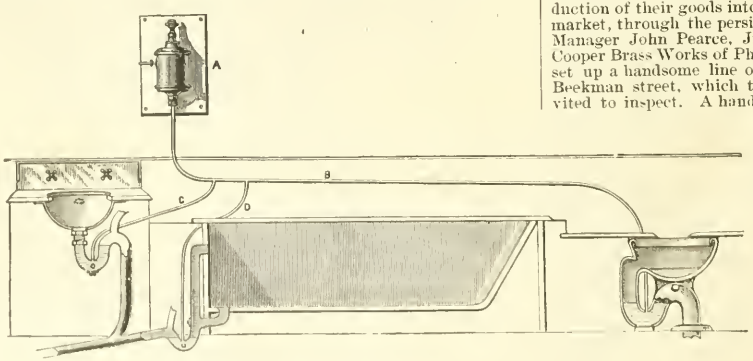


Fig. 2.—The Hydromaze Connected with Bathroom Fixtures.

pipe, is securely supported a cylinder closed at the top and a cylindrical air-tight float surrounding the inner cylinder with an intervening space. To the float is attached a piston, at the top of which is a chamber which may be weighted to balance the water pressure. Connected to the piston is a lever which opens and closes the supply valve with the rise and sufficient to run a six-horse power engine in a brass foundry. I am certain the patent has run out. The connection as originally applied is shown in Fig. 2. Where used for supplying steam to an engine the steam was taken from the top of the supplementary boiler and passed through a coil over the fire before being taken to the engine. If only used for bathtub fitted with their fixtures first greets the eye. Next comes the Nautilus water closet, which, it is claimed, possesses many superior advantages. The wood work being fastened directly to the closet, it sets out from the wall, so that it can be easily cleaned, leaving nothing to become foul. It requires no trap below the floor, and by its construction

permits a very material saving of time and material in setting. These closets are arranged along the wall, varying in finish from the plain to the beautifully decorated, and are ready to be tested by the purchaser. There are three handsome lavatories in pure white and Tennessee marble and onyx, set with handsome fixtures, finely plated. Together they make an exhibit well worth examination. The Hotel Savoy is fitted up with these closets and fixtures, and a recent order is for 26 of them in another fine building.

L. P. CLARK & SONS, Baltimore, Md., are issning a circular directing attention to what they call the original E. P. Clark's patent yard hydrant. Some of the merits claimed are its anti-wasting and anti-freezing features and the fact that it can be repaired without digging it out. It is made of cast iron and is sectional. By taking off the top and removing two brass screws the whole back section of the hydrant can be taken out, when all of the working parts can be removed for repairs or inspection with little trouble. It is pointed out that by a regulating screw the water supply can be increased or reduced and by the construction of the hydrant no water, it is said, wastes into the ground.

A SCARCITY of good journeymen plumbers seems to exist in Newark, N. J., according to the advertisements in the want columns in the daily papers, which is corroborated by the local houses.

IT IS SAID that numbers of high-priced buildings have lately been erected in St. Louis which have been wired for electricity, but no gas pipes have been put into them. Commenting npon this proceeding the *Progressive Age* says, in surprise: "We have known of builders in the West being guilty of erecting houses without gas pipes, believing gas to belong to the stage coach and canal boat age. But we have also seen the same builders or their successors tear down the handsomely frescoed ceilings and tear up the beautiful hard-wood floors of their buildings to place gas pipes, before they could get tenants to occupy their premises. We had thought, however, that that folly was entirely of the past."

SEALED proposals will be received at the office of the Supervising Architect, Washington, D. C., until May 17 for all the labor and materials required for the general excavation and temporary drainage, including sewer connection, of the U. S. Post Office building, Rome, Ga., in accordance with the drawings and specifications, copies of which may be had at the office of the Supervising Architect or at the office of the Superintendent at Rome, Ga.

A VERY PRETTY CIRCULAR issued by the Bailey-Farrell Mfg. Company, Pittsburgh, Pa., relates to the Globe hot-water heater of their manufacture. This device, for gas fuel, is designed for use with range boilers. It is illustrated and described in the circular and other interesting information concerning the heating of water is supplied. The circular is prettily printed in colored inks, and carries on the front page a picture of an angelic herald who is supposed to convey tidings to the trade of the Globe heater.

WILLIAM H. KAY has moved to 34 Dey street, New York, where he has better facilities for carrying and displaying a line of supplies for plumbers and steam and gas fitters.

THE CHICAGO BRANCH of the Smith & Anthony Stove Company, proprietors and manufacturers of the Sanitas Plumbing Specialties, have secured the adjoining store east, and will occupy the same in connection with their present sales room, thus securing a frontage of 40 feet on Lake street. The large basement will afford the necessary facilities for storage, &c.

Roof Area and House Sewer.

From P. J. G., *New Rochelle, N. Y.*—Will you please state if there is any rule among New York architects, or in force under the Building Department, which specifies any particular size of house sewer when taken in connection with roof surface? I have a one-story building for a summer pavilion in course of construction in which the fixtures are four water closets and other appliances. I made, as I considered, a correct estimate, calculating for a 5-inch sewer, but contracting to finish the work in accordance with New York sanitary practice, and when the work is almost finished the architect comes along and tells me I must put in a 6-inch sewer, such as they do in New York under similar circumstances. I have made inquiries and can obtain no information as to the regulation the architect speaks of, and before taking up the 5-inch sewer and replacing it with a 6-inch pipe would wish to know if such a rule is in existence.

Answer.—Under ordinary circumstances our correspondent would have supplied, in a 5-inch pipe, ample means of discharge of roof water, but we suppose the difficulty lay in the contract to finish the work in accordance with the rules prevailing in New York City. While the Health Department formerly, and the Building Department at present contents itself with providing pipes sufficiently large in caliber to discharge house wastes, the Department of Public Works has something to say in the matter of rain water discharge pipes. When the roof area of a building, no matter what may be the hight or the number of sanitary fixtures therein, equals 5000 square feet of surface, this department requires that the diameter of the house sewer must be not less than 6 inches. This rule is, we presume, to prevent the choking up of the sewer and the consequent flooding of cellars. Increased roof area above certain points calls for larger pipe. It is on the existence of this rule, evidently, the architect bases his objection to the use of the 5-inch pipe.

Laying Iron and Earthen Pipe.

From W. J., *Princeton, N. J.*—Can you help me out in devising some plan by which I can lay a line of house drain, say 80 feet long, without having sagged joints by the time I am out to the front wall? Also, how can I know, when the sewer outside the house is earthen or salt-glazed pipe and laid by a man who makes a living by laying sewers, that it is properly put down? My boss is sick, and for the first time the care of a very particular job of house plumbing is in my hands. Please enlighten me on these points in the columns of *The Metal Worker*.

Answer.—The best, or at least a very good plan, for our correspondent to adopt at the beginning is to determine what the grade of the house drain is to be. If the fall is to be ¼ inch to the foot he should provide himself with a straight-edged strip of wood 5 feet in length, and nail to the under side of one end of it a small block 1¼ inch in hight. This block represents the fall of ¼ inch per foot in 5 feet—that is, in each length of iron pipe. When adjusting the respective lengths preparatory to the calking of each joint, the strip should be laid from the hub of the last length of pipe calked to the hub of the length being put in position, the end with the block attached being toward the descent of the drain. Midway between the hubs a spirit level should then be laid on th strip, and if it indicated the necessity for lowering or raising the pipe this should be done until the exact level was obtained. By this means a uniform fall of 1¼ inches to each length of pipe would be secured, care being taken to properly support each joint during the process so as to avoid displacement before the calking takes place. As regards the earthen pipe the same rule holds good, only that a 2-foot strip with a ½-inch block would suffice—earthen pipe being generally in 2-foot lengths. Before connecting the house drain with the earthen sewer it is advisable to run a straight-edged strip of wood into the latter so as to detect any irregularity which might exist in the adjustment of the spigot end of any of the lengths of pipe, and avoid possibility of obstruction to the free outflow of house sewage. Care should also be taken, for the same reason, that when making the joints no cement should be allowed to remain inside the pipe.

Massachusetts Plumbers.

In *The Metal Worker* of April 29 we referred to the meeting called by Daniel G. Finnerty, vice-president of the National Association of Master Plumbers of the United States, to be held at the Builders' Exchange, Worcester, Mass., on May 1, for the organization of the State Association. The meeting was duly held and called to order by Mr. Finnerty, there being about 150 representative master plumbers present. The result of the meeting was the formation of a Massachusetts State Association, with the following officers:

President, William H. Mitchell, Boston; vice-president, John W. Jordan, Worcester; corresponding secretary, Daniel Shannon, Boston; financial secretary, C. P. Lyman, Holyoke; treasurer, F. W. Tower, Springfield; Executive Committee, the above officers and James F. Dadmun of Somerville, William N. McKenna of Boston, O. S. Kendall of Worcester, Mr. Kenally of Springfield and Mr. Kennedy of Holyoke.

The business session was followed by a banquet tendered by the local association to the delegates.

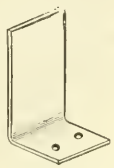
That cotton mills in the South pay when properly managed is again attested by the annual report of the Graniteville Mfg. Company of Augusta, Ga., just submitted to the stockholders. The earnings of the company for the year ended March 1 were $107,020.21. A 10 per cent. dividend, which is $60,000 on the capital stock, was paid and $42,000 were expended for new machinery and $6000 for other improvements. This is regarded as a wonderful showing for the Graniteville and Vancluse mills of the Graniteville Mfg. Company. Vancluse was built at an expense of $361,513.24 out of the profits of the Graniteville mill. The original capital was $600,000. The total surplus, March 1, 1893, is represented by $684,034.17.

West-bound freight rates from New York to San Francisco are reduced from 20 to 75 per cent. and over, embracing almost every commodity. This step is the beginning of the long threatened fight between the Southern Pacific Railroad and the new transcontinental freight line formed by the North American Navigation Company, the Panama Railroad and the Columbian Steamship line. The Southern Pacific people issued a new schedule of freight rates for west-bound business from New York to the California Terminals, which cuts under all figures previously quoted in the carrying traffic for the same distance.

ROOFING AND CORNICE.

Columbia Roofing.

A form of roof covering which has been introduced to the trade by the Columbia Roofing Company of Canton, Ohio, is made of the best quality of steel, thoroughly painted on both sides and put up in rolls 50 feet long by 26¾ inches wide. It is known as the self-capping roll roofing and is offered to the trade as something new in this line. The manufacturers state that every sheet is inspected before painting and the utmost care taken to see that all are free from holes, blisters and other defects. Each roll will lay one square of surface and can be used on any flat or pitched roof. The makers recommend it for flat-roofed buildings, as the edges are easily turned and a simple water-proof standing seam can be made. It is claimed to form its own ridge and hip caps by folding a seam which extends from end to end. The cleats are of simple construction, and, with the clinched eyelet fastening, it makes a substantial water-proof standing-seam roof. In Fig. 1 we show the general appearance of the cleat, while in Fig. 2 the cleat is represented fastened with a clinched eyelet to a 1¾-inch turned edge. The finished standing seam is represented in Fig. 3 of the cuts. The company have issued a little catalogue in which their specialties are described. Among these we notice pressed standing-seam roofing, made of what is described as semi-steel; also pressed steel brick siding, made of sheet steel and painted, while another form of siding is made of rock-faced brick. A square of this material consists of 8⅓ sheets, 60 inches long by 28 inches wide, painted on both sides and weighing 70 pounds. The company state that in ordering plain or rock-faced brick siding an allowance of from 4 to 6 square feet to the 100 should be made for laps.



Columbia Roofing.—Fig. 1.—General Appearance of Cleat.

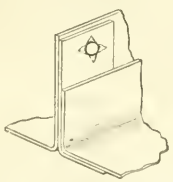


Fig. 2.—Cleat Fastened with Clinched Eyelet to 1¾-Inch Turned Edge.

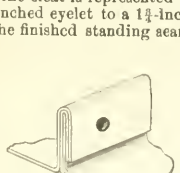
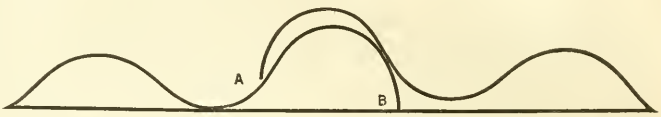


Fig. 3.—Finished Standing Seam.

Patent Edge Corrugated Iron.

The Cincinnati Corrugating Company of Piqua, Ohio, are manufacturing what they designate as Patent Edge corrugated iron, illustrations of which are presented herewith. Among the special features to which attention is directed may be noted the economy of the laps and the water-tight joints which are secured by the style of corrugation employed. The company claim that the great defect heretofore in the use of corrugated iron for roofing purposes has been the leakage of the side laps, and they state that with their patent edge iron the whole roof may be flooded and yet the lap joints remain high and dry, thus giving both a wind and water proof roof. The outside corrugation of each sheet represented by A B of Fig. 1 is made with an improved edge which is ¼ inch deeper than those in the interior of the sheet. The manufacturers claim for the improvement that the nails used in fastening, being driven vertically through the tops of the highest corrugations, as shown in Fig. 2, it is impossible for the roof to leak, as the nail heads completely cover the holes and the water rapidly drains away. They also refer to the fact that the flange with this style of corrugation hooks tightly its entire length and that the edge flanges of the sheets being vertical rest on the roof supports, as at B, thus firmly upholding the lapped joint and keeping it water tight without the use of wooden strips. Reference is also made to the great saving in the amount of material required to cover a given space, as only one lap is necessary to form a perfectly tight joint. The illustrations which are presented herewith represent outline sketches of the ends of the sheets before and after nailing.



Patent Edge Corrugated Iron.—Fig. 1.—View of Edge of Sheets Before Nailing.

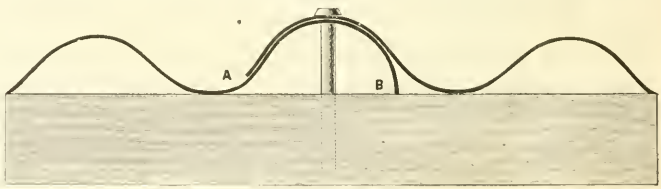


Fig. 2.—Appearance After Nailing.

Felt or Paper Under Tin.

From G. D., *Saugerties, N. Y.*—Is there any advantage in having felt or paper under the tin covering of a roof? I have heard it said that paper is liable to draw dampness which would cause the tin to rust on the under side.

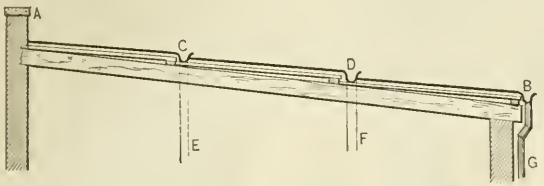
Note.—We would refer our correspondent to the letter from "W. C." of Jacksonville, Fla., in the issue of *The Metal Worker* of March 4, 1893. This communication will, we think, be a satisfactory answer to him on this subject. The use of felt or building paper is to be recommended under the tin on a roof and we may add that instead of drawing moisture it has directly the opposite effect.

The Berger Mfg. Company of Canton, Ohio, have just issued from the press an exceedingly attractive catalogue of 120 pages, which is intended to supersede all others. In size it measures 6 x 9 inches, is printed in a satisfactory manner and is bound in colored paper covers with embossed lettering in green upon a terra cotta ground. The company state that since their sixth annual catalogue was issued they have added to their factory the latest improved machinery, giving exceptional facilities for the production of sheet metal goods. In the publication before us, attention is directed to a wide range of specialties, including Berger's Patent Simplified Steel Roofing, Berger's Pressed Brick Ceiling, window caps, cornices, crestings, eave trough, elbows, finials, hangers, conductor pipes of various kinds, ridging and other goods likely to interest those engaged in the roofing business or having to do with building construction. The illustrations are numerous, showing the general appearance of many of the goods turned out, as well as their application. A number of pages in the book are devoted to illustrations of buildings in connection with which the company have used their goods. The catalogue, considered as a whole, gives evidence of careful arrangement and attention to details and

is likely to prove of interest and value to all those in the trade into whose hands copies may come.

Parallel Troughs on Roofs.

From J. B. M., *Saquache, Col.*—In the case of large buildings that are covered with a standing-seam tin roof, the water course is too long. As enormous quantities of water rush to the lower part of the roof, the standing seams are covered and some of the water is liable to find its way into the building. Would it not be a good plan in such cases to put a number of troughs across the roof, each of the troughs being provided with a down spout at the side of the building? In the accompanying diagram let A B represent the side view of a long roof. The usual trough would be placed at B, and the down spout at G. By having parallel troughs at C and D, and down spouts at E and F, the great rush of water at B would be avoided, troughs C and D each taking their share, which



Parallel Troughs in Roofs.—Plan Suggested by "J. B. M."

would be conveyed away by means of the down spouts E and F. Will the readers of *The Metal Worker* give their ideas regarding the value of the scheme?

Output of Slate in 1892.

The vast quantities of slate which are used every year for roofing purposes, and in connection with building construction generally, renders very interesting statistics bearing upon the subject. Many of our readers are, therefore, likely to find profitable study in the following figures, which are given in a recent issue of the *American Slate Trade Journal*, as showing the production of slate during the year 1892:

Regions.	Number of Quarries.	Production of roofing slate in squares.	Total value of roofing slate.	Total value of other manufactured slate.	Total value of entire product.
Bangor region, including the Pen Argyl and Hard Vein sections	60	360,000	$1,080,000	$200,000	$1,280,000
Lehigh region, including the Walnutport and Danielsville sections	47	155,000	555,000	225,000	775,000
Vermont and New York region, comprising Rutland County, Vt., and Washington County, N. Y.	77	310,000	900,000	300,000	1,200,000
Peach Bottom region	10	28,000	138,000	4,000	142,000
Maine	5	46,000	234,000	6,000	240,000
Virginia	4	24,400	93,600	2,400	9,000
Totals	203	924,000	$2,995,600	$737,400	$3,631,000

The year just closed has been one of satisfaction and profit to the slate operators in general. In the Vermont and New York region the output of sea green slate has been large and trade exceedingly good, much better even than during the previous year, when the quarries were operated to their utmost capacity and the entire product readily marketed. The shipments of this slate are principally to the West, and it is used where its cheaper price atones for its poor color. The shipments by the Vermont Slate Company, which controls the sea green product, were 225,000 squares, and show a material increase over 1891. The company enters the sixth year of its existence under very propitious conditions, all knotty points coming before the annual meeting in December having been thoroughly and amicably discussed and remedied in a business-like manner. No changes were made in the prices, the old schedule remaining in force until April 1, 1893. The unfading green and purple maintained their position and price as fancy slate. The red still command their high price, but even at that figure, on account of the smallness of the beds and difficulty in quarrying, are scarce. The manufactured slate dealers in the Vermont region have been somewhat hampered by competition and lack of organization, and in consequence have not operated their plants to their full capacity. The black Maine slate still ranks among the fancy articles and commands prices accordingly. It is finding some sale in the West, but is principally used in the New England States.

In Pennsylvania all branches of the trade report prosperous times, except school slate manufacturers, among whom business is a little dull and prices rather low. In the Bangor region all quarries turned out an increased product during 1892, yet have fewer slate on the bank than for years past. In Pen Argyl there is a very light stock on hand, and thorough and harmonious organization would command good prices for the spring trade. In the Lehigh region the outlook is good and prices fairly firm. The manufactured slate dealers in the Bangor and Lehigh regions have had a good year, and the prospects for a lively spring trade are exceedingly flattering. In the Peach Bottom and Virginia regions the year just closed has been satisfactory and profitable, and the manufacturers express confidence in the present season. The reports from the West are unusually good for this season of the year, showing a demand on many sizes exceeding the supply. The business is steadily extending to new districts, thus increasing the demand and keeping trade healthy. There is, however, still ample room for new markets, and it is confidently expected that the present season will witness the introduction of slate in many new localities and a corresponding increase in the output and sales.

FLASHINGS.

A RECENT ISSUE of the Decatur, Ohio, *Daily Republican* contains a flattering notice of the Decatur Steel Roofing & Corrugating Company's plant, the manager of which is L. S. Benbrake. In anticipation of a largely increased trade for this year the firm have made changes and improvements all through their plant and are now in a position to avoid all delay in shipment of goods. They have also laid in a large stock of material, so that there will be no trouble from a scarcity of supplies.

THE CORTRIGHT METAL ROOFING COMPANY, Philadelphia, Pa., are now prepared to furnish a new size, 7 x 10 inches, of their Victoria metal shingles. Heretofore they only made one size, 10 x 14 inches, but this proved so popular that the company have added a smaller size, which they particularly recommend for ornamental bands, gable ends, towers, &c. The shingle has the same side lock and top and bottom overlap as the other goods which they make and which have met with such success.

THE NEW ENGLAND STEEL ROOFING COMPANY, with headquarters at Worcester, Mass., are making an improved form of roofing adapted for use in connection with all kinds of buildings and in all climates. The construction is said to be such that it can either be laid on sheeting boards or lath, and without the use of outside cleats which are likely to become loose, hold dirt and dampness and cause corrosion. The roofing is known commercially as the New Improved H. W. Smith Patent Folded-Lock Standing-Seam Steel Roofing. The company are also prepared to furnish all styles of sheet-metal siding, roofing, slip-joint eave trough, conductor pipe, hangers, ventilators, crestings, finials, &c.

THE LUDOWICI ROOFING TILE COMPANY, which is composed of such well-known Chicago men as George Schneider, Henry W. King, Cyrus H. McCormick, and Carl Ludowici, have begun the construction of their plant at Chicago Heights, which will cover 10 acres of ground and give employment to a huge army of men. In selecting a location for the establishment of this large plant in America Carl Ludowici of Germany visited this country, and, in company with his American associates, made a careful investigation respecting the proper point at which to locate an industry of this magnitude.

THE PRENTICE PATENT METALLIC HIP SHINGLE is meeting with no little favor at the hands of the trade, and we understand from the manufacturers, the Metallic Hip Shingle Company of Toledo, Ohio, that it is indorsed and recommended by architects and sold by the hardware trade and builders' supply dealers. It is referred to as being of such construction as to completely protect while ornamenting a hip, making it absolutely water tight and firmly holding the shingles without exposure of nails. The company also refer to the economy of labor, time and materials in the use of this hip shingle, and state that cuttings from valley shingles may be used on the hips, enabling a carpenter to lay three times as many shingles in a day as would otherwise be the case. The hip shingle takes the place of unsightly and cumbersome saddle boards and hip rolls, and leaves a clean-cut line up the hip. The company state that they furnished 10,000 last season for the Grand Victory Hotel, located at Put-in-Bay Island, Ohio.

GEORGE L. FISK, Ellisville, Ill., is the patentee of an eave trough attachment, which consists in providing the opening leading from the trough to the drain pipe with a suitable attachment to prevent leaves and other accumulations from entering the pipe. The first claim covers a pivoted trap located in the trough, so arranged that it is easy to discharge accumulations and reset it.

WORLD'S FAIR NOTES.

The Fine Arts Building.

There are two annexes to the main art galleries. These are called the east and west pavilions, says the Chicago *Herald*, and their connection with the central pavilion is by means of corridors, which are also used as galleries. The east pavilion contains the French Government exhibit, and also the French masterpieces owned by Americans. The west pavilion contains the Italian exhibit and the exhibits of several other foreign countries whose space is limited. The central pavilion has two floors for the exhibit of paintings. The northeast section, or one-fourth of the space for paintings, is devoted to the works of United States artists. The southeast section is given up to Great Britain and Canada. The southwest section contains the works of art sent by Holland, Spain, Russia and Japan. The northwest section contains all the German paintings. In general terms, the oil paintings are all hung on the ground floor in the central pavilion, while water colors are on the second floor. There is an overflow exhibit of oil paintings upstairs in the American section.

Between these four quadrangles are four courts and the central rotunda. The north and south courts will contain the groupings of statuary. The east and west courts will contain the archtectural exhibit. Here will be seen structures and casts illustrating ancient, mediæval and modern architecture. There will be cases of antique and modern carvings, and architectural drawings will be hung on the walls.

The central rotunda will contain a heroic figure of Washington by Thomas Ball. On the sides of the rotunda are 12 spaces for figure groupings furnished by different foreign countries. There are also rotundas in each of the smaller pavilions, where statuary and architectural specimens will be grouped. There are 80 galleries in all, including the east and west pavilions. These range from 30 feet square to 36 x 120 feet for the exhibition of paintings. There are also 108 alcoves, fronting on the court of the central pavilion. Twenty-eight of these are on the first floor and 80 on the second floor, and much additional wall space is gained by their use. Engravings, etchings and black-and-whites are mainly up-stairs with the water colors, and pastels are down-stairs with the oils.

It is almost needless to say that the lighting arrangements are as faultless as can be devised. All the pavilions, including rotundas, courts and galleries, are lighted from above. The modulation of natural light in the daytime is simple and effective. The system of artificial lighting at night will be a work of art. Myriads of incandescent lamps will shed a mellow radiance over courts and galleries. The electric lamps are arranged in clusters above each court, and also in continuous rows around the galleries. The attractiveness of the art galleries at night will be one of the features of the exposition.

So much praise has already been bestowed on the exterior architecture of the Fine Arts Galleries that little need be said on that score. Those who have seen the finished structure are enthusiastic over Mr. Atwood's magnificent design, and even the lay public pronounces it the architectural gem of the exposition. Whether seen for the first time across the lagoon from the south or from the main approach to the north, the splendid proportions of the classic pile lend dignity and charm to the varied surroundings.

The main building is the Grecian-Ionic architecture of the most refined type. The order is taken from the Erechtheum of the Acropolis at Athens. The east and west pavilions are of harmonious proportions. The entire structure is practically fire proof. The main walls are of brick covered with staff, and the roof is of iron, steel and glass. The circular stairways in the central pavilion are of iron. The aggregate length of all the pavilions is 1152 feet and their aggregate depth 504 feet.

The main approaches to the art galleries are imposing in design, and will be arranged in harmony with the general effect of richness and classic simplicity. To the north, and facing the State buildings, there is a Grecian court. A broad flight of steps leads up to the portico and colonnade. In the court are broad grass plats, which will have simple elevations of palms in unique vases. Near the outer extremity of the court there is to be a pedestal statue of Augustus Cæsar. On each side there will be a Roman exedra, or semi-circular stone bench. At each end of the court the classic decorations will be in the form of copies of the choragic monument of Lysicrates from Athenian ruins. Fountains and garden seats will combine estheticism and public comfort.

To the south the main approach to the art galleries faces directly on the north lagoon. A broad flight of steps leads down from the portico to the surrounding driveway. From the latter another still broader flight of steps leads down to the water landing, where the electric launches will take passengers for other parts of the grounds and deposit visitors to the art galleries. This is the most northerly water landing on the grounds.

It has been often said that the World's Fair architecture is destined to create a new era in the design of modern buildings. Scattered around are lessons in the composite, the mediæval, the renaissance and all the schools. Here in the art galleries the classic model is pure and superbly designed in keeping with its purpose. The interior exhibit, moreover, contains the greatest collection of architectural specimens ever brought together. The growth of the art from ancient and mediæval times to the present, and the various applications of sculpture to architechtural forms are here illustrated. Thus the outer and interior exhibits of this department of fine arts will in themselves constitute one of the crowning glories of the exposition.

Permanent Beauty of Jackson Park.

The landscape art of the exposition is one of the best things it has to show, and fortunately the best of it can be kept as the leading features of a splendid pleasure ground that will comfort thousands when the World's Fair is history. Its chief glories are the lagoon and islands and these can and should be preserved intact. The group of islands consists of the Wooded Island, Hunters' Island and a number of attendant isles and islets, some of them only large enough to give foothold to graceful semi-aquatic plants.

The treatment of the entire group is so artistic that one thinks only of nature—a result that should give satisfaction to the most exacting landscape artist alive. Plantations of such trees as make a rapid growth have been added to a grove of indigenous oaks. Outside of these the islands are fringed with shrubbery and great stretches of wild flowers growing in colonies as they do on the prairies and borders of woodlands, and in marshes all through Northern Illinois. Semi-aquatic plants troop down to the brink; tall reeds and other water plants rise from the lagoon itself, and on it its quiet surface lily leaves float dreamily, while the low outlying isles are tinged a living green by the sedgy things that creep to the water's edge.

Few realize the vast amount of work that has been done by the Landscape Department to bring about this and other delightful results. The planting alone, which is merely putting on the trimming after the dress is made, has been an enormous work. A work, too, that had to be done in a limited time and with a sure hand. There was no time to try again. The first trial meant success or failure, luxuriance or barrenness. No one who saw the islands last fall, when they stood painted to the rim with splendid masses of foliage and glowing groups of wild flowers, failed to appreciate the remarkable success of it all, although few knew what it stood for in detail.

There have been planted on the islands and in other parts of the grounds 12,618 trees, 50,644 shrubs, 151,394 hardy perennial, herbaceous and miscellaneous plants, 136,678 aquatic and semi-aquatic plants, 3300 ferns, 9582 vines, climbers and ornamental grasses, 60,000 willow cuttings, 114,920 bulbs and similar plants, and a great collection of native plants, which were used by the carload. Most of the latter are such as grow in the swamps, lanes and woodlands of Michigan, Minnesota, Illinois and Ohio, but several other States are represented. The trees used were principally willows, poplars, water maples, cherries, elms and lindens. The shrubbery consists of various kinds of low-growing willows, cornues, spiræas, loniceras, lilacs, snowballs and berries. These form the basis of the groups, but to give variety and test their adaptability to the climate many rare shrubs were added. The splendid success of this part of the work is modestly attributed by the superintendent of Messrs. Olmstead & Co. to the weather. The dry fall of 1891, followed by a mild winter and wet open spring, certainly was a propitious series of seasons for the work in hand, but that does not dim the fact that efficient head and hand work—all done under pressure—has been accomplished.

The inner, higher part of the wooded island, reserved for the use of the Floricultural Department, was laid out in lawns, flower beds, and a rose garden, while the extreme north end space was set apart for the Japanese Temple and garden, which are to remain as a permanent reminder of the patience, ingenuity, gentleness, good will, and love of beauty of the nation of artists. The flower exhibits on the island will form a long and charming procession. The wooded island is about 16 acres in extent, ten of which are devoted to the plantations of trees, shrubs, and native plants already described. Through the middle is the long sweep of lawns and flower garden, about six acres in all. At the south end of this space will be shown for the first time, it is believed, in the West a combination of plants and style of grouping that is seen on large places in the East, notably on the grounds of the Newport home of the late Miss Catharine Wolf, consisting of well-placed azaleas and rhododendrons; and in the partial shade of these shrubs great clumps of lilies in many varieties will be planted. The bulbs and shrubs bloom at different seasons, and thus the arrangement affords double pleasure.

Over the lawns north from this fine exhibit will be seen a green and flowery wall, the first hint of the rose garden—the glory of the island. This is a plot of 1¼ acres, oblong in shape, and will be inclosed by a wire fence supported by posts 9 feet high set at intervals of 8 feet. Between the posts the wire netting droops in curves, the lowest point of each curve being 6 feet above the ground. The fence will be lined with climbing roses, and draped on the outside with many kinds of light-growing creepers. This gracefully shaped, vine covered, flower-starred wall will be in itself a thing of beauty. Access to the interior will be at four points only, in the middle of each side and at the middle of each end, so the garden will possess the first requisite of a garden—seclusion. It will also possess the second—flowers. The

plot is divided into 36 beds of various sizes and shapes. Between the beds broad graveled walks wind their way to a pretty little pavilion in the center also smothered in vines. Surrounding the entire garden runs an irregular border, bounded on the outside by the green wall and on the inside by a continuous promenade. Fifty thousand roses are to be grown in the garden. Thirty thousand of them belong to the taller-growing, hardy class, and will be found in the beds. Twenty thousand tea and other tender roses of the low-growing kinds will fill the border, where they can be seen to the best advantage and have the grateful shelter from the wind of the growing wall.

The rose garden will be a revelation. On moonlit nights people will wait there to hear the nightingales that sung around the rose bower that blossomed by Bendemeer's stream. North of the garden will be found a great nursery exhibit, where the foremost growers of nursery stock will show ornamental trees and shrubs, such as home makers should know and use. Here will be specimens of everything of that class desirable for the decorative planting of either large or small places. West of the nursery exhibit a number of florists will have a great show of hardy herbaceous plants, one firm alone sending 10,000 plants. Still west of these England will justify herself for clinging to fine old herbaceous perennials, such as peonies, phloxes, &c., a class of plants grown to perfection by the English. Just south of the approaches to the Japanese garden Germany will display her formal favorites, such as stocks, asters, zinnias and dahlias. Thus the whole sweep of the lawns from end to end is utilized by the best-known plantsmen of Europe and America for their large and attractive exhibits.

The islands will be a great object lesson in beautiful landscape effects, while the interior of the largest one will show a series of object lessons as to what and how to plant, although not just where to plant it, as the space is too limited to admit of the best grouping.

The Midway Plaisance.

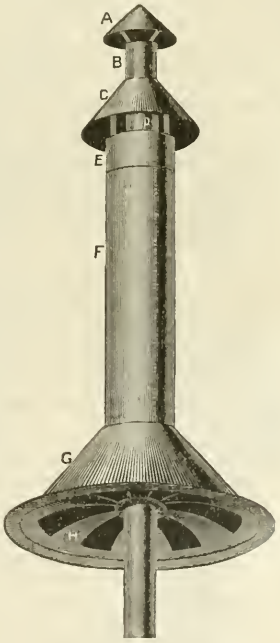
Those who visit the exposition to be entertained and amused as well as instructed will be greatly interested in the peculiar features of the Plaisance. This is a long strip of ground running at a right angle from the west boundary of Jackson Park. It is entered by a broad passageway near the Woman's Building. A macadamized street, formerly the Boulevard, from Jackson to Washington Park, extends through the center of this strip of ground, fronting on which are all sorts of structures built by persons who secured concessions for that purpose. An admission fee is charged for entrance to each of these attractions. The Plaisance is cosmopolitan. There is a "Street in Cairo," on which are quaint Egyptian buildings, peopled by shrewd merchants with their families. An Irish village is to be seen, as well as a reproduction of German home life. A Javanese settlement is shown, with its quaint huts and their thatched roofs and broad porches. The Turks have their mosque, Moors and Algerians have erected special pavilions and even the natives of Samoa are represented in this motley gathering. A famous German wild beast tamer has erected a large arena in which he exhibits his skill and prowess. Towering above everything is the huge Ferris wheel, about half completed, but covered with a swarm of busy workmen.

Tardy Exhibitors Will Suffer.

There are exhibitors who will not be ready on May 1, the same kind of men as a rule as those who are forever trying to take a 7.32 train at 7.34. They will find that it will be more expensive and difficult to get exhibits in place after the opening than it has been. The rule in regard to bringing exhibits on the grounds after the fair has been opened is that the goods must be delivered to one of the two warehouses belonging to the exposition, one of which is located at Sixty-seventh street and the other at Midway Plaisance. From there they will be taken into the grounds by the exposition teams during the night. This force of trucks will do its work in the night after the fair opens and the visitors will not see any belated exhibits arriving and will not see any of them put in place, for this work must be done during the hours that the gates are closed.

Jackson's Flue and Ventilator.

A combination flue and register designed for use in connection with buildings of all kinds, and more especially for ventilating the kitchens of dwellings, has been brought out by M. H. Jackson of 411 West Sycamore street, Kokomo, Ind. The construction of the device is claimed to be such that the flue takes from the kitchen all smoke, dust, steam and noxious vapors arising from the cook stove while in use. It keeps the house free from condensed steam and the effects of damp weather, while in summer it tends to maintain a circulation of air, rendering the kitchen more cool and comfortable than would



Jackson's Combined Flue and Ventilator.

otherwise be the case. The manufacturer states that the device is both a chimney and a ventilator, and that no chimney or flue is needed where it is employed. A general view of the device is shown in the accompanying illustration. Referring to the cut, H represents the cast register and G the flaring end of the ventilating stack F. At E is a sleeve which is designed to cover the stack. D is the central or smoke pipe. The cast register is fastened to the under side of the device by means of screws. The smoke pipe and ventilating pipe rest in castings as indicated in the cut. The device is made in three sizes, the No. 1 having a 32-inch cast register, 14-inch stack and either 6 or 7 inch smoke pipe, according to requirements. No. 2 ventilator has a 16-inch cast register with 12-inch stack, while No. 3 has a 10-inch register and a 10-inch stack, the central pipe in the latter cases being 6 inches in diameter.

Athol Spraying Force Pump.

The Athol Pump Company, Athol, Mass., have brought out an improved form of force spraying pump, an illustration of which is shown herewith. The pump is

Athol Spraying Force Pump.

made of brass, and is described as simple in construction, strong and durable and adapted to many uses. Besides spraying fruit trees it is used for washing windows, wetting lawns, testing pipes, pumping hot water for thawing out pipes, filling steam boilers, &c. It can be run by wind, steam or water power. We understand that they have been put in use where they had to pump against a pressure of 90 pounds of steam.

Robert T. Frazier has been appointed manager of the Washington office of Howson & Howson of New York, which has now been moved to the National Union Building, 918 F street. Mr. Frazier is a graduate of the Naval Academy at Annapolis, and has had an experience of five years as examiner in the Patent Office, having, at the time he resigned from the bureau to take charge of the Washington office, earned his promotion to the position of a principal examiner.

The onerous nature of the assessments to which strikers in labor organizations are compelled to submit is illustrated in a case cited by Eugene Debs, president of the new Western American Railway Union, who states that the Burlington strike cost the firemen $500,000 and a loss of 7000 in membership.

It is said in San Francisco that the Pacific Mail Steamship Company will soon make an Eastern connection via the Isthmus of Tehuantepec.

THE RETAIL STORE.

How to Keep the Store Neat and Clean.

SECOND ARTICLE.

By F. F. Gilmore.

The chief requisite is that the proprietor should be a man of judgment, clear ideas, and withal of a kindly nature. This latter characteristic will impart a feeling of ambition to the clerks to keep things in shape out of respect to the head of the house. A clerk is necessarily somewhat of a machine, but if he feels that consideration is shown him, he will unconsciously grow to the idea that his employer's interests are his own, and in this way be willing and anxious to use all means of preventing confusion in the stock and accumulations of litter about the floor. The stocks will be put back carefully, each piece of display goods will be kept arranged properly and the shelves show a neat appearance.

Of course, as first set forth, the merchant or his manager will have to embody the principles of neatness. Some men are born so, others achieve it by hard lessons, other storekeepers buy it, and have to pay dearly for the luxury.

MANY ORDERS ARE LOST.

The impression made upon a purchaser when entering a store by a trashy floor, unkept and mislaid stock, is anything but prepossessing, and many orders are lost by permitting the front part of the house, in both jobbing and retail business, to be used for packing and unpacking goods. It is very well to show in this way what a busy set of clerks one has, or what a big volume of business is being done, but many buyers hesitate to enter such a pandemonium. It is well to show the busyness of the clerks, but let them carry to a rear room the goods to be packed, and bring from there the new goods, bright and clean, to be neatly placed on the shelf or stowed in bins and cellar.

Every store should have a large, rough mat at the door to prevent bringing into the house mud, dust, &c. The doors to the different stock or display rooms should be kept shut. Change of temperature, or rather, the varying of wet and dry atmosphere, badly affects fine goods, and then, when one department is swept and dusted, the settlement should not accumulate on the other stock. And in the matter of sweeping and dusting, great art can be displayed, and no wise clerk or good porter should object to being thought effeminate in the discharge of this part of the work. Clerks should take pride in keeping their stocks clean and attractive, and notice of credit as well as fault-finding, should be shown by the proprietor.

THE MOST CONVENIENT PLACE.

Wherever sprinkling can be done on the floors it is probably the quickest means of allaying and preventing dust in cleaning up, but wet sawdust is nearly as handy and much better adapted to a Hardware house, as the floor is not wet much and not so much evaporation is given off. Out on the street or pavement is the most convenient place to deposit the sweepings of dirt, litter, scraps of paper, &c., but the fire place or ash barrel is a far more decent place to get rid of them.

Where it is possible it will be found very serviceable to have curtains of light material to hang in front of shelving from the ceiling while the sweeping is going on, and to hang these from Saturday evening until Monday morning. And as the force of clerks should be in reality a trained body of men or boys, they could easily put away the curtains in short time and dust their stock over, and at night, cover them up again; and as each stock should be looked after by a certain clerk, it will not be a hard matter for him to put away and collect his goods that were scattered by other salesmen showing customers around.

THE MOST ATTRACTIVE FEATURE.

It should be a rule, too, for the clerks or salesmen who go around with the buyers, and necessarily take down and handle many sensitive goods, to go back and put away those articles; and the proprietors and their "bossy" sons, should be willing to show this amount of consideration themselves.

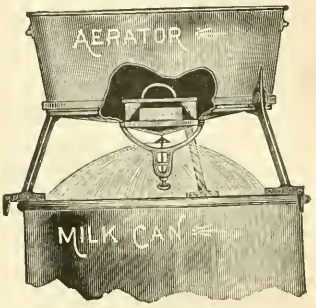
The show windows of a large house should be the most attractive feature of the building, and under the constant care of a man who thoroughly understands art in exhibiting goods. The displays should be constantly changed to represent the needs of the various seasons and changes of weather. The windows should be kept scrupulously clean, and have glass between the display goods and interior of store. It will pay to burn a gas jet day and night in these, turned down and out of sight, to prevent the condensing of moisture on the glass and goods.

Although it may be a good idea to receive and ship many goods through the front part of the house, to keep before the public and visitors the thrift and volume of business done, yet in most cases it is best to let the goods go out of a side or rear door.

Let the proprietors be polite and considerate to the clerks, appreciating neatness and original ideas, giving some leaway to the developments of the future merchants and yet demanding or rather requiring promptess and dispatch, and there will be found very few young men who would not consider it an honor to be connected with such a firm.

Baird's Cooler and Aerator.

A. M. Coon, Leonardsville, N. Y., is introducing the above article, as illustrated herewith. In operation the pressure of milk falling on a small wheel with reaction buckets causes the wheel to revolve, while a set screw under the wheel allows the pressure to be increased or diminished, causing the wheel to run fast or slow, according to the number of milkers. The point is made that this arrangement dispenses with the necessity of perforations in the bottom, and that all the parts being detachable and thoroughly tinned renders it easily cleaned. The manufacturer claims that the device thoroughly removes all animal heat and gases from the milk and reduces to a minimum the labor of properly caring for it, as it is considered by experts that thorough aeration of the milk is necessary to obtain the best product of butter and cheese.



Baird's Cooler and Aerator.

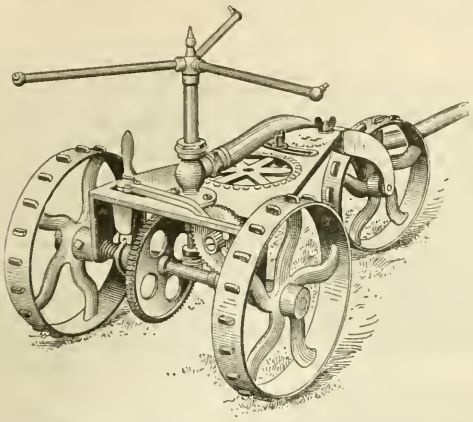
Thompson's Sample Holder.

The illustration herewith given represents a Sample Holder put on the market by Massey & Thompson, Monroe City, Mo. The holder consists of a steel plate to which an oil-tempered spring is fastened, the plate being held on the shelf by means of two round-headed screws. They are made in three sizes to hold any article to be displayed. It is remarked that among the conveniences resulting from this device is that the sample can be sold each time and a fresh one put in its place without loss of time or trouble; also that it will prevent the accumulation of shopworn samples, and will save much time and annoyance in avoiding the necessity of wiring on samples. Samples will be sent by the manufacturers upon the receipt of 5 cents in stamps.

Thompson's Sample Holder.

Little Giant Traveling Lawn Sprinkler.

The accompanying cut represents a sprinkler put on the market by the Portland Lawn Sprinkler Company, 98 Exchange street, Portland, Maine, and 32 Oliver street, Boston, Mass. Its construction is such that it has the capacity of moving itself over the lawn, or may be used stationary at any point desired. The manufacturers state that under an ordinary pressure of water it will roll itself slowly and steadily in any direction, either in a straight line or in a circle of any diameter desired; that it can be set to travel anywhere from 15 to 500 feet an hour, as preferred, and can be changed from the lowest to the highest speed in a moment; that it can be gauged to throw the water over a swath anywhere from 5 to 50 feet in width, or can be used as a stationary sprinkler by throwing it out of gear; that it has a figured dial by which it can be adjusted to travel any number of feet, and that it will stop automatically after covering the desired distance. It is claimed that with a pressure of water as low as 20 pounds it will drag 75 feet of hose, while with a pressure of 60 or 70 pounds it will carry 200 pounds extra weight and drag as many feet of hose. In an illustrated circular, testimonials are given from persons who used the machine last year.



Little Giant Traveling Lawn Sprinkler.

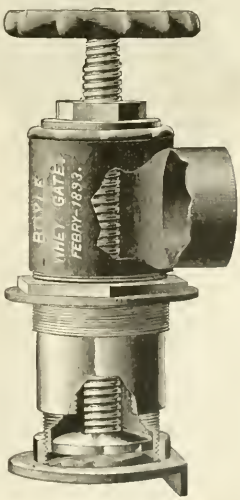
The New Safety Ash Barrel.

The Dover Stamping Company, Boston, Mass., are offering to the trade the new Safety Ash Barrel of their manufacture. This barrel, illustrated in the accompanying cut, is described as having a heavy concave iron bottom, so interlocked with the body that it will remain there as long as the body lasts. At the top and bottom are heavy wrought-iron bands strongly riveted to the body, and wrought-iron outstanding handles of a strength suitable for heavy work. V-shape lateral strips of iron, firmly secured to the body, afford the protection so greatly needed in ash cans, and furthermore remove all danger from fire. The cans are dipped and galvanized after making, to fill all the seams and joints of metal and make it rust proof.

The New Safety Ash Barrel.

The Boyle Whey Gate.

The accompanying illustration shows a broken view of the Boyle Whey Gate, which has been brought out for the Canadian market by Boyle & Son, Napanee, Ont., and which was patented by William H. Boyle. The whey gate closes up to end of pan, and it is pointed out that no curd is wasted, and there is no chance of the white curd getting mixed with the colored. It has an opening of 2½ inches, which will take the whey away very quickly when necessary. It is made short, so as not to protrude beyond the vat, and is therefore not in the way of anything. It is entirely made of brass, with ground valve and valve seat, and no leather or washers are needed. The McClary Mfg. Company, London, Ont., are the agents for the Boyle whey gate for Western Ontario.



The Boyle Whey Gate.

The Abell Coffee Pot.

The Leach Roaster and Baker Company, Paxton, Ill., are introducing the coffee pot as shown in the illustration herewith given. The object sought in the construction of this pot is to have the coffee made in a closed chamber, and all steam condensed before it has an opportunity to escape, the condensed steam being conveyed back to the coffee in form of water. The pot is provided with a fine aluminum strainer to prevent any grounds from being poured into the cup. The strainer is removable for cleaning, and being of aluminum does not rust or corrode. The manufacturers state that the pot effects a saving in the amount of coffee used, that the strength of the berry is saved and used, and that there can be no waste, as the steam is condensed and returned to the coffee. The pot is made in two sizes, medium and large.

The Abell Coffee Pot.

GEO. FRIES' SONS of 909 Filbert street, Philadelphia, makers of Tinware Specialties, are offering a useful line of seasonable goods, including Nursery Refrigerator Kettles, fitted with a movable zinc reservoir for holding ice and a zinc lining so arranged as to allow of ½ inch of air space between it and the outside body; Tin Butter Chests with ice reservoirs, Cream or Egg Whips, Nursery Refrigerators, Tin Lady Lock Sticks for making pastry, Croquet Molds and Window Mirrors. They state that the season finds them well stocked with the different goods and prepared to execute all orders promptly. As their specialties are favorably known, they will no doubt get a good share of the season's trade.

EX-SHERIFF HENRY FREDERICKS, Camden, N. J., who has largely turned the management of his large hardware business over to his sons, has secured apartments at the Boscobel, Atlantic City, where he and his family will spend the summer.

AT THE FIFTH ANNUAL CONVENTION of the Tin, Sheet Iron and Cornice Workers, which was held in St. Louis during the past week, the following officers were elected: President, F. A. Ponchart, Chicago; first vice-president, J. Y. Cross, Denver; second vice-president, C. H. Burton, Richmond, Va.; secretary, Thomas McMaster, Allegheny City, Pa.; treasurer, James H. Horn, Louisville, Ky.

STOVE TRADE NOTES.

Cyrus Carpenter.

At a meeting of the Stove Trade held at the office of the Walker & Pratt Mfg. Company to take action upon the death of the late Cyrus Carpenter, who died April 28, 1893, it was voted that J. M. Read, Wm. E. Smith and George W. Walker be a committee to prepare memorial resolutions, a copy of which should be sent to the widow and to the daily papers for publication. It was also voted to attend the funeral, and close their places of business from 2 o'clock to 3 30 o'clock p.m. on Wednesday, May 3.

IN MEMORIAM.

Mr. Carpenter was born October 9, 1818; died April 28, 1893. He commenced business as a stove dealer in 1841, and was actively engaged in the same line to the day of his death. He was genial, quiet, unassuming, and attended strictly to his own business.

Through all of these years of an unusually long business life, he had become one of the most familiar business men of the city. We shall, while passing here and there upon the streets of the city, miss his courteous and cordial greetings.

To the members of the family we extend our sympathy.

J. M. READ,
WM. E. SMITH, } Committee.
GEO. W. WALKER,

BOSTON, May 1, 1893.

Abram Cox Stove Co.

of Philadelphia are making an exhibit at the Builders' Exchange in that city of their new ranges, hot-air furnaces, combination heaters and hot water circulators. They show a handsome line of their steel kitchen ranges, which they claim will, with fair use and wear, last a lifetime. The line includes a double-oven ten-hole range in a tiled background or setting, having a large hood in connection with a flue ventilator designed to carry off the steam and odors incident to cooking. Considerable floor space is taken up for diaplaying their Ideal Novelty hot-air furnace, designed for the use of hard or soft coal or coke. The grate in this furnace can be instantly removed for repairs or change as easily, it is claimed, as a drawer from a bureau and without disturbing any other parts or the removal of pins or bolts; while when repairs are needed only such parts as may be worn out need be replaced. The company claim for this heater the advantages of freedom from dust, ease of management and great heating power. Prominence is also given to the Ideal Novelty combination hot-air and hot-water heater. This heater, it is stated, will heat by hot-water radiators apartments remote or inconveniently situated for the introduction of hot air. The hot-water section in the heater is cast in one piece, and is, therefore, seamless and proof against leak. All the parts constituting the hot-water arrangement are interchangeable with the plain hot air furnace, so that the combination, when desired, may be effected where the hot-air furnace has alone been used. An excellent working model of their Novelty Circulator for hot water heating attracts a good deal of attention.

The Fireside is the title of an open-front fire-place stove forming part of the exhibit. This stove is intended to heat an upstairs room, as well as the room in which it is located. It can be furnished for a tile setting, or in any style of finish desired. The Novelty Kitchener is also exhibited, and the statement made regarding it is that it is the biggest range for the space it occupies yet put on the market. It is a six-hole range, and is intended to heat an upper or adjoining room without extra cost for fuel. It is made with right or left hand ovens, and has an ornamental case covering the horizontal boiler, to prevent undue radiation of heat, and has a hot closet underneath the boiler. The grate can be removed, when required, without disturbing the lining of the fire box or removing any bolts or nuts.

New Trade-Mark.

Among the stove concerns which have recently adopted new trade-marks may be mentioned the Bain Mfg. Company of

New Trade-Mark of Bain Mfg. Company.

Charleston, Ill., makers of the Monarch stoves and ranges. The design of the trade-mark by which their goods will be designated in the future is presented in the accompanying illustration. It will be seen that the design is suggestive in character, the circular panel in the center carrying a warrior's head, above which is the word "Monarch" and below "Stoves and Ranges." Bordering the design is also the name and address of the company. The features of the design are such as to be readily employed in connection with stoves and ranges, and the device, while being bold and striking, is at the same time unique and distinctive.

A CABLE DISPATCH from Vienna dated April 22 says :

The Chamber of Commerce of Vienna has adopted a vote of thanks to Julius Goldschmidt, Consul-General at Vienna for the United States, in recognition of the Consul-General having used his influence for the promotion of Austrian trade with the United States.

This is a graceful compliment to a well-known member of the stove trade, Mr. Goldschmidt being vice-president of the Brand Stove Company of Milwaukee. We may remark, in view of the early expiration of his term of service, that some of our Democratic friends have been disappointed at the seclection by the President of a successor to Mr. Goldschmidt who is not a stove man. It had been hoped that the precedent thus established in the Vienna Consul-General's office would be followed by the new administration. As there is some chance that the gentleman nominated cannot serve, it may not be too late for the question to be pressed. Now, who wants to go to Vienna for the coming four years? Are there many in the trade who prefer the hardships and vexations of official position to the luxurious surroundings and ceaseless pleasures of American stove manufacturers ?

John Plane and the Acorn.

Rathbone, Sard & Co. have placed in their sample room at Wabash avenue and Randolph street, Chicago, a large oil painting of their first customer in the West—John Plane of Belvidere, Ill. Mr. Plane has been depicted by the artist in the act of expatiating to a customer on the merits of a Royal Acorn heater, which stands near him. It is a life-sized portrait, and represents him as he looks at this time. The size of the painting is 9½ x 7½ feet. It is incased in a heavy oak frame, decorated with oak leaves and acorns beautifully carved. At the bottom is a plate bearing the inscription, "John Plane, the pioneer hardware dealer, who has sold stoves from 1836 to 1893." On the margin of the painting is a view of the Aurora plant of Rathbone, Sard & Co. The artist is a Belvidere lady, Mrs. S. Rhodes Loomis, who was commissioned by Mr. Plane to perform this work, in which she has shown rare artistic talent. Mr. Plane is an enthusiast on the subject of Acorn stoves, and the painting is his own idea, of which he has borne the entire expense. The frame alone cost him $100. It was originally intended to exhibit the painting at the World's Fair, but the arrangement of Rathbone, Sard & Co.'s space was not found well adapted to it, and it was, therefore, given a conspicuous place in the sample room, where it will attract much attention this summer. The Belvidere *Northwestern* of recent date contains some poetry written by a friend of Mr. Plane, and doubtless suggested by this painting, of which we reproduce a few stanzas :

Behold ! the Royal Acorn stove,
The latest and the best
That John Plane ever introduced
To the people of the West.

Which for artistic elegance
And beauty of design,
Perfection and magnificence
All rivals does outshine.

This Royal Acorn parlor stove
All other bids defiance,
For none like it is built upon
A system based on science.

* * * * *

John has for seven and fifty years,
While in the hardware trade,
Sold Rathbone's stoves and testifies
No better can be made.

There are 26 stanzas of this poem, and those of our readers who desire to follow

further the thoughts of the poet should call on Vice President Sard who takes great pleasure in reading it to an appreciative listener. Mr. Plane is remarkably well preserved, and is by no means the venerable patriarch that one would expect to see. He has just retired from active business and has been succeeded by R. F. Tousley.

A Large Lump of Coal.

The following item from an English exchange may interest the stove man who often has to blame the failure of the magazine in a stove to feed to the use of coal of too large size: "An enormous cob of cannel coal intended for the Chicago exhibition, and sent from the Abram Collieries, Wigan, has been shipped at Liverpool. It is said to be the largest block of coal ever raised and weighs over 12 tons. In getting this cob to the surface many men were employed, and it took nine months to hew it out of the seam. It is said that the cost of obtaining it was £1000, or about £83 per ton. When raised the cob was inclosed in a case of planks, the weight of the cob and case being 13 tons 11 hundred weight. It arrived safely at the Alexandra dock and was placed on board the "Philadelphia" by means of ropes and chains attached to four pulley purchase blocks with a 6-inch wire rope span. As a precaution against the masts giving way under the great strain of the lifting gear attached to them, preventive guys were placed fore and aft. The power was supplied by a steam winch on board the vessel. The time occupied in shipping the cob was only 30 minutes.

It is, however, claimed in other quarters that a still larger cob was dug from a Derbyshire pit and exhibited at the first International Exhibition in London in 1861. This piece weighed, it is said, no less than 18 tons. Several large blocks of salt have also been recently shipped from Liverpool from the Cheshire salt district which are destined for World's Fair exhibits. Some of them are skillfully carved with figures representing a cow and dairymaid milking, "Lot's Wife," "Liberty," &c.

ODD PLATES.

The Spicer Stove Company of Providence, R. I., are shipping large quantities of stoves to the West, some going to the Pacific Coast by way of Cape Horn and others overland. We are advised that the Model Grand ranges made by this concern received the highest award at the Mechanics' Fair held in Boston in October last, and that they are in use at the Providence Cooking School. Several important changes have been made in Model Grand for this season, which will be shown to the trade during the month of May. An attractive exhibit of these goods is already set up at the World's Fair.

A. B. Kingsland & Co., Burlington, Vt., have arranged their portable baking ovens for the use of gasoline, as well as wood and coal fuel, and have recently perfected an attachment which enables confectioners to utilize surplus heat from the smoke pipe of an ordinary confectioner's furnace in connection with their ovens.

S. H. Pierce, who has been the mainstay on the road of Warren Foundry Company, Warren, R. I., since their beginning, has given up the management of that concern and joined the forces of the Richmond Stove Company, Norwich, Conn. Mr. Pierce entered upon his new duties May 1.

A. F. Glaessner of the Union Stove Works, New York, has just returned from a trip in Maine, where he not only succeeded in bagging a satisfactory number of orders, but is credited with catching a 15-pound salmon. It is probable that the fish will be stuffed and added to Mr. Glaessner's collection of dead gamecocks in the Museum at Meriden, Conn.

S. H. Plumb of the Stamford Foundry Company, and E. L. Marston of Manning, Bowman & Co., formed the center of a bouquet of traveling men at Boston one evening last week. A number of well-known stove concerns were represented in the bunch, and the flowers, to continue the simile, were daisies.

The Excelsior Steel Furnace Company, 110 South Jefferson street, Chicago, have issued a large folder giving numerous illustrations of samples from the Excelsior line of heating specialties. These illustrate a number of different types of furnaces, showing their interior construction, the arrangement of their grates, &c.; also hot-water boilers and combination heaters. In addition there are shown smoke radiators of several patterns, adapted to ordinary or very strong flues, registers of all kinds in artistic patterns, radiators for steam and hot water, quick-opening valves, gauges, &c. The sheet is a very creditable showing for this enterprising company, although it represents only a portion of their specialties.

Some old stoves that have given long service have recently been removed by E. H. McCann, 61 Lafayette avenue, Brooklyn, N. Y. One, an old pattern St. Nicholas range that had been used 32 years consecutively, was replaced by one of their new Champion ranges. The top of the old range was cast in one piece and showed a crack near the front which had been neatly mended, but otherwise was in good condition. The oven door was of the drop character and the lugs and catches, while giving evidence of much wear and tear were still intact. The other servant of 28 years was a fire-place heater, and from comparison of heating qualities these of the present day have not greatly advanced.

Friends of A. J. Doty, the gas expert, will find him the manager of the Harlem Gas Appliance Exchange, recently opened at 155 West 125th street, New York. The store is well lighted and stocked with a varied line of high-grade goods, displayed with excellent taste.

One of the features of the new gas range just brought out by A. Weiskittel & Son of Baltimore, Md., is an open fretwork top made perfectly flush, so cooking utensils can be readily moved about. The top cooking burners are made in two parts, the upper part lifting off so that it can be easily cleaned.

The March-Brownback Stove Company of Pottstown, Pa., announce in a bright, terse circular of four pages, printed in black and red on enameled paper, one of their newest productions—the Crown hot-air furnace,—"the kind that heats." Before pointing out the strong features of the Crown, they make some very suggestive remarks on "the matter of price" and "the matter of size." These are to the point, as many expenses arise, the company say, "all from one kind of economy," and the safest principle to follow in deciding the size of furnace to use is to select one with capacity to heat the whole house, getting one "with plenty of radiating surface, and with a large fire pot underneath to give capacity," then zero weather will create no discomfort. "The Crown furnaces are built on this principle." The base is of the kind which receives the galvanized casing on a heavy rim at the floor and contains a large, strong ash pit, provided with an efficient dust flue and the Smythe patent triplex grate. A two-part fire pot insures strength and a sand joint insures a tight connection. On the fire pot rests a dome, containing a large fire door, and supporting the top return flue steel radiator, which contibutes a large hot surface and utilizes the heat of the gases. Another strong point alluded to is that it stands low, affording a sharp rise in the heating pipes and a rapid flow of the air. All of the dampers are on the outside where they can be seen and attended to and are so constructed that they can be operated from upstairs by a chain. A cut shows the construction and under it are given the sizes, being Nos. 30, 34, 38 and 42, the diameter of the casing in inches, and the different hights, 56, 58, 60 and 63 inches, with fire pot diameters of 18, 20, 22 and 24 inches, respectively. The last page of the circular shows a cut of the base and the grate.

The increasing use of American gas and oil stoves abroad is apparent from the reports of British consuls in various countries, remarks the *Gas World* of London. Already these stoves are in use in Australia, France, England, Belgium, Canada, Mexico, and, to a lesser extent, in Central and South America, where a growing demand for them is noticed. The United States Consul at Cape Town, South Africa, reports that gas stoves are in use there to only a limited extent, which is matter for surprise, seeing that coal is worth from $15 to $20 a ton, and fire is only needed for cooking purposes. The adoption of gas or oil stoves would, under these circumstances, save quite 50 per cent. in outlay, besides doing away with the heat and worry incident to coal fires. There would appear to be a most promising field for the further extension of American trade in this line of goods in other places similarly conditioned.

The Ridgway Furnace Company of Boston, Mass., favor up with a copy of a neatly printed catalogue of 32 pages, which has just been issued from the press. It relates to the Ridgway revolving open fire pot heater or furnace, and gives a full description of the device, numerous illustrations being presented showing the general arrangement of parts. By far the major portion of the catalogue is taken up with testimonials from those who have used the company's furnaces. These letters come from various sections of the country, and show in a very forcible manner the light in which the Ridgway furnace is regarded by those who have practically demonstrated its merits.

We understand that E. L. Tallmadge, Jr., has severed his connection with the Perry Stove Company and will now devote his attention to the interests of Sam S. Utter. Mr. Tallmadge will visit the trade in New York and vicinity where he has many friends, and who, by reason of his ability to secure orders wherever he goes, have dubbed him "Old Reliable."

The establishment of Joseph Huse & Son, 95–97 Blackstone street, Boston, Mass., is a model of compact arrangement, and it is probable that more business to the square inch is done there than in any other store in the same line in Boston. Upon entering may be found a narrow passage, bounded on one side by shelves filled with stove repairs, and on the other by a bank-like partition, behind which diminutive desks are packed like sardines. Here and there is an irregular opening, which, if followed by chart, leads to the private office of G. H. Huse, who directs, from a seat in the show window, his force of small but mighty clerks. Large men are barred unless they happen to be customers, and for these special accommodations are provided in the rear of the store. In this part of the building the large orders are handled also, and for these ample accommodation has been provided. Mr. Huse's private sanctum is plenty large enough for two, and the visitor, whether he comes to buy or bore, is made to feel

that he fills it completely. This concern make a specialty of repairs, hollow ware, mica, &c., and their quarters resemble a veritable hive of industry.

J. H. HOFFMAN, manager of the Excelsior Hardware Company, 58 Warren street, New York, is just home from Europe, where he has been looking after the gas stove interests of the house who represent in the United States the John Wright Company of England. New vigor will now be infused into the sale of the Beaver and other gas goods which the house manufacture.

ON OPENING a substantial envelope, bearing the inscription "The Novelty Kitchener, made by Abram Cox Stove Company, Philadelphia," a handsome enameled four-page card with gilt edges appears, bearing the inscription in gilt, "What's Inside?" On the first inside page, printed in a silver tint, is a brief description of the Novelty Kitchener. A handsome half-tone engraving of the range occupies the opposite page, and is so printed as to give the full impression of a rich original photograph highly finished. It is one of the now popular horizontal boiler ranges with a low closet, a top hot closet with the boiler lying above it, a drop boiler or feed door, an ash door with ample air opening, and an oven door betokening a capacious oven. The pipe collar gives evidence that its operation will be sure to please if full-size pipe is carried to the chimney, and a hot-air pipe in the oven side shows that a current of air to warm another room will be supplied. On the last page in gilt is the Novelty trade-mark and the words "Compliments of," with a line below bearing the autograph of John P. Ley, the manager of the Second street sales room and the designer of the announcement described.

ACCORDING to one of the St. Louis papers an exhibition was recently given in that city at the rooms of the Electrical Club, designed to demonstrate the practical merits of electricity for cooking purposes. The rooms of the club were ablaze with incandescent lights, while the arrangement of the tables, kitchen utensils, &c., was such as to present a cheerful and homelike appearance.

IN COMMEMORATION of the World's Fair year, the Peninsular Stove Company of Detroit, Mich., are preparing a steel engraving of the grounds and buildings of the World's Columbian Exposition. This engraving is to be distributed as a souvenir to all dealers handling Peninsular stoves, ranges and furnaces; and in order that every one of the company's customers may receive a copy of the picture, they ask all who desire a copy to make application for it. For the purpose of systematizing the delivery of the engravings, the company will send a card to each of their customers applying, and these cards will be duly registered in the company's office. Upon the return of the card to the company, either in person or otherwise, a copy of the engraving will be delivered or forwarded, as may be directed. It is expected that the souvenir will be ready for delivery about June 1.

CONSPICUOUS above everything in its vicinity is the pavilion of the Michigan Stove Company in the Manufactures Building at the World's Fair. This pavilion is in the form of a huge cooking stove, being a reproduction on a mammoth scale of the Family Garland. Its top is 25 feet from the floor, its length is 30 feet, its width is 20 feet, and it stands with each of its great feet on a pedestal 2 feet square and 3 feet high. The under part of the stove forms a gold-lined dome, 20 feet high, giving ample room for the reception and entertainment of visitors. The base and feet of this great stove are finished in aluminum, the body in black, the trimmings in nickel, and the trademark on the oven door in colored glass. The word "Garland" appears on front and rear in large letters, and "The Michigan Stove Company" is on the side below the oven door. These letters are in glass, as well as the trade-mark, and at night electric lights in the interior of the stove will make them visible a long distance. The weight of this great stove is 20 tons, and three freight cars were required to transport its various parts from Detroit to Chicago. It is a most unique and striking advertisement and will certainly attract much attention.

CHARLES E. COLEMAN, with Eugene Munsell & Co., 218 Water street, New York City, is at present traveling through Pennsylvania, Ohio and Indiana, in the interests of the Mica Insulating Company of the address given. Mr. Coleman, we understand, is visiting electric street railways, motor and dynamo manufacturers in the larger cities. He expects to be absent for a month or more, and during his sojourn in the West will spend a few days at Chicago, where he will attend the World's Fair. Mr. Coleman will return in time to visit his many friends in the stove trade in New York State, Western Connecticut and Massachusetts.

F. H. WILLIAMS & Co., general agents at 174 Monroe avenue, Rochester, N. Y., for the superior steel furnaces, combination steam and hot water heaters, stoves, ranges, &c., have issued an announcement under date of May 1 to the effect that they have severed their connection with the firm of Bamber & Williams, and have started business on their own account at the address given. The new concern state that as they have been identified with the commercial interests of Rochester for nearly a score of years, during which time they gave personal supervision to the execution of all work connected with the mechanical or heating department, they are in a position to promptly and satisfactorily attend to the wants of their friends in the trade. The new concern refer to their equipment and facilities as first-class and state that they hold themselves in readiness "to prepare plans and specifications, submit estimates, close contracts and execute all work intrusted to us in a first-class and workmanlike manner."

THE WARREN HARDWARE COMPANY of Warren, Ohio, have issued a circular illustrating the Warren steel range which they claim is constructed upon scientific principles and is economical, durable and convenient. The flues are lined with asbestos, thus economizing the heat generated. The bottom flues are lined with cement, making the case double and adding, it is claimed, to the baking qualities of the oven, while the doors to the oven are double, having between them an air space. The top warming closet has sliding doors, which admit of quick opening, with a passage just wide enough for use, to be used as quickly as may be. The range is referred to as being first-class in every particular and as calculated to meet the wants of a discriminating trade.

F. & L. KAHN & BROTHERS of Hamilton, Ohio, send us an attractive catalogue of 24 pages relating to their Bijou and Peerless gas ranges, for which many strong claims are made. The construction of these goods is said to be such that the burners may be regulated to produce satisfactory combustion under all conditions of pressure and with all qualities of gas; that the burners may be easily kept clean inside and outside by the most ignorant user; that the ranges are made in every size and form called for by any class of buyers, and that the consumption of gas is economical, while the operation of the stove is rapid and efficient. The goods are shown in various styles, together wit the Hotel Peerless and Bijou Estate. Several pages are given over to junior stoves with and without oven, aad-iron heaters, cake griddles, hot-water reservoir, waffle irons and other goods intended for use in connection with gas-cooking apparatus.

SHERMAN S. JEWETT & Co., Buffalo, N. Y., have issued an attractive catalogue showing their line of wrought steel gas ranges, together with other heating and cooking appliances The major portion of the pamphlet is given up to the Jewett range, patented on April 12 of the present year. This range is made with hot-water generator, and is intended for using artificial, natural or fuel water gas. There are eight round improved sheet flame or sawed cap boiling burners on the top, with 8-inch openings for either closed or open griddles. Beneath each bake oven are two oblong baking and roasting burners. A warming oven is placed below the broiling chamber and above the generator chamber, which is heated by the surplus heat from the generating chamber burner. The range has cast-iron top, front, bottom and corner pieces, and steel back, sides and ovens. The sides are lined with heavy asbestos, in order to concentrate the heat in the ovens and prevent radiation into the kitchen. Other features include patent balanced oven doors, draw-out bake ovens, nickel supply gas pipe, valves, pilot lighters for oven and generator burners, mixers, door handles, panels, turn buckles and hinges. The range is shown in various styles and sizes. Other goods include the Jewett gas range and broiler, Jewett gas heater with asbestos flame plate and the Jewett gas range, which was awarded the gold medal by the Pittsburgh Exposition in October of last year.

A FIRST RATE PUBLICATION is the *Garland Magazine*, issued now and again by the Michigan Stove Company. The World's Fair number has just appeared. It is a 16-page pamphlet, with a terra-cotta cover, and the contents are so interesting that if a man doesn't wish to spare the time to read it through he had better not dip into it. There are a few references to Garland stoves and ranges, but they are brought in so happily that they add to the attractiveness of the contents. A pretty song, "School Bells," covers two of the pages. We observe that the circulation of the magazine is put at an even million.

A PHOTOGRAPH just received from the Mount Penn Stove Works, Reading, Pa., shows the Penn Diamond, one of their latest productions. It is a handsome square parlor stove and double heater, which we are informed is of the most modern style and of the highest grade and quality in every particular. In appearance it pleases the eye, the design blending with the elaborate nickel decoration. A handsome name plate reposes above the ash door, with massive foot rest on the side and a deep cabinet base, all of which glisten like silver. The fire pot section is surrounded and surmounted by beautiful open work and a dome with large mica spaces, through which may gleam the rays from the fire. Up on the dome rests an elegant top section, full nickeled and so arranged as to highten by reflection the illuminating effects of the fire. The magazine has a handsome movable cover supporting an ornament of appropriate splendor. As beauty is as beauty does, the internal construction and the essential conveniences are of that character which increases the satisfaction of the owner as the demands made upon the stove become greater.

California's wheat prospects are unusually bright since the recent rains.

New Excelsior Furnace Bonnets.

The Excelsior Steel Furnace Company, 110 South Jefferson street, Chicago, have brought out some special furnace bonnets possessing marked advantages over the usual style of bonnet. They are made with two heads, and the space between is filled with mineral wool. Illustrations are given herewith to show the several styles manufactured by the company, a portion of each being broken away to present the interior construction.

Fig. 1 is a bonnet with straight sides, Fig. 2 with sides pitched at an angle of 60° and Fig. 3 of 75°. These are the stock patterns and they are made of any hight wanted, as indicated by the scale of inches on the side of each cut.

The special advantages of these bonnets, as pointed out by the manufacturers, are the prevention of radiation of heat from the top of the furnace into the cellar, the better distribution or radiation of heat into the pipes, and the avoidance of danger from overheating cellar joists in a low cellar. The top of such a bonnet, it is said, is so cold that it could be put in direct contact with the joists, if that was necessary. The mineral wool used for filling is well known to be a most excellent non-conductor.

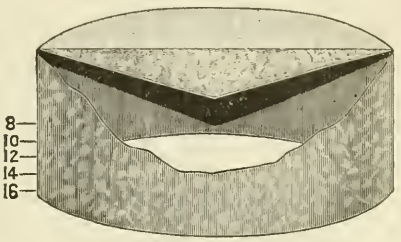


Fig. 1.—Bonnet with Straight Sides.

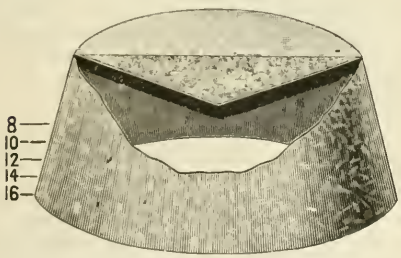


Fig. 2.—Bonnet Having Sides Pitched at an Angle of 60°.

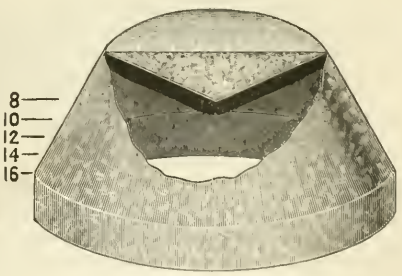


Fig. 3.—Sides Inclined at an Angle of 75°.

NEW EXCELSIOR FURNACE BONNETS.

The J. L. Mott Iron Works.

At Mott Haven, just across the Harlem River, at 133d street and Third avenue, New York, the plant of the J. L. Mott Iron Works is located. Fronting on both streets and running back to a large river front an abundance of light and air is secured, while for receiving iron, coal and foundry supplies and shipping goods the advantages of a water front in a large city are of great value. With the steady growth of a large and varied business many changes became necessary, and under the superintendency of H. Van Atta rapid advances have been made in economy of space and efficiency of plant. During the past year a large building, a portion of the plant erected in 1852, has been torn down to make room for a larger five-story building to be erected this summer, a portion of which will be used as a mounting shop and the balance for storage. A large building was recently built to facilitate the manufacture of their Sunray hot-water apparatus, and on the first floor has been installed specially designed and constructed machinery for that purpose. As these boilers are subjected to a high-pressure cold-water test, it is absolutely necessary that each part and connection shall be perfect to prevent loss in manufacture, as well as the great commercial disadvantage of imperfect goods.

The general machine shop of the works formerly had an independent engine, but by an ingenious use of a rope drive this is no longer necessary, though the engine is ready for use when the main power is idle from any cause. To the hot-air man the heating of the different floors of this part of the plant will be of interest. In the basement is a series of pipe coils, heated by either live or exhaust steam, through which air is drawn by a blower and forced up through the center of the building through a large cylindrical sheet-iron shaft. From this central shaft near the ceiling on each floor a pipe is taken off leading out into the room to be heated, where it divides into three pipes, each shooting a current of warm air in a different direction to warm the room evenly. With the varied character of goods sold by the house in great quantities, the floor space of the foundry is necessarily very large and requires three large cupolas, each charged with a different mixture of irons, and so distributed that the peculiar character of metal required for the different kinds of work is convenient for the molder. The stove department is busily occupied with some additions to their line of ranges which merit the approval of those who have seen them. That portion of the foundry where the heavier work is done is provided with a jib crane and several overhead trolleys.

A great number of plumbing and sanitary goods are turned out every day, in none of which is more pride taken or finer workmanship displayed than in Mott's celebrated cast-iron bathtubs. By a careful selection of irons and a perfect system of patterns and core making the loss in the pipe department has been kept down to a point that is a credit to the management. In the core-making department, where the heavy cores for the large Sunray hot-water apparatus are made, there are trolley carriers running on a system of overhead railways in which there are switches, and which is so arranged that a core can be picked up at any point in the shop and brought to the oven or to the foundry door.

In addition to the iron foundry, a brass foundry for which great claims are made and which shows an admirable management and system throughout is run to make the brass work for the plumbers' goods. In the foundry, which is at the top of the buildings with the necessary core ovens securely protected against fire in a manner worthy of commendation, a fine grade of castings is produced. The castings run down a shute to the cleaning and gate cutting room and on to the finishing shop, where the superintendent has installed many labor-saving machines. Having a nickel plant in every way modern, the plating is kept up to the standard of their goods. As the goods advance toward completion they pass down from floor to floor till they reach the storeroom in a finished state for packing and shipment.

In addition to this plant is a large plant at 137th street and Third avenue under the charge of the Messrs. Lefferts—father and sons—which is entirely devoted to enameling work. After being enameled the tubs pass to the finishers and decorators, where they are finished in keeping with a handsome tiled bathroom, after which they are passed on to the packers, who carefully wrap them in paper and crate them ready for shipment. Under the present management each department charges every other with the goods it furnishes, and yet the system so indispensable in a large business is carried out with no unnecessary red tape.

Work on the Harlem River ship canal, designed to connect the East River with the Hudson, has so far advanced that a steam launch sailed through from Kingsbridge to Spuyten Duyvil during the recent flood. The stone bridge just commenced will cost $348,000.

TRADE REPORT.

The Iron Market.

The past week has seen no improvement in the Iron or Steel trades. This is unsatisfactory, as the fifth month of the year has been reached. A moderate tonnage of Structural Material is being called for, and with favorable building weather during the next few months it is expected that a heavy tonnage will develop. Prices are no worse than they were a month ago, but they are no better, and, for the time being, give but scant promise of being better in the near future. In other respects there is no room for complaint; stocks are light, prices are so low that they cannot be subject to further shrinkage, while the demand is all that ought to be expected under the circumstances. The trade of itself is all right; what is needed is more confidence and easier money.

Pig Iron.—The New York market is dull and the outlook is not regarded hopefully. The general feeling is that the condition of financial affairs will tend to make buyers even more conservative in closing contracts, and may force some furnaces to market occasional blocks at a sacrifice, in order to secure ready money. Southern No. 2 Soft has sold as low as $8.50, Birmingham. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14.25 @ $14.50 for No. 1; $13 @ $13.50 for No. 2 and $13.25 @ $14 for No. 1 Soft.

In Philadelphia Pig Iron has got to a price where there is no room for further concessions. A bad break in Iron is regarded as simply impossible, and all that the trade requires is a fair chance to assert itself. Meanwhile sales are chiefly at figures as quoted herewith for Philadelphia and equivalent deliveries, with 25¢ @ 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X.....	$16.00	@ $16.50
American Scotch, No. 2X... ..	15.00	@ 15.50

The molders' strike in Chicago continues, but there are indications of its early termination. Quite a number of the molders employed in some of the principal foundries have resumed work at the old terms, and it is expected that in a few days the remainder will follow suit. The Pig-Iron dealers have found their trade interrupted to some extent by the strike, but not so much as would have been supposed, as the strike is purely local. High grades of Lake Superior Charcoal Iron, say Nos. 4 to 6, are quite scarce. Inquiries for these grades are coming in from Car-Wheel concerns, and efforts are being made to weaken the market, but makers are firm. Quotations are as follows, cash, f.o.b., Chicago:

Lake Superior Charcoal.....	$16.50 @	$17.00
Local Coke Foundry, No. 1.....	13.75 @	14.25
Local Coke Foundry, No. 2.....	13.00 @	13.25
Local Coke Foundry, No. 3.....	12.75 @	13.00

There is no increase in the volume of business in Pig Iron in Southern markets, and the transactions are mainly in small lots. A few sales have been made of 1000 tons in each instance, but many are from one to ten carloads, and yet in the aggregate they foot up quite a good amount. Some factories say that the volume of business in April was larger than any previous like period. Prices remain steady at $9 for No. 2 Foundry, f.o.b. Birmingham, and although there have doubtless been sales for less it was exceptional, and at points where the difference in freight made up for the concession in price. Quotations are as follows:

Foundry.

Southern Coke, No. 1	$13.25 @	$13.50
Southern Coke, No. 2..... .	11.75 @	12.00
Southern Coke, No. 3.....	11.00 @	11.25
Ohio Soft Stone Coal, No. 1.....	16.00 @	16.25
Ohio Soft Stone Coal, No. 2	15.00 @	15.25
Mahoning and Shenango Valley....	14.75 @	15.00
Hanging Rock Charcoal, No. 1.....	19.00 @	19.25
Hanging Rock Charcoal, No. 2....	18.00 @	18.50
Tennessee and Alabama Charcoal, No. 1.....	15.50 @	15.75
Tennessee and Alabama Charcoal, No. 2.....	14.50 @	14.75

Metal Market.

Copper.—The rumor referred to in last week's report to the effect that a large quantity of Lake Superior Ingot was sold to American consumers at 11¢ ℔ lb has been confirmed. Particulars as to quantity of Copper involved and the prices paid were not divulged, but there is quite good evidence that the contracts represented at least 15,000,000 lb, and that the deliveries run three to six months ahead from May 1. There was a firmer feeling at the close, with bids of 11¢ for Lake Ingot turned down by some producers.

Pig Tin.—Arrivals from London continue heavy and have added still further to the stock in first hands here, without preventing accumulation at that point. According to the data given there was an increase last month of 1213 tons in New York and 156 tons in New York stocks, which, despite a reported decrease of 730 tons in Holland, leaves an unprecedented stock. July delivery was raised to 21¢ on Saturday, but not permitted to drop below 20.80¢ afterwards, cash stock, in the meantime, being held steadily at 20.60¢ @ 20.65¢. Fair average consumption assists in sustaining the market, but careful manipulation is evidently the greater force in preventing prices from weakening under the weight of present heavy stocks.

Pig Lead.—The market has remained in a dull and somewhat feverish condition, with underlying symptoms of weakness. During the period under review some sales were made at as low as 4¢ regular, while official bullion price dropped to 3.95¢. Subsequently single carloads were sold at 4.05¢ @ 4.07½¢, but later on there were free sellers at 4.05¢ and no buyers of round lots at above 4¢.

Spelter.—Western brands delivered here and at common point are now quoted at 4.50¢ @ 4.60¢, with comparatively light offering for either prompt or future shipment.

Antimony.—No change reported. Business moderate and chiefly at former prices, say 10¢ @ 10½¢ for Hallett's, 10⅝¢ @ 10½¢ for L.X., and 10⅝¢ @ 10¾¢ for Cookson's.

Tin Plate.—No improvement reported in the demand for spot stock or future shipments. Supplies here are liberal, with quite good assortment. Prices seem to be a little soft, but show no radical change. Consumers' prices remain unchanged and demand continues about the same.

Coal.

The Coal market is dull in both departments—Anthracite and Bituminous, and no change has taken place within the week. The Anthracite market is construed as being in a waiting condition, pending the Reading reorganization and the part to be acted by Mr. Harris, McLeod's successor. The scarcity of the small steam sizes is almost a famine, caused by restrictions and active consumption, Pea selling at $3 alongside in New York and Buckwheat $2.35, alongside. The trade newspapers last week were widely at fault in stating that the sales agents had made another reduction of 50¢ ℔ ton. What they really did at their last meeting was to make prices at various points West conform to the reductions made in Eastern prices last March. Though varying with the locality the reductions average about 50¢. The Reading issued orders to close 12 to 15 collieries, leaving 35 in operation.

Bituminous Coal is quoted $3.10 alongside in New York for Clearfield and $3.35 for St. George's Creek Cumberland. The advance in railroad tolls in April makes the rate $2 to New York tidewater and $1.40 to tidewater in Philadelphia and Baltimore. At the latter point shipping expenses of 8¢ @ 10¢ ℔ ton are added, according to the quantity of Coal.

A convention representing the railroad Coal miners in Western Pennsylvania met in Pittsburgh and decided not to ask for any advance in wages.

Chicago Report.

Scrap.—Consumers have forced the market lower on Old Material. Dealers' buying prices are as follows :

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12.50	....
Machinery Cast	10.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	7.50	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.00	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	11 00	....
Old Gas-Pipe and Boiler Tubes	8 00	....
Cast Borings	4 75	....
Turnings	6.00	....
Horseshoes	12 50	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8½¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	3 ¢

Anthracite.—We continue to quote carload lots of 12 net tons as follows:

	Egg, Grate.	Sto. and Ch.
Chicago, Ill	$5.35	$5.60
Milwaukee, Wis	5.35	5 60
Kansas City, Mo	8 55	8.80
Council Bluffs, Iowa	8.55	8.80
St. Joseph, Mo	8.55	8.80
Leavenworth, Kan	8.55	8.80
Omaha, Neb	8.55	8 80
Burlington, Iowa	6.85	7.10
Des Moines, Iowa	8.30	8 55
Davenport, Iowa	6.65	6.90
Dubuque, Iowa	6.65	6.90
Madison, Wis	6.85	7.10
St. Paul, Minn	7.85	8.10
Lincoln, Neb	8.70	8 95
Sioux City, Iowa	8.55	8.80
Aberdeen, S. Dak	8.60	8.85

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

BRUCE & COOK, 86-90 Water street, New York, have put in a stock of the leading numbers and sizes of Genuine Charcoal Bloom Galvanized Iron, branded in black and made by the McDaniel & Harvey Company, Philadelphia, Pa., whose advertisement in this issue calls special attention to the leading features of these goods. Bruce & Cook emphasize the fact that buyers ordering this Iron should be careful to specify that they want Iron branded in black, as the price is a little higher than the ordinary Galvanized Sheets branded in red.

THE IRON-CLAD CLOTHES DRYER COMPANY has been formed at Saratoga, N. Y., with a capital of $6000 and the following officers: Deyoe Lohnas, president; A. S. Hays, vice-president; T. S. Estabrook, secretary; C. F. Rich, treasurer; Deyoe Lohnas, A. S. Hays, T. S. Estabrook, C. F. Rich, G. B. Eddy, W. H. Harris and J. C. Hulbert, directors.

FOR THE GREATER CONVENIENCE of their patrons Merchant & Co. of Philadelphia, in addition to their New York house, have opened a salesroom at 584 and 586 Flushing avenue, Brooklyn, where a line of Tin-Plate and Tinners' goods is carried, that is calculated to meet all ordinary requirements.

THE HABERMAN MFG. COMPANY, Berlin Village, L. I., make a prominent announcement elsewhere in this issue relating to their steel enameled ware, in which they call attention to the circular recently issued by the Lalance & Grosjean Mfg. Company in retereuce to a decision of the Circuit Court of Appeals.

CONDITION OF THE

Hardware Trade.

THE CONDITION OF BUSINESS on the whole is fairly satisfactory, though there has not been as yet that increase in volume which was expected with the advance of the season. This is doubtless in part owing to the continued cold and inclement weather which has prevailed in many parts of the country, curtailing a demand which would have otherwise set in. Many manufacturers, jobbers and commission houses report, however, an excellent business, and in some lines there is certainly a scarcity of goods and manufacturers find difficulty in filling orders as promptly as the goods are required by the trade. In view of the condition of the money market some of the large houses are pursuing a conservative policy in regard to credits, limiting their sales to cash transactions to a greater extent than is usual. It is generally admitted that goods are being sold on narrow margins of profit and that it requires special efforts to keep up the volume of business so as to make it compare favorably with other years.

Advices from Chicago.—The Shelf Hardware trade has been affected unfavorably by the stormy weather of the past week. Snow again fell in some portions of the Northwest, and salesmen have been very much discouraged by the continuance of practically winter weather. The volume of business shows considerable falling off since our last report. The change to winter weather has checked the demand for Refrigerators, Ice Cream Freezers, Screen Doors and other summer goods, but manufacturers are only now catching up with the heavy orders which were booked some time since. Wire Cloth is scarcer than ever. Jobbers quote $1.75, but are turning away a great many orders which they find it absolutely impossible to fill. They are endeavoring to take care of their regular trade but find the stock hardly large enough to meet even this demand. Heavy Hardware keeps up remarkably well, considering the unfavorable circumstances; in fact, presenting somewhat of a contrast to the quietness now prevailing in the Shelf Hardware trade.

Notes on Prices.

Cut Nails.—The Cut Nail market is not in a very satisfactory condition. There has been some falling off in the demand, so that the volume of business is at present only fair. A weakness in prices has also been developed, and $1.10 is now named for carload lots at mill, with intimations that in some special cases this figure has even been slightly shaded. The state of the money market has, probably, some effect in producing this condition of things. Small lots from store are quoted at $1.35 to $1.40.

Advices from Chicago.—Specifications on Steel Cut Nails have been coming in more freely the past week, indicating a growing consumption. The enlarged business, however, came from outside localities, the trade in this immediate vicinity having been badly checked by the unfavorable weather. Prices are now down to a point below which they can hardly be expected to go, and manufacturers look forward to a very steady business as soon as the weather is in good condition for outside work. Quotations on factory lots are $1.30 to $1.35, according to the character of the order. Small lots from stock are selling at $1.40 to $1.45.

Wire Nails.—The market continues without open change, the quotation for carload lots at mill being still $1.55, f.o.b., with Cleveland as the point of equalization for the West and Pittsburgh for the East. It is, however, understood that some sales have been made at $1.50, this price being apparently confined to the Pittsburgh district. The demand continues good. Quotations on small lots from store in New York are $1.80 to $1.85.

Advices from Chicago.—New business in Wire Nails is slow on account of the unsatisfactory weather. In the larger part of last week rain feel almost incessantly, absolutely preventing outdoor work. Jobbers are well fixed with contracts and their stocks will have to be worked off before new orders are given out. The most encouraging feature of the situation is the sale and withdrawal from the market of quite a large stock of Nails in warehouse here, which for a time had threatened to demoralize prices. The rates on factory lots are unchanged at $1.62½, Chicago. Small lots are selling at $1.70 to $1.75 from stock.

Barb Wire.—The Barb-Wire market continues without important change and with a fair though not especially heavy demand. We quote $2.45 to $2.50 for Four-Point Galvanized in carload lots at mill. Small lots delivered in New York are quoted at $2 70 for Galvanized and $2.30 for Plain.

Advices from Chicago.—The Barb-Wire trade shows no improvement, conditions remaining precisely the same as last week. Orders are light, but shipments are still fair on old contracts. Factory prices are $2.20 for Painted and $2.60 for Galvanized, while small lots from stock are selling at $2.30 and $2.70 respectively.

Wire Cloth.—There is a continued scarcity of Wire Cloth, and prices are being advanced by jobbers who have stock on hand and also by manufacturers who are in a position to fill orders promptly. In many cases $2 is demanded and jobbers' quotations are fairly represented by a range of $1.75 to $2.

Wringers.—In the Wringer market there has lately been a good deal of competition and some cutting of prices, so that it has been characterized by some irregularity. As a result of this prices on some leading Wringers are slightly lower. The condition of things is reflected in the fact that the American Wringer Company, 99 Chambers street, New York, have recently reduced the list prices of their No. 2½ Universal, No. 10 Keystone and Nos. 2, 2½ and 10 Novelty Wringers to $20 per dozen, instead of $21, as heretofore. It is understood that the

Lovell Mfg. Company, Erie, Pa., and the Peerless Wringer Company, Cleveland, Ohio, have lately been adding considerably to their line of Wringers, and the competition between them and the American Wringer Company has been of late more active than heretofore.

Leather Horse Tie.—This is put on the market by Covert's Saddlery Works, Farmer, N. Y. The list prices for these Ties are $8.40 per dozen for 1-inch, and $10.80 per dozen for 1¼-inch, these prices being subject to a discount of 33⅓ per cent. to the trade.

Lebanon Cake Cutter.—This is made by the Seltzer Specialty Company, Lebanon, Pa. The Cutters liat at 15 cents each, or $1.80 per dozen, and are quoted to the trade at 40 per cent. discount from list, 100 pounds delivered. The Cutters weigh 60 pounds to the gross and are packed four dozen in a case. A sample set will be sent to any address on receipt of the list price.

Lebanon Beater.—The Lebanon Beater, put on the market by the Seltzer Specialty Company, Lebanon, Pa., is listed at 50 cents each, or $6 per dozen. The discount to the trade is 40 per cent., 100 pounds delivered. The Beaters weigh 200 pounds to the gross and are packed two dozen in case, and also half gross if desired.

Baird's Cooler and Aerator.—A. M. Coon, Leonardsville, N. Y., is the manufacturer of this article. It is sold to the trade at $3, subject to a discount of 25 per cent.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, in ton lots, ℔ lb.	....	@	$0.03½
Rubber Shoes, in ton lots ℔ lb.	....	@	.04
Large Hose, ℔ ton	....	@	9.00
Wringer Rolls, ℔ lb	....	@	.04½
Wringer Wire Rolls, ℔ lb	.01	@	.02
Syringes, ℔ lb	....	@	.05

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb	9½¢
Light and Tinned Copper	℔ lb	8½¢
Heavy Brass	℔ lb	7¢
Light Brass	℔ lb	6¢
Lead	℔ lb	3½¢
Tea Lead	℔ lb	3¼¢
Zinc	℔ lb	2¾¢
No. 1 Pewter	℔ lb	14¢
No. 2 Pewter	℔ lb	7¢
Wrought Scrap Iron	℔ gross ton,	$13.00
Heavy Cast Scrap	℔ gross ton,	9.00
Stove Plate Scrap	℔ gross ton,	6.00
Burnt Iron	℔ gross ton,	4.00

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags	℔ lb	4 ¢
No. 2 White Rags	℔ lb	3 ¢
Mixed Rags	℔ lb	1½ @ 1¾¢
Blues and 3ds	℔ lb	1¾ @ 2 ¢
Hard Sized White Shavings	℔ lb	2¾ @ 3 ¢
No. 1 White Book Shavings	℔ lb	2¼ @ 2⅝¢
No. 2 White Book Shavings	℔ lb	1½ @ 1¾¢
Light Book Shavings	℔ lb	⅝ @ 1 ¢
No. 1 Mixed Shavings	℔ lb	1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @ ⅞¢
No. 1 Printed Books	℔ lb	1⅜ @ 1½¢
Ordinary Mixed Books	℔ lb	¾ @ ⅞¢
Newspapers		½¢
No. 1 Manila Paper	℔ lb	1¾ @ 1¾¢
No. 2 Manila Paper	℔ lb	⅞ @ 1 ¢
Bogus Paper	℔ lb	¾ @ ⅞¢
Common Paper	℔ lb	¾ @ ⅞¢
Straw Chips	℔ lb	½ @ ⅝¢
Binders' Clippings	℔ lb	½ @ ⅝¢
Jute Butts	℔ lb	1¾¢
No. 1 Jute Bagging	℔ lb	1¼ @ 1⅝¢
Mixed Bagging	℔ lb	1 ¢
No. 2 Bagging	℔ lb	¾¢
Hemp Twine	℔ lb	2½¢
Manila Rope	℔ lb	2½¢
Jute Rope	℔ lb	1⅞ @ 2 ¢
Mixed Rope	℔ lb	¾ @ ⅞¢

Trade Notes.

WE ARE INDEBTED to J. H. & D. Lake Company, Massillon, Ohio, for a serviceable glass paper weight that will prove particularly useful in the summer, when open windows make drafts about a desk and scatter the papers. Incidentally the paper weight directs attention to Friction Clutch Pulleys, Cut off Couplings, Hangers, Shafting, &c., made by the J. H. & D. Lake Company.

A NOTICE WAS ISSUED to the trade by Cordley & Hayes that after May 1 their location will be at 172 Duane St., New York City. The firm, who are sole agents for the Indurated Fiber Ware, recently issued a circular to the trade calling attention to a decision in a litigation against the New York Wood Fiber Company for Infringing the patents protecting the indurated Fiber Ware. Accompanying the circular was a copy of the decree.

THE RIEHLE BROTHERS TESTING MACHINE COMPANY, Philadelphia, Pa., are installing an extensive and interesting exhibit at the World's Fair Columbian Exposition. Among the articles that will be exhibited are a 300,000-lb Vertical Screw Power Testing Machine, with patent electric automatic screw beam; 200,000-lb Horizontal Car-Coupler Testing Machine; 200,000-lb Vertical Screw Power Testing Machine; 100,000-lb Vertical Screw Power Testing Machine with electric automatic beam, besides a very large number of other similar machines. The exhibit will be in charge of J. R. Matlack, Jr., while the exhibit in the Government Building will be in charge of Capt. A. H. Russell.

GEORGE FRIES' SONS, 909 Filbert street, Philadelphia, Pa., make an interesting announcement this week in our advertising columns concerning various articles of Tinware that they manufacture. The illustrations show a variety of goods and descriptive particulars are given.

THE KEYSTONE TINNING WORKS, operated by Cavanagh & Ferrell, are now located at 312 and 314 Oxford street, Philadelphia, where they are fitted for a capacity of about 1 ton per day. They have recently undertaken the tinning of gray-iron castings which has considerably increased their business and insures them plenty of work in lines not before open to them.

RUMSEY & CO., LIMITED, Seneca Falls, N. Y., and 36 Dey street, New York, have prepared a pamphlet treating specially of Pumps of various character for apraying trees and plants. From the fact that it treats comprehensively and gives engravings of many moths and insects that destroy fruit and vegetables, the name "bug circular" is used to distinguish it from their other Pump literature. This house has been developing in Cuba, Mexico and South America, a trade in Pumps especially designed to meet Southern requirements.

A PAGE ANNOUNCEMENT of William Connors, 676 River street, Troy, N. Y., directs prominent attention to various manufactures of his, which include Stove Cement, Asbestos Furnace Cement, Builders' and Roofers' Elastic Oil Cement, besides American Seal Roofing Paint.

THE UNITED STATES IMPROVED STOVE BOARD COMPANY is the name of a concern recently incorporated at Chicago, Ill., with a capital stock of $30,000. The incorporators include Richard J. Hawes, David Goldberg and Jesse Lowenhaupt.

BORSUM BROS., 202 Fulton street, New York, make a specialty of Polishes for Metal and Glass. They are the American agents for the well-known red Putz-Pulver. At their factory in Jersey City they make a variety of polishes, claiming that they can be used on the finest surfaces of gold or silver.

W. R. OSTRANDER & CO. will now be found at 204 Fulton street, New York, having moved across the street to more convenient quarters, where their stock and samples of Electrical, Mechanical and Pneumatic Bells and Speaking Tubes and Whistles are attractively arranged.

R. B. WHITTEMORE, secretary of the American Roofing Company, St. Louis and Cincinnati, is at present on the Pacific Coast in the interest of his company. He reports the outlook as particularly encouraging, and has sent in a number of substantial orders.

I. BREMER, 44-46 Duane street, New York, claims the distinction of being the only manufacturer whose production is confined to articles of Metal, Leather, &c., intended exclusively for the dog. The manufactured articles might be termed dog furnishings, consisting as they do of Collars in a multitude of styles, shapes and sizes, enabling a selection by purchasers of Harness, Locks for Collars, &c., Leads, Bells, Couplings, Boots, Blankets, Combs, Brushes, Dog Baskets, Dog Bracelets, Whips, &c. Collars are now being trimmed with polished Steel, in addition to the customary silver, brass and nickel. A line is also manufactured of attractive Collars of sterling silver for such as can indulge expensive tastes. A recent novelty is a top lock patent Dog Collar so arranged that there is no movement of the lock or swinging motion, thus avoiding noise and the wearing of the hasp. The lock is flat and placed rigidly on a metal loop, which slides over the end of collar, keeping it in place. This lock is made in a number of sizes for small or large collars.

THE LUDLOW-SAYLOR WIRE COMPANY St. Louis, Mo., have secured a contract for an ornamental Iron arch for the Kelley Building, Portland, Oregon, and a large number of brass foot rails for the Tacoma Chamber of Commerce. In addition to this work they are busily engaged on a number of large local contracts.

CHAMPION BLOWER & FORGE COMPANY of Lancaster, Pa., find the recent additions to their plant inadequate to the requirements of their rapidly increasing trade, and have, therefore, decided on plans for an extension of premises to double what they now are. Work will be commenced at an early date, so that toward fall they hope to be pretty well on to completion.

THE PROFUSELY ILLUSTRATED page advertisement of the Deming Company Salem, Ohio, will be of interest to the trade, calling attention as it does to the complete line of Spray Pumps, Nozzles, Appliances, &c., which they are putting on the market. The New York office of the company is at 72 John street, Henion & Hubbell being their general Western agents, at 55 and 57 North Clinton street, Chicago.

BOAS BROTHERS, manufacturers and importers of Adamant Enameled Ware, Hamburg, Germany, announce that owing to the constantly increasing demand for their gray-mottled ware they are removing to larger quarters at 235 Greenwich street, New York, where greater facilities will enable them to fill orders with the utmost care and promptness.

AMONG recently authorized corporations in Illinois are the following: The Kiabel Palace Car Company, Chicago; capital stock, $10,000,000; for the manufacture of railroad coaches and cars and all kinds of railroad specialties and supplies; incorporators, William E. Schrader, Howard A. Baldwin and Frank B. Redington. Brown

Nut Lock Company, Chicago; capital stock, $600,000; for the manufacture of railway appliances; incorporators, Julius C. Brown, J. C. Le Masters and James W. Wilson. The Weber Brothers' Metal Works, at Chicago; capital stock, $30,000; for the manufacture of sheet-metal articles; incorporators, Charles F. Weber, William J. Weber and William Rochlitz. The Chicago Sanitary Vertical Trap Company, Chicago; capital stock, $150,000; incorporators, Joseph Obyne, John F. Mahon and Joseph Mahon. The Safe and Timelock Company, Chicago; capital stock, $200,000; incorporators, N. B. Rees, J. W. Kenevel Calvin C. March and George F. Probst. The Stiles Tin Company of Chicago; capital stock, $200,000; for the manufacture of tinware; incorporators, William Patte. Stephen Stiles and Henry Stiles. The Automatic Time Stamp Company, Chicago; capital stock, $150,000; for manufacturing; incorporators, Warren B. Martindale, John M. Stebbins, Walter B. Pelton and Charles H. Tallmadge. The United States Improved Stove Board Company, at Chicago; capital stock, 30,000; for the manufacture of stove boards; incorporators, Richard J. Hawes, David Goldberg and Jesse Lowenhaupt. Griffin Wheel Company, at Chicago; capital stock, $1,250,000; for the manufacture of car wheels; incorporators, Thomas A. Griffin, Gardner G. Willard and William W. Evans. Metropolitan Electric Engineering Company, at Chicago; capital stock, $50,000; for the manufacture of machinery and electric motors; incorporators, Francis J. Dommergue, Charles H. Fleischer and Joseph Staab. Turnbull & Cullerton Metal Lath Company, at Chicago; capital stock, $50,000; for manufacturing and contracting; incorporators, George A. Turnbull, E. F. Cullerton and N. H. Hanchett. John F. Alles Plumbing Company, at Chicago; capital stock, $60,000; for manufacturing and repairing plumbing; incorporators, John F. Alles, Joseph W. Alles and Warwick A. Shaw. Killmer Mfg. Company, at Chicago; capital stock, $50,000; for the manufacture of water filters and novelties; incorporators, Louis J. Pierson, Edward M. Burst and W. N. Woodson. Tilton Sewing Machine Company, at Chicago; capital stock, $50,000; for the manufacture of sewing machines, equipments and supplies; incorporators, Joseph H. Tilton, Victor T. Eltiug and J. E. Fay. The Goltra Steel Company, at East St. Louis; capital stock, $1,500,000; for a general foundry business; incorporators, G. J. Root, R. J. Whitney and Edward F. Goltra.

The Capital Sheet Metal Company of Columbus, Ohio, capitalized at $100,000, have been incorporated. The object is to manufacture Sheet-Metal products and carry on a general manufacturing business at Columbus. Operations will begin at once.

The Sykes Iron Steel & Roofing Company of Niles, Ohio, have space at the World's Fair, which is located in the north end of the Manufactures and Liberal Arts Building. The space is in Section E, on the gallery floor, and the display is in charge of R. G. Sykes, who, we understand, is a pioneer in the manufacture of iron and steel roofing. The company invite their friends in the trade to make use of their pagoda as headquarters while visiting the exposition. They also extend an invitation to customers to visit their office and works at 611 South Morgan street and inspect their lines of roofing, siding, steel lath, &c. In reaching their exhibit in the Manufactures and Liberal Arts Building the company request visitors to take the first stairway east of the central entrance on the north, and their space will be found the second east after landing in the gallery.

At Cambridge, Ohio, J D. Taylor and others will at once begin the building of the Guernsey Rolling Mill, and the Cambridge Iron & Steel Company are beginning to build an extensive galvanized Sheet-Iron plant.

Morgan & Cornell, New York, issue a circular relating to Plain, Japanned, Stamped and Decorated Tin Cans, Grocers' Fine Canisters, Chinese Scenery Paper and Views and Store Fittings of every description. Illustrations are given of Canisters, Spice Cabinets, Tea Bins, Tin Scoops, Fancy Tin Tea Signs, Molasses, Syrup and Oil Cans, Sample Boxes, &c.

Gummey, Spering & Co., Philadelphia, issue a circular to the trade referring to their tin-plate works, where they are making bright and roofing plates in large quantities. The circular also gives a list of the plates they make, together with prices of different sizes and gauges. They say that they will send a box of their brands to any point east of the Mississippi, and if not satisfactory they will take it back at thei rexpense of freight.

In the United States Circuit Court at Pittsburgh last week the National Wringer Company filed an answer in the suit brought by the Erie Wringer Mfg. Company, through its receiver, A. Y. Smith. The original bill states that the defendants infringed upon the claimants' patent. In their answer the National Wringer Company claim that the Erie concern were sold on January 29, 1892, and the respondents bought the patents after they had passed through several hands, and they claim they had permission to manufacture the Wringers.

On the 19th inst. the residence of La Rue Brothers of the La Rue Hardware Company, at Kansas City, Mo., was destroyed by fire. John H. La Rue and his wife were in the Western part of the State and the inmates of the house, who narrowly escaped, were George A. La Rue, Charles O. La Rue, W. J. Wilder and his son and Annie Nordling, a servant girl, who was overcome and carried from the third floor where she slept. They were not able to save even their clothes. Mr. Wilder the inventor of the aluminum alloy lost all of his valuable papers. The La Rue Hardware Company are general agents of the Aluminum Alloy Metal Company of Hampton, Iowa.

The Cleveland Stamping and Tool Company of Cleveland, Ohio, have increased their capital stock from $25,000 to $100,000.

The demand for the Colliau cupola furnace has encouraged Byram & Co. of Detroit, Mich., to add eight new sizes, making 16 different sizes in all They have recently made shipment to the Ohio Falls Car Mfg. Company, Jeffersonsville, Ind.; the Marion Steam Shovel Company, Marion, Ohio; the Bignall Mfg. Company, Medina, N. Y.; R. S. Newbold & Son, Norristown, Pa.

The Niles Spouting & Roofing Company of Niles, Ohio, have been granted a charter of incorporation, with a capital stock of $10,000.

Friedly & Voshardt, manufacturers of sheet-metal architectural ornaments, are erecting a four-story and basement factory for the manufacture of their goods at 196-198 Mather street, Chicago. The buiding will have a frontage of 50 feet on Mather street and a depth of 115 feet. In the basement will be placed a new tubular boiler and engine, which will furnish the necessary power for elevator, presses and other machinery. They are designing a number of new styles of sheet-metal work for ceilings, which they will not be ready to put on the market until their new factory is completed and some special machinery has been installed.

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See Standard Lists on Following Pages

CHICAGO, MAY 4, 1893.

Tin—

Straits pigs.....23¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland and Melyn Grade	IC, 10 x 14.....@	$6.75
	IC, 12 x 12.....@	6.75
	IC, 14 x 20.....@	6.75
	IC, 20 x 28.....@	13.50
	IX, 10 x 14.....@	8.75
	IX, 12 x 12.....@	8.75
	IX, 14 x 20.....@	17.50
	IX, 20 x 28.....@	17.50
	DC, 12½ x 17.....@	8.50
	DX, 12½ x 17.....@	8.50
Allaway Grade,	IC, 10 x 14.....@	6.50
"	IC, 12 x 12.....@	6.50
"	IC, 14 x 20.....@	13.00
"	IC, 20 x 28.....@	13.00
"	IX, 14 x 20.....@	8.00
"	IX, 20 x 28.....@	16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14.14x20.....@	$6.00
IC, 14x20.00 ℔.....@	5.75
IC, 14x20, 100 ℔.....@	5.85
10 x 20.....@	9.00
20 x 28.....@	12.00
IX, 10x14, 14 x 20.....@	7.50
BV Grade.—IC, 10x14, 14x20.....@	6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.— IC, 14 x 20 ...@	$5.62½
20 x 28.....@	11.25
IX, 20 x 28.....@	14.25
Worcester Brand and equal.— IC, 14 x 20...6.12½@	.....
IC, 20 x 28...12.25 @	.....
IX, 14 x 20.. 7.62½@	.....
20 x 28..15.25 @	.....

American Tin Plates.

Charcoal Plates.—Bright.

Irondale, A. A.—IC, 14 x 20.....	$7.00
" " IC, 14 x 20.....	9.00
" " IXX, 14 x 20.....	11.00
" " IC, 20 x 28.....	14.00
" " IX, 20 x 28.....	18.00
" " IXX, 20 x 28.....	22 00
Florence.— IC, 10 x 14, 12 x 12, 14 x 20..	$6.75
IX, 10 x 14, 12 x 12, 14 x 20..	8.75
Palma.— IC, 10 x 14, 12 x 12, 14 x 20..	$7.50
IX, 10 x 14, 12 x 12, 14 x 20..	9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, Tissue Packed, IC, 14 x 20..	$9.25
Royal, extra, IC, 14 x 20.....	7.25
Merlon, IC, 14 x 20.....	7.00
Almond, IC, 14 x 20.....	6.50
Mint, IC, 14 x 20.....	6.25

Coke Plates.—Bright.

Elwood.—IC, 14 x 28.....	$6.00
" IC, 20 x 28.....	12.50

Roofing Plates.

Arch (205 ℔), 20 x 28.....@	$12.00
Palma (205 ℔), 20 x 28.....@	12.25
Crescent, IC, 20 x 28.....@	12.50
Crescent, IX, 20 x 28.....@	15.75
Empire, IC, 20 x 28.....@	12.75
" IX, 20 x 28.....@	16.00
Hickory, IC, 20 x 28.....@	13.00
" IX, 20 x 28.....@	16.10
Alaska (heavily coated), IC, 20x28@	$14.50
Alaska IX, 20 x 28.....@	17.75
Special, IC, 20 x 28.....@	15.00
" IX, 20 x 28.....@	18.25
Merchant's Roofing (extra coated) IC, 20 x 28.....@	$17.75
Merchant's Roofing (extra coated) IX, 20 x 28.....@	$21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28.....@	$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28.....	$23.00
Irondale A: IC, 14 x 20.....	$6.25
IX, 14 x 20.....	7.75
IC, 20 x 28.....	12.50
IX, 20 x 28.....	16.50
Westmoreland: IC, 14 x 20	$6.25
IC, 20 x 28.....	12.50
Juno: IC, 14 x 20.....	$5.75
IC, 20 x 28.....	11.50
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20	$9.50
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20	11.00
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28	19.00
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28	22.00
Neville, Stamped, IC, 14 x 20	6.25
" " IX, 14 x 20.....	7.50
" " IC, 20 x 28	12.50
" " IX, 20 x 28.....	15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared).....	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared).....	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared).....	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared).....	16.50
Columbia, IC, 14 x 20 (Stamped).....	7.25
" IC, 20 x 28 (Stamped).....	14.50
Maple, IC, 14 x 20 (Stamped).....	6.75
" IC, 20 x 28 (Stamped).....	13.50
Willow, IC, 14 x 20.....	6.25
" IC, 20 x 28.....	12.50
Knoxall, IC, 14 x 20	6.00
" IC, 20 x 28.....	12.00
Globe, IC, 14 x 20.....	5.75
" IC, 20 x 28	11.50
Miami, IC, 14 x 20.....	6.00
" IC, 20 x 28.....	12.00
" IX, 20 x 28.....	15.00
" (Redipped), IC, 20 x 28.....	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28.....	$13.00	$13.00
XX, 14 x 28.....	14.50	14.50
X, 14 x 31.....	14.50	15.80
XX, 14 x 31.....	16.50	17.50

	Per box of 56 sheets.
X, 14 x 56.....	16.50
XX, 14 x 56.....	18.20
X, 14 x 60.....	17.65
XX, 14 x 60.....	20.00

Sheet Iron—

Black.

Nos.	Common American	Refined.
10 to 16.....	℔ ▷ 2 7-10¢	3 2-10¢
17 to 20.....	℔ ▷ 2 8-10¢	3 4-10¢
21 to 24.....	℔ ▷ 2 9-10¢	3¼¢
25 and 26.....	℔ ▷ 3¢	3 6-10¢
27.....	℔ ▷ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ ▷ A, 10¼¢; B, 9½¢

dis. 5%

Craig Polished Sheet Steel.....℔ ▷ 8¼¢

Galvanized.

List on following page.
Juniata or first quality.....dls. 70&2½%

Copper—

Ingot.

Lake.....13¢ @ 13¼¢
Casting Brands.....12¢ @ 12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ ▷ additional.

Brazed Brass Tubing.
(No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 ▷.

Above 5-16 inch to 3 inch inclu...	35¢
Plain, above 3 inch.....	45¢
Plain, 5-16 inch.....	45¢
Plain, ¼ inch.....	60¢
Plain, 3-16 inch.....	$1.00
Plain, ⅛ inch.....	$1.50
Fancy Tubing, Brass, to No. 20 incl.....	43¢
Bronze Tubing, 3¢ ℔ ▷ more than Brass.	

35 @ 40%.

Roll and Sheet Brass.

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 ▷ casks.....6¼¢
Less than Casks, ℔ ▷.....6½¢

Lead—

Soft Pig Lead.....4¼¢
Bar.....4½@5¢
Pipe.....5½@, dis. 10¢
Block Tin Pipe.....30¢
Sheet.....6¢, dis. 10%

Solder—

½@½.....13¼@13⅞¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....13¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain.....	60&10%
1¼ and under, Galv.....	52½&10%
1½ and over, Plain.....	70&10%
1½ and over, Galv.....	60&10%

Boiler Tubes, list Oct. 24, 1892...65@67½%
Casing, list Nov. 16, 1892.....62½%
Inserted Joints Casing, list Nov. 16, 1892.....47½%
Steel Boiler Tubes.....27½%
Cold Drawn Seamless Steel Tubing...50%

Cast-Iron Soil Pipe—

Cast-Iron Soil Pipe, Tarred; sizes 2 to 6 inches, Inclusive.....dls 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted.....55%
Austin's Corrugated.....60%
Gordon & Gilbert's Corrugated.....55%
Ritchie's (Galv. Iron only) Cor'd.....55%
Ritchie's Spiral Lock Seam, Galv'd....60%
Austin's Spiral Ribbed Pipe.....55%
Plain Adjustable Elbows.....55%
James A. Miller Bros. (Galv'd Iron only) Corrugated.....55%

Furnace Fittings—

Discount from Excelsior Steel Furnace Co.'s list.....50%

Steel Roofing—

Perfection.....$3.75 square
Climax.....$3.50 square
The Lloyd Spanish Tiling.....$4.50 square

Metallic Shingles—

Cushman's.....$1.25 square
Merchant & Co.'s Spanish Tiles: Copper, 14 oz.....$6.00 square
Steel, painted.....$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzoline.....	7¼@8 ¢
Iron Paint, Bright Red.....	℔ ▷, 2 ¢
" " Brown.....	℔ ▷, 1½¢
" " Purple.....	℔ ▷, 2½¢
" " Ground in oil, B. Red..	℔ ▷, 6¼¢
" " Ground in oil, Red..	℔ ▷, 6½¢
" " Ground in oil, Brown	℔ ▷, 5½¢
" " Ground in oil, Purple	℔ ▷, 6 ¢
Linseed Oil, Boiled, in bbls.....	55¢
Linseed Oil, Raw, in bbls.....	50¢
Mineral Paints.....	2@4¢
Orange Mineral.....	10¼¢
Pure White Lead in Oil.....	6¾@7¼¢
Dry White Lead in bbls.....	6½@6¾¢
Red Lead, American.....	6@7½¢
Red Venetian, English, dry..	$1.65@$1.70
Red Venetian in oil; asst'd cans, kegs.....	8½¢
	7½¢
Sipe's Japan Oil, in bbls, ℔ gal.....	.34
Spirits Turpentine, in bbls., ℔ gal..	35½¢
Asphaltum, Trinidad Refined, ℔ ton..	$15
Coal Tar, Felt, 1 Ply, ℔ 100 ▷.....	$1.65
Coal Tar, Felt, 2 Ply, ℔ roll 108 sq. feet.....	$1.50
Coal Tar, Felt, 3 Ply, ℔ roll of 108 sq. feet.....	$2.00
Roofing Pitch, ℔ bbl. of 300 ▷.....	$3.20

NEW YORK, MAY 5, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots..℔ ▷, $0.75
No 1 (guaranteed to be 98 % pure and over), in ton lots.....℔ ▷ .90
Lots less than 1 ton, 10¢ ℔ ▷ additional.

Antimony—

Cookson.....℔ ▷, 11¼¢
Hallett's.....℔ ▷, 10¾@11¢

Brass—

Planished.....net
Roll and Sheet.....35@40%

Brass and Copper Tubes Brazed Brass Tubing—

List May 20, 1880.

	Per ▷.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive....	$0.35
Plain, to No. 20, above 3 inch....	45
Plain, 5-16 inch to No. 20.....	45
Plain, ¼ inch.....	60
Plain, 3-16 inch.....	1.00
Plain, ⅛ inch.....	1.50
Fancy Tubing to No. 20, inclu...	43

35@40%

Copper and Bronze Tubing—

3¢ ℔ ▷ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¼ to 3½ inches inclusive....17¢ ℔ ▷
Over 3½ to 5 inches inclusive....18¢ ℔ ▷

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ ▷
Over 3½ to 5 inches inclusive....19¢ ℔ ▷

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $1.50 per doz.....40&10%

Conductors—

Corrugated. *Round or Square—*

Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—

Galvanized.....50

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

*Bottoms, Pits and Flats.....*15@25%

Ingot.

Lake.....12¢
Ansonia Grade Arizona.....11¼¢
Ansonia Grade Casting.....11¢
Planished......net
Sheet and Bolt......25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering,* in Current Hardware Prices.

Damper Clips Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

Lap or Slip Joint.....list, net

Elbows—

Plain Adjustable—

Tin.....					70%
Galvanized.....					70%
	4 in.	5	5½	6	7 inch,
$0.78	.87	.00	.09	1.20	per doz.. 20 %

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four-Piece.

4 in.	5	5½	6	7 inch,
$0.78	.87	.00	.09	1.20 per doz.. 20 %

Elbows and Shoes—

Flat Crimp.

Tin.....35%
Galvanized.....35%

Corrugated. Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—

Black.

Nos.	Common American.	R. G. Cleaned American.
10 to 16...	℔ ▷, 2¾@...	3¾¢
17 to 20	℔ ▷, 3 @...	3¾¢
21 to 24...	℔ ▷, 3¼@...	3¾¢
25 and 26	℔ ▷, 3¼@...	3¾¢
27.....	℔ ▷, 3¼@...	3¾¢
28.....	℔ ▷, 3¾@...	4¢

American B. B.....℔ ▷, 4¼@4½¢

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ ▷, 12@13¢
Patent Planished....℔ ▷, A, 10¢; B, 9½¢, 5%
Craig Polished Sheet Steel.....℔ ▷, 8¾¢

Galvanized.

Nos.	B. B.
10 to 16.....	℔ ▷, 4 2-10¢
17 to 22.....	℔ ▷, 4¾¢
23 to 24.....	℔ ▷, 4¾¢
25 to 26.....	℔ ▷, 5¢
27.....	℔ ▷, 5¼¢
28.....	℔ ▷, 5¾¢
29 and 30.....	℔ ▷, 6¾¢

Iron Joints—

Lee's.....33½ %

Lead—

American Pig.....4¾¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....13¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ ▷.

Pittsburgh Prices.

Lead Pipe in whole coils. ℔ ▷, .05¢, 10&5%
Sheet Lead in whole coils. ℔ ▷, .05½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing.....	10%
Fencing, Painted Sheets.....	20%
Netting, Painted Sheets.....	20%
Door Mats, Galvanized.....	25%
Window Guards, Paneled.....	15%
Tree Guards, Paneled.....	15%

Mitres Eave-Trough—See *Eave-Trough Mitres.*

Paints Oils &c.—

Lead, Ann. White, Dry or in oil:

Kegs, lots less than 500 ▷ ...	7 @ 7¼
Kegs, lots 500 ▷ to 5 tons ..	6¼ @ 6¾
Kegs, lots 5 tons to 12 tons...	6¾ @ 6¾
Kegs, lots 12 tons and over..	6¼ @ 6¾
Lead, White, in oil, 25 ▷ tin pails, add to keg price.	... @ ¼
Lead, White, in oil, 12½ ▷ tin pails, add to keg price.	... @ 1
Lead, Red, bbls. and ½ bbls...	6 @ 7
Lead, Red, kegs ...	6¼ @ 7¼
Ocher, American	½ @ 1½
Red, Venetian, American	℔ 100 ▷...1.00 @ 1.10

Linseed Oil:

City, raw, ℔ gal.	.. @ .50
City, boiled	.. @ .53
Western, raw	.. @ .50

Spirits Turpentine:

In regular bbls	.. @ .34½
In machine bbls	.. @ .35

Putty:

In barrels and ½ bbls	.01¾ @ .01¾
In tubs	.01¾ @ .01¾
In tin cans	.01¾ @ .02½
In bladders	.01¾ @ .02¼

Roofing Material, &c.:

Asphaltum, Trinidad Refined, ℔ ton	$30.00@$35.00
Asphaltum, Rock, ℔ ton	$14.00
Coal Tar Felt, 1 Ply, ℔ ▷	.2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl.	$2.24

Pipe, Drain 50%

Pipe and Fittings, Cast Iron Soil—

Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 Inches, Inclusive.....60@60&10%
Other sizes.....65@55&10%
Cast-Iron Fittings, Tarred, Sizes 2 to 6 inches .....60@60&10%
Other sizes.....65@55&10%

Pipe, Spiral—

Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

For discounts see Current Hardware Prices.

Rivets and Burrs—

For discounts see Current Hardware Prices.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, May 13, 1893.

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ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....312 The Cuyahoga

BRITISH AGENCY: The Ironmonger, 42 Cannon St., London, England.

The Annual Fire Bill.

It is somewhat startling to be told that the average yearly destruction of property by fire in the United States reaches the immense figure of $100,000,000. Still more so, when we stop to consider that this great sum is an absolute yearly loss incurred by the wealth of the nation, that it is so much property completely blotted out of existence. For although some $70,000,000 out of the total is paid through the insurance companies, every dollar of this amount comes, not out of the coffers of the companies or the pockets of the stockholders, but from the policy holders. Now, it is asserted by recognized authorities that the majority of these conflagrations, which are annually taking such a large slice out of the country's means, arise from *preventable causes*. Therefore, it seems a clear case where the proverbial "ounce of prevention" should be brought into active play. Americans are apt to plume themselves upon the excellence and efficiency of their city fire departments, which may here represent the "pound of cure," but little has been done toward the *prevention* of fires, which, after all, should be the first solicitude.

Fire Prevention.

This subject is treated with considerable ability by C. John Hexamer in a paper on "Causes of Fires," printed recently in the *Journal* of the Franklin Institute. Mr. Hexamer is strongly of opinion that the modern lavish use of glass and iron, which is so noticeable in the new store and business buildings of cities, has increased and will still further increase the terrible annual fire waste. The want of care in regard to the paraphernalia of heating, lighting, &c., and its relation to the accumulation of rubbish and the inflammable material stored in these tinder boxes, furnish food for reflection. Looking at the immense hazards run daily in nearly all such establishments it is only wonderful, says our authority, that we have not more fire losses. This, however, is but meager cause for congratulation. Something must be done to remove the main causes of fire. The remedies for the present state of things suggested in the paper above quoted as the only efficacious ones, and which should be adopted without delay, are: 1. A national bureau for ascertaining fire hazards. 2. Better building laws. 3. Inspection and reinspection by faithful, competent and well-paid men. 4. The co-operation of the press in instructing the public in the vital importance of this matter. 5. The supervision and inspection of mechanics erecting heating and lighting paraphernalia. 6. The appointment of a "fire coroner" in all cities, who must be an expert. It is time the public awoke to the importance of this question of fire prevention, of which it is even more ignorant than of matters of hygiene.

One Effect of the World's Fair.

That one effect of the great show at Chicago will be to stimulate trade in American manufactures is a foregone conclusion. This fact is recognized at its true value by at least one of our English trade contemporaries. The *Ironmonger*, in a late issue, contains an able editorial on the subject, in which it warns British hardware men and manufacturers in general that they will have to gird up their loins and strive mightily in order to neutralize the effect of the World's Fair on the minds—and orders—of their former customers abroad. The article roundly asserts that the outcome of the exhibition will be a very marked impetus to the sale of American goods in Great Britain and the European countries, as well as in the British colonies, South America, the West Indies, Japan, and other markets where English manufactures have hitherto held sway. Our contemporary strikes the right note when it says: "The World's Fair will attract an enormous number of visitors from all parts of the earth. These visitors will go with very open minds, for the most part, and it is not unreasonable to assume that they will go somewhat predisposed in favor of that American inventiveness and 'push' of which they have all heard so much. They will be readily impressed, therefore, by all they see, and, as the Americans are doing their 'level best' to make the show the very biggest thing of its kind, all the odds favor the inference that the visitors will return home with many 'Yankee' notions in their minds and a general disposition to be much more receptive than heretofore in relation to American products of all kinds. This frame of mind will naturally highly favor the export efforts of our American cousins, and we may rely upon them to make the utmost of their opportunities both at the exhibition and subsequently."

An Education for Foreign Competitors.

The manufacturers of the United Kingdom are accordingly counseled in the article above quoted to make the most of the opportunities of instruction and the "wrinkles" which can be gained there, by visiting the fair themselves and making good use of the knowledge which, with open eyes and receptive minds, they cannot fail to pick up. They can turn this to good account in the improvement of their own productions, bringing them up to the standard of American goods where through conservatism or lethargy they have fallen in the rear. If this timely advice is acted upon the fair may be made to serve a double end. While primarily, doubtless, benefiting the home manufacturers, it should impel our British cousins to shake off the trammels of old traditions in business and imbibe new notions—"Yankee" or otherwise—which they will doubtless turn to good account. The world's trade should offer a field wide enough for both nations to work in for many years to come without any necessity for skinflint competition or embittered rivalry. We learn that numbers of English hardwaremen and manufacturers are likely to take a run over to Chicago, and the journal above quoted remarks: "No man, unless he is an absolute fool, can visit the United States and return without being wiser in some respect for what he has seen, and the really smart man ought to be able to pick up a sufficient number of wrinkles to much more than compensate him for his outlay and loss of time." We believe that a visit to the fair will be an education to a British—or any other—manufacturer, of which he should have no hesitation in availing himself, if he has any desire to keep or extend his business.

No Time to Advance Wages.

The agitation for higher wages and shorter hours of labor is a curious feature of the existing situation. Labor leaders seem to have no comprehension of the crisis through which the country is passing, but press their schemes as though every industry was enjoying the hight of prosperity. The disturbances in the financial world are wholly ignored, and a deaf ear is turned to all statements of a decreasing volume of business and bad collections on standing accounts. Merchants have been complaining for several months of the slowness with which their customers have met bills, but they looked forward to the opening of spring, when relief was expected from the enlarged movement of farm products. That relief has not come, but on the contrary further discouragement intervenes in the backwardness of the season. Failure after failure has shaken confidence among capitalists, and purse strings are being tightened, which must result in more failures unless a change speedily takes place. Prices of all kinds of manufactured goods feel the effect of the financial pressure, and it looks as though the few articles now steadily held at a good price must come down with the rest. Yet, despite these untoward events, labor demands increased compensation, heedless of the fact that costs would thus be enhanced and reckless of ensuing consequences.

Resources of Employers.

Every workingman knows, if he has the least glimmering of common sense, that the establishment which employs him has a much better chance for continuing in steady operation if its cost of production is lower than that of competing concerns. The concession of higher wages under pressure is often a sign of weakness, and the workmen employed in such an establishment should not congratulate one another too heartily. When the pressure for business is sharp and lower prices on goods must be made to secure trade it is only a question of time until the concerns struggling with highest costs will drop out of the contest. Employers of labor have no mysterious source from which they can obtain an illimitable supply of money to carry on their business. When a man becomes an employer of other men he does not change his condition and cease to be a man, but he borrows in the same way as other men who are not employers, and must pay his debts in the same way or he will speedily wind up his career as an employer. Labor leaders, however, act as if employers were a different order of human beings, with unlimited financial resources, making huge profits in some inexplicable fashion, but always reluctant to divide fairly with those who work for them.

Labor at Chicago.

The very high wages obtaining at Chicago are being used as a lever in other localities. That city, however, is at present in an abnormal condition, owing to the magnitude of the preparations made for the World's Fair, not only inside the exposition grounds, but outside of them. Building materials and labor in the building trades have been at a premium for some time. The high wages thus paid, under the force of circumstances, have made workingmen restive in other lines. Even the waiters in hotels and restaurants have caught the infection, and demand compensation equal to that usually paid to the most skilled mechanics. This is only a temporary matter, however, and in another month the rush will be over. There will then be a surplus of labor, and the hard and fast rules of the unions, to which the members are inclined to give the credit of their high earnings, will have to be ignored in the search for employment. Chicago will surely take an early tumble from its present proud position as the workingman's paradise. The dispersion of the crowds of skilled workmen, by the completion of the fair, may then affect other localities in precisely the opposite manner. It is unfortunate for the workingman, but perhaps inevitable. In view of the troublesome times ahead, labor leaders should act conservatively and restrain their hot-headed followers rather than seek to further inflame them.

Small Power for Small Shops.

The need of power in small shops on special occasions has been too keenly felt to require comment, but the ordinary power plant presents many objections and entails expenses that are unwarranted by the work to be done. With the advent of electric lighting in so many cities and larger towns, the electric motor may prove to many an acceptable solution of the problem. It requires no licensed engineer or fuel, makes no dirt and is always ready, while its management or control is simple and confined to the lever which completes the electric circuit and the switch lever which graduates the current to the work. The cost of the electric plant compares favorably, power for power, with that of plants previously available for small work. When installed for intermittent use, a contract, varying in price with the locality, can, we are told, be made with the local electric company to supply a small power for one-tenth to one-fifth of the cost of steam. Some of the plumbing, metal spinning and machine shops of New York have already adopted the electric motor, and as much of the machinery of the tin shop can be advantageously run by power, it is more than likely that electricity will find increasing favor in that field.

Cleanliness in Shops.

We believe that, all other things being equal, more work is done and larger profits are made in clean shops than where uncleanliness and confusion are allowed to prevail. In a well-ordered shop there is no overhauling of materials to find a particular kind or quality; the hand can be immediately placed upon the thing needed. This saves much more time than is required to put everything in its proper place when it is done with. It also saves loss of the articles themselves. In a well-ordered shop there are no heaps of refuse into which small tools and other small but useful articles, as screws, nuts, nails, pins, rivets, &c., are liable to be dropped and carried out with scrap. In a well-ordered shop everything has its particular place, either on the bench when in use or in some appropriate rack, room or closet, and when wanted for use it will be found in that particular place and nowhere else. In a well-ordered shop the influence of the place itself exerts a beneficial effect upon the men. An example of this is given in the *American Engineer and Railroad Journal*. A visitor to some railway shops found attached to each of them a conservatory, in which were quantities of flowers in bloom, and he observed that some of the men had stuck blossoms in the oil holes of their lathes. The master mechanics of both these shops maintained that an actual saving resulted to the company from the maintenance of these greenhouses, through the cultivation of a spirit of neatness in the men. While perhaps we should be inclined to regard the cultivation of flowers in a shop as rather going to an extreme length, the result of systematic order and tidiness never yet failed to appeal to the best part of human nature, and there is a vast deal of human nature in those who work in shops.

Paris is now supplied with pure water from six springs eighty miles distant, through three large reservoirs, one of which serves as a filter, so that the city is no longer dependent on the foul water of the Seine.

Blessed Be Common Sense.

The simple and effective way in which a mechanical problem, which has proved too tough a nut for ingenious theorists and inventors to crack, is sometimes "accidentally" solved by some one possessed of far less scientific and technical knowledge, but blessed with what, after all, is the greatest of endowments—common sense—is illustrated by an incident related in connection with the discovery of rolling tin foil for tobacconists' use. Some years ago a tobacco manufacturer discovered the superiority of tin foil over paper for wrapping chewing tobacco. There were drawbacks to its adoption, however, in its cost and the fact that it could only be rolled to a certain thinness, beyond which it seemed impossible to go. No rollers could be made to sustain the pressure necessary to render the leaf sufficiently thin to suit the manufacturer. Inventors innumerable struggled with the problem for months and finally gave it up as unsolvable. An ordinary workman about the shop, one day after rolling a couple of sheets to the accustomed thinness, bethought him of putting the two sheets through the rollers again together, and lo! they came out as thin as one; and so the question was solved. It was as simple as is Columbus' egg puzzle and many similar conundrums, after one has seen how it is done. One is inclined to say, "Any fool ought to have known that!" But the fact remains that a large number of thoughtful men had spent brains, time and money over the attempted solution of so simple a problem, and in the end the gordian knot was cut by the "happy thought" of a man who merely exercised his common sense. Instances might be multiplied in which great and epoch-making discoveries were the result of a mere logical following up of an incident, observed accidentally by some one who was happy enough to possess common sense. James Watt and the tea kettle: Isaac Newton and the falling apple; Galileo and the swinging lamp at Pisa, are cases in point which will recur to every one. Through these "accidents" the observers were started on the paths which led to the great discoveries of the law of gravitation and the use of steam and the pendulum, with which their names are inseparably connected. Had either one of them been but a dreamy theorist, we venture to say that the discovery would not have been made by him. But each possessed the inestimable gift of common sense, which, allied with great intellectual power, led to his scientific triumphs. So we say, "blessed be common sense," so called, for the true common sense which is always available and which gives a man correct judgment and ready resource, is by no means a very "common" attribute.

Japan's American trade is increasing, but she buys the larger part of her cotton goods in Europe, where the coarser grades are cheaper.

The Canadian canals this season will have a uniform rate of 10 cents per ton, thus removing all complaints of discrimination against American shippers who transfer cargoes at Ogdensburg, N. Y.

WORLD'S FAIR NOTES.

The claim steadily made by its promoters, that the Chicago Exposition would surpass its predecessors in every respect, has been strengthened by the enormous attendance on the opening day. There were nearly 400,000 visitors present, not counting employees, exhibitors and their attendants and others connected with concessions, &c., whose numbers ran well up into the thousands. It was the greatest day thus far in the history of international expositions. Encouragement has thus been given to the somewhat extravagant expectations which have been indulged in by the people of Chicago who are most directly interested in the success of the fair. The attendance on the following day fell to 14,000 paid admissions, and perhaps doubled this number for the remainder of the week, but that was expected in view of the incomplete condition of the exhibits and the disagreeable weather. Chilly blasts have swept down from the north, and heavy rains have fallen, making a visit to the grounds extremely unpleasant. In some respects such weather has been more welcome than days of balmy sunshine. Attention has thus been diverted from the tardiness of exhibitors, who have meanwhile busily pushed the work of installation. From a general survey this work has made slow progress, and is still far from being complete. Going more closely into details, however, one finds a vast multitude of exhibits in perfect order and ready for the most critical inspection. But their unkempt neighbors detract from their appearance, and until all booths are finished, all exhibits installed and all rubbish is cleared away the visitor will overlook that which is pretty and think of that which is unsightly. The exhibitors are not alone to blame for this tardiness in completing installations. The transportation department on the grounds must take a large part of the censure. A great deal of material has been in the grounds on cars for days, and the utmost exertions of exhibitors have been unavailing to secure the delivery of such cars at the points where they are to be unloaded. The writer has met a number of these, whose experience has been most exasperating. They have lost days of valuable time, merely waiting for the shifting of a car for the space of three or four blocks, and meanwhile hear themselves denounced as a class for hindering the completion of exhibits. In due time these matters will all be straightened out, but it does take time and more of it than had been anticipated. The Director General has ordered that no more exhibits will be received after the 12th, so that at least the end of shipment to the fair is in sight, and the work of installing cannot extend much beyond that.

The W. Dewees Wood Company.

Among the completed exhibits in the Mines and Mining Building is that of the W. Dewees Wood Company of Pittsburgh, manufacturers of patent planished sheet iron. Their exhibit is very striking and most appropriate. It is composed wholly of patent planished sheet iron. In the first place, the inclosure is surrounded by a tubular railing with square posts, very ingeniously constructed of sheet iron. The posts have ornamental caps, surmounted by a nickeled knob. The bars of the railing are made with a lock seam, placed on the under side so as to be invisible. The chief feature of the exhibit is a large column with a square base, on which stand four pillars, one on each corner, with a heavy fluted pillar in the center, supporting a roof, which recedes by gradual rises to a pedestal. Here is placed a large gilt representation of the company's trade-mark—an eagle with outstretched wings triumphant over a prostrate bear. In another part of the inclosure is a rack filled with sheet iron oven doors, stamped in pretty patterns. Stove pipe, stove cylinders, elbows and specimens of plain sheet iron are tastefully arranged near by. A sheet-iron table, of the parlor center table type, is a very interesting specimen of the ingenuity and skill of those who designed this most interesting display.

The Mines Building in General.

While great progress has been made in the installation of exhibits in the Mines Building during the week, much still remains to be done. The official catalogue has been issued, but it is by no means complete or accurate. Reassignments of space have been made within a few days in consequence of some exhibitors having failed to make their appearance. Several foreign countries have just begun the erection of their pavilions. This is very disheartening to Chief Skiff, but he has been unable to control everything. The visitor to the building finds on all sides exhibits covered with muslin, behind which workmen are busily engaged putting affairs in order. Enough is visible, however, to confirm the opinion heretofore expressed that the display in this department when complete will be superb.

The Charge for Power.

The assertion has been made in some of the daily papers that exhibitors in Machinery Hall are complaining because they are obliged to pay for power when they run their machinery continuously. It is rather singular that such complaints should be made now. This whole matter was settled a long time since, and intending exhibitors were advised of the fact that a charge would be made of $60 per horse-power for the whole term. In an interview on the subject last week, Chief Robinson said:

"The question of charging for motive power has been thoroughly canvassed and the basis of rates was established three or four months ago. There was no special committee appointed, but the matter was discussed by the Director-General, Mr. Burnham, Mr. Sargent and myself, and the amount to be charged was then referred to the commission several times for ratification. The result was that the limitation of power was embodied in rule 1 in the classification and rules of the department of machinery, which is as follows:

Exhibitors will not be charged for space; a limited amount of power will be supplied gratuitously. This amount will be settled definitely at the time space is alloted. Power in excess of that alloted gratuitously will be furnished by the exposition at a fixed price. Demands for excess must be made before the allotment of space

"Now this is plain as can be and there is no possibility for a kick. The interpretation of 'a limited amount of power' is the amount of power necessary to turn a machine over to show its workings. The maximum amount under this construction is the amount necessary to turn the heaviest machine. The power is to be furnished at the discretion of the chief to prevent overstraining the shafting. If the exhibitors wish to run their machines continuously they must pay for the extra power used pro rata. If they only need a half horse-power it will cost them $30 for the season. There is no other alternative. This department is not run on a philanthropic basis, but is business, and we expect to make $40,000 or $50,000 out of power furnished. We furnish light and power free to the grounds and big buildings, but the State buildings, individual exhibits and concessionaires must pay for light and power or they will not get it. The exhibits will stay in their places and they will not be covered up, either."

The Question of Sunday Closing.

Although Congress imposed upon the fair authorities the condition that the exposition should be closed on Sunday, the matter is not regarded as absolutely settled, but seems even yet a debatable question. Local influences are being exerted very strongly in favor of ignoring the action of Congress and braving the consequences. At a meeting of the National Commission last week this topic was discussed, and Commissioner Massey said:

"The whole matter, in my opinion, has passed beyond the power of this commission to deal with. The commission had a duty to perform which it has discharged according to the mandates of the statute. I deny that the commission can hereafter lawfully make an order modifying the rule of Sunday closing. When Congress specified the conditions of the $2,500,000 gift and declared that the exposition should be closed on Sunday, it commanded us to pass a rule; and when it made it mandatory on this commission to make a rule closing the gates on Sunday, it limited the powers of the commission in this matter and we are powerless. We can't touch the matter until Congress says so, or until a court of proper jurisdiction shall declare the act of Congress inoperative. The commission is bound hide, hand and foot, and its powers in this regard are absolutely ended. No matter where or how or when the question originates, the commission is powerless to make a rule permitting the opening of the exposition gates on Sunday."

Commissioner St. Clair, who is a pronounced advocate of Sunday opening, and believes that a way will be found at an early day by which an open fair can be secured, made the following declaration:

"When the act of Congress appropriating $2,500,000 to the fair was passed, it had in it the condition that a rule should be made providing that the gates be closed on Sunday, and that if the money were accepted the commission should make this rule. Subsequent to the passage of that act there was in the sundry civil bill the provision that more than $500,000 of the $2,500,000 should be withdrawn and turned over for the payment of awards. Congress therefore broke the Sunday-closing condition, as it took from the directory more than $500,000.

"When the time comes—if it ever does come—for the question to be passed upon, I shall undertake to show that the exposition company stand to-day as they stood under the original exposition act, and that the commission has the power to pass on the question regardless of the act of Congress, as the conditions upon which the mandate was issued has been removed and the mandate is therefore inoperative.

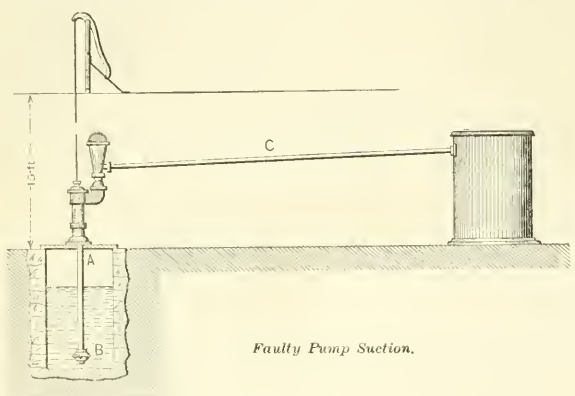
"Under the existing rule of Sunday closing, I am frank to say, the directory hasn't any power to open the gates unless a majority of this commission assent to it, and there is no danger of any attempt being made. If it is made I will exert my efforts, in the courts if necessary, to enforce the present rule."

The commission sustained the position taken by these gentlemen, but it remains to be seen what will be done by the local directory, on whose shoulders the actual burden rests of practically conducting the affairs of the exposition. The impression prevails that in June, if not earlier, the gates will be thrown open, not to be closed on any day until the term of the exposition is ended. It is somewhat significant that the term passes which have been issued contain a coupon for every day in the week, including Sundays, for the entire period.

THE LETTER BOX.

Faulty Pump Suction.

From J. T., *Brooklyn, N. Y.*—In my judgment if "L. R.," Warren, Pa., whose letter about faulty pump suction appeared in *The Metal Worker* of April 1, would place a foot valve on suction, as shown at B in the accompanying sketch, I think his difficulty will disappear, for this reason: The valve will keep in the pipe all the water used by each stroke, and when not in use the suction will always remain full and obviate the necessity of drawing the air out of the long run of pipe each time it is used, and it will also keep the leather valve moist and expanded. That is the difficulty with leather valves; if they are not kept submerged all the time they will soon contract and will be useless for handling air. If "L. R." finds that the foot valve will not give satisfaction he will have to locate his pump as I show in the sketch.



Faulty Pump Suction.

A Variety of Legal Questions.

From E. K. W., *Cleveland, Ohio.*—Please give me information on the following questions through *The Metal Worker*:

If A and wife give a mortgage to C, and A and his wife have a son who is not of age, can C hold this son for it when he becomes of age?

Is there a law to prevent one from marking an article patented if it is not patented, and what is the penalty for so doing?

I see articles marked "patent applied for." Does this mean that application was made for a patent, which was not granted, or has the owner a caveat on it?

What can be done with a person who makes and sells a patented article, the patent of which belongs to another?

Answer.—1. "If A and wife give a mortgage to C, and A and his wife have a son who is not of age, can C hold his son for it when he becomes of age?"

A mortgage is not an instrument of debt in itself. It is given to secure the debt, which is usually evidenced by a bond under seal or by a note. The bond is the most usual obligation given. The mortgage is simply collateral. It is a pledge of the real estate or other property mortgaged and binds all the property covered by its terms. It holds the property, but by itself does not hold any person liable. That object is effected by the bond or note. And the only person liable for the debt personally is the person who signs the bond. No one else is liable. Thus it frequently happens that while both husband and wife always sign the mortgage, the wife to convey her dower right, she does not sign the bond. She cannot in that case be sued for the debt. In this instance the son is not responsible for this debt and it is immaterial whether he was of age or under age when the bond or note and mortgage were executed as long as he does not sign the bond or note. Of course the mortgage remains valid, and if the debt is not paid it can be foreclosed and the property sold. If A and his wife should die and the son become the heir, he only takes the property subject to the mortgage, and it might be taken away from him by foreclosure. In short, the answer to the question is that while the property can be held under the mortgage the son individually cannot.

2. "Is there a law to prevent one from marking an article patented if it is not petented, and what is the penalty for so doing?"

There is such a law. Section 4901 of the Revised Statutes of the United States provides that any person who marks the words "patent," "patentee" or "letters patent," or any words of like import, on articles made or sold by him where no patent has been obtained, is guilty of a crime, and is liable for every offense to a fine of $100 and costs. This may be collected in a suit brought by any person whomsoever, and such person suing is entitled to half the fine. The other half goes to the United States. The action must be brought in the United States District Court. The act also provides that where the name or device used by a person who has obtained a patent is used by a person not having obtained a patent, without the consent of the person entitled to the use of the name or device, the person so infringing is guilty of the same offense and liable to the same penalty. Section 4919 provides that in case of such infringement the court may award damages to the owner of the patent who brings the suit to the extent of three times the amount of the verdict found by the jury. It should be understood that each article thus wrongfully marked constitutes a separate offense and entails a separate full penalty.

3. "I see articles marked 'patent applied for.' Does this mean that application was made for a patent which was not granted or has the owner a caveat on it?"

As soon as an application is made by an inventor for letters patent he is entitled to mark his article "patent applied for." If he continued the use of these words after his application was finally rejected he would certainly be guilty of a moral offense, as it would be a clear case of attempted deception, but there seems to be no criminal penalty for such an act provided by the statute. Where these words are seen it usually means that the proprietor or inventor has made application for a patent, and that the application is still pending in the Patent Office and has not been finally acted upon. The filing of the application gives priority to the person filing it, and the words are used so as to warn others of the claim the inventor makes to the exclusive use of the article, which claim may be good even though the application has not yet been granted, and although the formal letters patent have not been issued. A "caveat" is a secret document filed in the Patent Office, not entered on the public records and not accessible to the public, by an inventor who has not perfected his invention and is not ready to make the formal application, but who desires to obtain priority and to protect himself against competitors or against those who might discover or attempt to steal his invention. The words "patent applied for" are not likely to be used in cases where a caveat has been filed, for the reason that the inventor has not completed his invention so far as to put manufactured articles on the market.

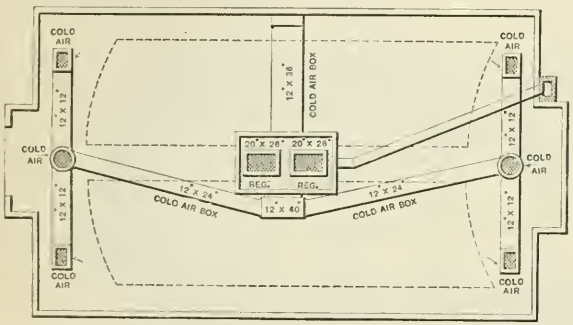
4. "What can be done with a person who makes and sells a patented article the patent of which belongs to another?"

The remedy is an action for an injunction to restrain the offender from continuing to manufacture or sell any of the articles and for damages already incurred. Both these forms of relief can be obtained in one action, which must be brought in the United States Circuit Court in the district where the defendant resides. The

Court usually grants a preliminary injunction if the patent is good on its face, but the owner of the patent must give bonds that in case he is defeated he will pay all damages caused by the injunction. The damages awarded must be proved, and it is very difficult usually to ascertain what the real damage is. The measure of damages is the amount of profits which the owner of the patent would have been enabled to make if his patent had not been infringed. There is no penal or criminal remedy against an infringer.

Warming a Church.

From E. E. DUNNING, *Milwaukee, Wis.*—I was somewhat interested in the letter and plan from "W. D." of Oxford, N. S., on page 40 of *The Metal Worker* of April 15, in relation to a furnace that had been set up in a church, which did not work satisfactorily, and how to remedy the difficulty, also the answer, and as I am sure that there is a much better way to



Warming a Church.—Registers Directly Over Furnace.

arrange this furnace for heating the building, I will give you my ideas of the matter. In the first place, it is necessary that the furnace should have a good draft, as no furnace can work without a good chimney. If the chimney is large enough and not too large (about 8 x 16 is best for this size of wood furnace), and of the same size from top to bottom, without any openings, and up as high as the highest point of the building, there will be no trouble with the draft, although a chimney on the inside of the building is better than one on the outside, for if it is on the outside it is subject to more cold and will take longer to warm up. Taking it for granted that the chimney is all right, I should remove the tin hot-air pipes from the building and place in the center aisle directly over the furnace, as shown in plan, two 20 x 26 warm-air registers and borders, with an opening of the same size, made of brick, from the hot-air chamber up to the registers. I would then use the two warm-air registers in each end of the building for cold air, in connection with the present cold-air registers, by running a 12 x 12 box from each of these two registers into one box directly under the present cold air registers and a 12 x 24 box along the ceiling from this point to the side of the furnace, making such a box from both ends of the building, and connect it in one 12 x 40 box, and run down to the cold-air chamber under the furnace.

In building a box of this kind it is necessary, in order to work successfully, that it be as near air tight as possible, and should be built of dry matched fencing, double, with building paper between. There should be a damper in that portion of the box near the furnace, which damper should be as near air tight as possible when closed. Then build a cold-air box from the out ide, 12 x 36, constructed double, the same as circulating box, and with a tight fitting damper near the outside opening, so that no air can come in from the outside when the air is being drawn from the church and *vice versa*, as it is necessary that one of these dampers shall be closed when the other is open.

This method is not only much more effectual than the one recommended by your answer, but has another qualification of being cheaper. As far as heating the church is concerned, this method I consider equal to any other, although, as far as perfect ventilation is concerned, better results would be obtained by building a new chimney about 4 feet square area inside, for the cold air, with a tile flue in the center for smoke, discharging the impure air into this ventilating flue. But as I am recommending a cure for a furnace instead of setting one in new, I have simply explained what best to do under the circumstances.

Galvanizing Corrugated Iron.

From W. J., *Bay City, Mich.*—I wish to galvanize pieces of common black sheet iron, corrugated, about 15 inches by 30 inches in size and of about No. 26 gauge, which are made up in the shape of shelves. How much tin must I use with the zinc for the coating? What kind of acid is best to remove the scale and what kind of material is best to make tanks of to hold the acid for pickling? I also would like to get some idea of the crucibles or furnace used for melting the spelter.

Crack in Water Back.

From E. E., *Portland, Conn.*—I am at a loss to understand why a water back in a range cracked under the following circumstances. About a month ago the water was shut off the main in street to allow of some repairs being made. After they turned the water on again I went to the house to see if the pipes were all right. I am certain the stops were all open and every pipe and the range boiler were all full of water. We have about 100 pounds water pressure. About an hour later we were notified that water was pouring out of stove and flooding the house. Upon examination I found that the water back had a bad crack and had to be replaced by a new one. What could have caused this? I am sure that it was fully an hour after the water was turned on that the water back showed a leak and it was not caused by the sudden force of water when it was turned on from the main. I would like your opinion on this matter.

Answer.—It is rather a difficult matter from the information furnished us to correctly state why the water back cracked. Numerous causes could be suggested which would tend to such a result under the circumstances, but which is the correct one we could not positively aver. It is possible that the damage to the water back was caused by a too sudden turning on of the water before our correspondent arrived at the house, although the full extent of the damage done did not become apparent until some time afterward, when the fire in the range was started. Or if the fire had not been out at all during the time that the water was shut off, then when turned on again a sudden influx of water would be sufficient to cause the water back to crack under.

Dismissing the foregoing as the real cause and assuming that the water back was sound until after our correspondent left the house, after his first call, it is possible that there may have been some obstructions in the circulation pipes between the boiler and water back, or this may have been present in the water back itself; conditions of which our correspondent may not have been aware of at the time. Assuming that this defect in the circulation allowed the water back to become too hot, then when the colder water was finally forced into it again, by the heavy pressure from the main, the back may have contracted so suddenly as to cause it to crack. We have given the foregoing causes among which possibly is the one to which the cracking of the water back was due.

Cleaning Solder.

From C. W. B., *Fresno, Cal.*—In answer to the question of "A. J. T.," in *The Metal Worker* of April 22, on how to clean wiping solder which has become foul, would say that I have used common salt, in the same manner as described in the sulphur treatment, and think it gives as good or better results. At the same time it does not remind one so forcibly of the place prepared for refractory plumbers. Why use galvanized iron? Why not use brass or black iron nipples, supposing the work to be the connecting of lead and iron pipes?

Sliding Damper.

From L. H. S., *Albion, Pa.*—In reply to "J. C. F." Williamsburgh, Ohio, who wishes to obtain a sliding damper, I would suggest that he take a hack saw and slot about one-third the diameter of the pipe, and slide in the slot a piece of sheet iron. This will serve as a good sliding damper.

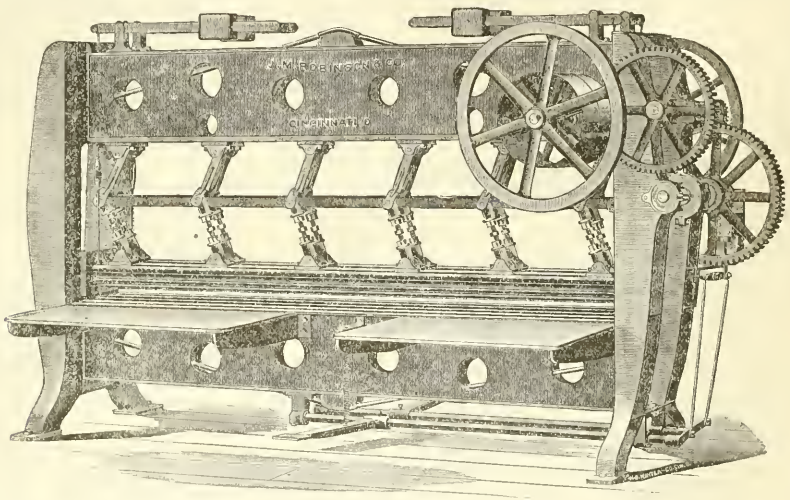
The late Kansas Legislature may be accepted as a fair representative of the Western opponents of alleged "gold bugs." During the closing days of the session that body passed two bills, which received executive approval. The first of them, both being now the law of Kansas, prohibits any lender of money to a person in that State to contract or exact a condition that his loan shall be paid in gold; the second of them provides that any person whose property may be sold under foreclosure of mortgage shall have 18 months in which to redeem it; he during that time to remain in undisputed possession.

The emigrants landing in New York, Boston and Philadelphia excite the envy of Brazil and Argentine, which entice them by offers of liberal premiums. The Southern States, too, hold out strong inducements, especially in sections where the negroes are going to Mexico.

Mexican railroad companies report heavy losses from the depreciation of silver. The Government treasury suffers in like manner.

Sheet-Metal Forming Machine.

The illustration represents a machine manufactured by J. M. Robinson & Co., Cincinnati, Ohio, to meet the demands for forming heavy sheet metal into various shapes required by the trade. It will be observed that the machine is supplied with two sets of gearing, or compound gearing. This is only the case when it is required to form extra heavy sheet metal, such as No. 12 and 14 gauge, into plain figures. With single gear the machine is capable of forming No. 16 gauge and lighter of 12-foot lengths and less. The manufacturers say that under severe test in formiog heavy sheet metal there is no observable spring or giving away. As a single-geared machine, it will work 12-foot sheets of No. 16 gauge, mild steel or iron, and will with suitable dies form V-crimps, corrugations of all sizes in general use, beaded sheets for ceilings, escalloped steel sheets, sheet steel window casing and window sills, clapboards, metal combing caps, fancy or plain, O. G. hanging gutter or eaves trough, half round gutters, metal lathing, inches. Weights are secured to bars with set screws, and are adjustable. The weight bars are fulcrumed to standards secured to the cross beam. To the short end of weight bars rods are secured, the lower ends of which are fastened to the movable slides, thus forming a ballast for the steady moving of the slides. All dies suitable for forming the various figures or forms mentioned are interchangeable and can be worked in the machine. Grooves are provided in the bed and slides for the dies to slip into, and when secured are in line for work.



Sheet-Metal Forming Machine.

Double-Acting Safety Valve.

A. B. Fisher, 385 and 387 Kent avenue, Brooklyn, N. Y., is offering a double acting safety valve, as shown in Figs. 1 and 2. In Fig. 1 is seen the valve as sent out by the maker ready to be attached. Fig. 2 is a sectional view, showing the interior mechanism. The valve is designed as a preventive of explosion or collapse and intended for use in connection with coffee boilers, tea urns or any vessel in which

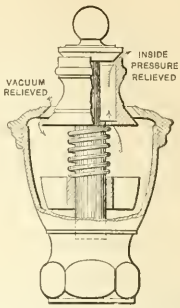


Fig. 2.—Section of Safety Valve, Showing Method of Relieving Inside or Outside Pressure.

sight yields and allows sufficient air to enter to maintain an equilibrium. In the event of abnormal steam pressure, the concealed spring permits of the escape of superfluous steam. This valve may be fitted with an alarm whistle if so ordered.

Double-Acting Safety Valve.—Fig. 1.—Valve Ready for Use.

Fig. 2, the other being inside the tube around which the spring shown is coiled. In case of a vacuum the large spring in

cattle troughs, skylight bars, and other forms for which dies can be used. The weight of the machine is about 22,000 pounds, and of cross beams, 2800 pounds each. These are supported with a cast-iron arch, cast to and as a part of the interior and braced with a heavy hog chain running from one end of the beam to the other, thus securing solidity, which is the main feature in producing good work. The slides to which the traveling portion of the dies are attached are of extra depth and width and are supported by arches and moldings, thus preventing any spring while pressing the sheet metal into the molds. Power is transmitted through gearing on to a shaft, to which are secured cams by which motion is communicated to the horizontal bar. Each toggle is linked to this bar at the knee, the lower end to the movable slides and the upper or stationary end to the top cross beam; thus a movement of the horizontal bar causes the toggles to straighten to a perpendicular and bring a downward pressure on the slides. When the motion of the slides comes to a stop by the action of a clutch movement, it can be continued by the operator with foot pressure on treadle. The stroke of the slides is from 3 to 4

water is confined and heated to a high temperature. There are two sets of springs, only one of which is shown in

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High prices for pork at the present time, such as have been rarely equaled in the last 20 years, do not result from any scarcity of corn fodder, but rather from the relative increase of pork consumers. It is shown by an array of figures that during the last eight years the number of pork eaters has increased fully 11,000,000, without any increase whatever in the number of those engaged in raising the commercial supply of swine. The result is seen in diminished relative supplies, enhanced prices and a shrinking in the volume of exports

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Respecting monetary troubles in Australia, the London *Economist* remarks that the telegrams received are so obviously designed to disguise the gravity of the situation that they have only tended to excite distrust. A change in Australian bank practice in several respects is anticipated. The bulk of their deposits being for long terms, only a small proportion of their assets are immediately realizable.

FOUNDRY FACINGS.*

BY HOWARD EVANS.

The time that foundry facing was first invented and the foundry that used it first may be an important fact if we were discussing history. But, as the Foundrymen's Association is looking for information more particularly as to the using of it, we will start under the head of "The reason for its use, what is expected of it, and how it is made." That which is used most is known as bituminous or sea coal, which is mixed with sand, and makes what is known as facing sand.

The object gained by this procedure is to keep the mold from bursting. The hot metal burns out the facing and turns it into a gas, which allows the heated air to penetrate the sand and pass off, leaving the mold in its original shape. This gives form to the casting.

It will be noticed that the escaping gas, after being fired by a torch, burns with a blue flame in the atmosphere, because of the oxygen of the air coming in contact with it and forming a gas somewhat similar to our illuminating gas, which is known as C_2H_4, or four parts of hydrogen and four parts of carbon.

This bituminous or sea coal facing is made from soft coal, such as is used for making gas in our cities and towns. The larger the percentage of bitumen and the smaller the amount of dirt which it contains being important factors, therefore the purer it is the less it takes to perform the object to be gained. In large castings weighing 1 ton or over, made in green sand, it can be used to advantage if ground a little finer than mustard seed, as the escaping air must pass off quickly. In lighter work, such as small pulleys, bench work, &c., this facing should be ground very fine, so the air will escape very gradually and evenly.

As far as the quality of this kind of facing is concerned, there is not so much difference in it, as made in the various mills, as there is in what is known as fine facings. Therefore, bituminous or sea coal facing is only used to mix with the sand. The purer and the larger percentage of bitumen it contains the less amount of it is required, and the better castings it will make.

Fine Facings.

This is where the miller's art excels—in making the proper fine facing. It is made from various refractory materials that will stand the extreme heat in the mold, keeping it from burning into the sand. My idea as to the working of this facing may be illustrated by the following: If one drops a little water on a red-hot stove, he will notice that a bubble is formed which slides off the heated surface. There is an atmosphere of steam between the bubble and the stove. There are various theories expressed regarding the matter, but I think it is a well-known fact that when fine facing is used on the inside of the mold and the heated iron or metal comes in contact with it, there exists immediately an atmosphere between the facing on the mold and the metal which keeps the iron separate from the mold. When the sand is taken from it, it will be found that it has peeled off, leaving a clean surface.

All the best grades of these fine facings are made from plumbago, that which is known as East India plumbago being the best. There is, probably, more of it sold where fine castings of clean surface are required than of any other brand. Other qualities of facings are made from various mixtures, some using soapstone, anthracite coal, carbon, coke, charcoal, fire clay, asbestos, minerals, &c., every mill grinding facing having its own mixture, which is supposed to be a secret. Under ordinary circumstances the finer and more regularly it is pulverized the better, the best grades being bolted through a very fine silk cloth, running about 200 meshes to the inch. In fact, the intention is to make it as nearly an impalpable powder as possible. These facings are placed upon the mold with a bag, slicked with a tool, a camel's hair brush or the hand, and the mold blown off with a bellows, so that there will be none left loose for the iron in passing over the mold to pick up and deposit in some part of the cope, where it might make an imperfect casting. Where it is necessary to return the pattern to make what is known as print work, like stove castings, &c., it is found of advantage to dust on the mold, which has been previously covered with a heavy dust, charcoal or return facings, which prevents the heavy dust of a plumbagenous nature from sticking to the pattern, as the natural dampness of the sand has a tendency to make the heavy dust of a pasty, sticky nature. The charcoal absorbs the moisture and allows the pattern to be taken out of the sand, leaving it clean, and when the metal is poured and taken out of the sand it should have a beautiful, even dark gray or bluish color, making the stove an ornament to the house which it occupies. The making of stove-plate facing is considered an art, as the different shops vie with each other and try to make cleaner castings, of a better color, than their neighbors. The castings must be thin and of a large surface, some of them being only $\frac{1}{4}$ inch in thickness. From this fact it is not necessary to use bituminous or sea coal facing, as the amount of metal used can find vent without its aid.

Another facing, which is used for cast iron water and gas pipe, known as pipe blacking, is used probably more than any other of the fine facings; the large surface to be covered and the immense number of pipes made occasion the great demand. This facing is used as a wash, being mixed with clay water to the consistency of a cream and placed upon the mold. The better grades of this facing, or blacking, are made from superior qualities of coal from the anthracite district, which are selected on account of the large amount of fixed carbon which they contain. Unless it will analyze as high as 85 per cent. of fixed carbon, and less than 10 per cent. of ash, it is not supposed to work with economy or to make clean castings. Most of the large pipe foundries employ chemists to analyze samples from each carload, that they may be sure it is up to the standard before it is allowed to be placed in the foundry. This keeps the facing man continually at work making his selection of coal of a quality that will stand the test, and while coal coming from the same mine is supposed to stand the same analysis, there is nevertheless a considerable amount of difference in the different shipments that are made. The difficulty to contend with in making black wash for making pipe is the liability of it foaming, having an appearance as though it contained a percentage of oil, as it refuses to mix with the clay water. Sometimes a barrel or bag that might be taken from a carload will be found to work in this way, although the facing man has used his best endeavors to make it regular. It is a peculiar thing that the same facing will work differently in the various shops, although they may be using the same grades of molding sand. There are certain secrets in the foundry, and while two foundries may use different secrets in the foundry, and may use different material, they make good work, each having its favorite facing.

The greatest variety of fine facings are found in the foundries making machine castings and general work. Here we find facing with all kinds of names, which leads to confusion. If one will look over the facing catalogues sent out by the different mills, he will find no less than 100 different brands, each of which is to accomplish the same results. It is this that makes it confusing to the foundrymen, and the old saying, that "there is nothing in a name," holds true in fact. It is in these foundries that the greatest variety of work is made. Sometimes very hot iron is required, while at others a slow iron can be used. For that reason a facing that might work excellently well in the shop using slow iron might be inferior in the other using hot, as the hot iron is more searching, and burns through the facing and sand. This is a very important matter and must be taken into consideration. It is necessary, as a rule, to use hot iron, as it makes a clean, sharp corner, but foundrymen must bear in mind that a superior quality of both sand and facing should be selected to stand it.

Some years ago solid facings—that is those made from one material, such as lead, charcoal, anthracite, mineral, &c.—were used, but of late years, in order to keep pace with the times, it has been found necessary to make mixtures of different materials of a refractory nature, which are adapted to the various kinds of castings made, according to the size and shape. In other words, foundrymen cannot expect to use one facing to suit all classes of work. It is not an unusual thing to find a half-dozen different brands in shops making machine and jobbing work.

I visited a foundry a short time since where East India lead of a pure quality was being used. The foreman reported that he was obliged to turn it down, for the reason that it washed and made scalds on the castings. Upon investigation we found the molder worked upon the principle "if a little was good, more was better," and he actually had at least $\frac{1}{4}$-inch thickness of the facing on the cope side of the mold. When I called the foreman's attention to it he directed the molder to make another mold, using the same facing in smaller quantity, being sure to have it well slicked and blown off with a bellows. After the two castings were poured, the one having too much facing on was ruined, while the other was perfect. In this case, therefore, it was not the fault of the facing, but of the molder.

As an ending to this subject, it will be well to remember that it is not always the facing that is at fault. It is sometimes the iron, sometimes the sand, sometimes the atmosphere, that causes the trouble, but I believe that, after all, the molder who uses it has more to do with the successful working of the facing, in making clean castings, than any other element.

* An address before the Foundrymen's Association, May 3, by Howard Evans of J. W. Paxson & Co., Philadelphia, Pa.

How are our cherished delusions shattered by hard historical facts! It appears that the "John Bull" engine, which recently made the trip from Jersey City to the World's Fair, was neither the first locomotive run in the United States nor the first one imported from England. The *Railroad Gazette* tells us that another engine, the "Stourbridge Lion," arrived in New York from England in May, 1829, two years before "John Bull" touched these shores; while in 1830 no less than three American-built locomotives were turned out—the "Best Friend," the "West Point" and the "Tom Thumb." Probably, however, "John Bull" is the oldest engine now in existence in this country.

The tremendous floods of the last five weeks have delayed seeding and other agricultural preparations to such an extent that a "late season" will be a common complaint in many lines of business for some time to come.

ROOFING AND CORNICE.

The Country Cornice Shop.

VII.

By Cornice Worker.

MOLDED GUTTERS ON BRICK WALLS.

Fig. 53 is another form of molded gutter for brick wall, showing the method of fastening it to the wooden wall plate B. A represents the brick wall, B the wall plate, and C the rafter upon which the roof boards are fastened. It will be noticed that part of the molding, from P to E, drops down over the wall, and that the top bend of the molding has an angle iron inserted at H

After the detail of the molding is made, draw a section of the angle iron in the top edge, as at H, also marking the position of the bolts through angle iron, shown at 1 and 8. Now draw the top flange and lock of the molding, making the top flange as wide as shown at F, so that the bolt 8 passing through the angle iron will have plenty of play room to pass the lock J; or, in other words, the lock J should be placed at such a distance from the bolt 8 that the gutter lining can be locked into the lock J, without interfering with the bolt. When making the detail of the inside brace, care should be taken that it meets the angle iron at 1, and the length of the brace at X X should be such that when the plank L is laid upon the portion of the brace from X to U it will come directly under the lock J; in this way, when the gutter lining is locked into the molding the seam can be pounded down tight. The other portion of the brace should meet the molding as shown at 2 and 3, then back to the wall plate with an angle bent upward and nailed to the wooden plate at 6 and 7. The small angle at 4 and 5 is intended to keep the drip molding tight against the wall, without nailing or defacing the molding. The angle should be fastened to the main brace by means of a bolt, 4, and then bolted through the flange of galvanized iron at 5. The hole 5 should be countersunk, so that a smooth surface is obtained. Care should be taken in bolting the angle 4 5 to the main brace that one is exactly like the other, otherwise the drip molding will not lay even against the wall. The length of the stove bolt which is inserted into the hole 5 should not be greater than the inside width of the member Y of the drip molding.

CONSTRUCTING AND PUTTING UP THE GUTTER.

After the molding is formed and set together to the required length the angle iron is held in position with hand vises, as explained in a previous chapter, until the top bolts are all inserted from the bottom up, as shown at 2, Fig. 55. After the top bolts are all in place and the nuts fastened the front bolt 1 is placed through the molding, angle iron and brace and fastened on the inside; the bolts are also inserted at 2 and 3, Fig. 53, and the angle bolted to the main brace at 4, being careful to have the distance from the angle 4 5 to the angle 6 7 the same as the distance from the front of the wall to the wall plate B. The angle irons and braces can all be put in the molding in the shop. Let us suppose the molding is 28 feet in length, in which there are ten braces. In hoisting up on the wall two ropes would be required, looping and fastening each rope on each side to the third brace from the end and tying around the the highest point, it being blocked up with wood, as explained in a previous chapter. The gutter is then lined with either tin, copper or galvanized iron and locked into the lock of the molding at J,

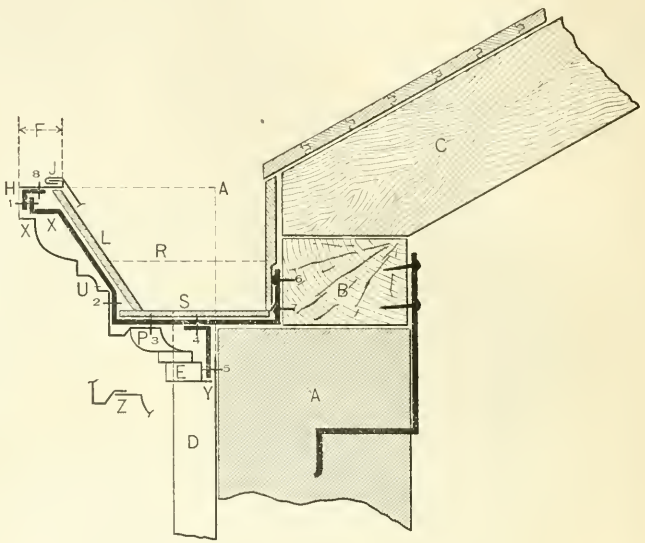


Fig. 53.—Fastening Sheet-Metal Molding Against Wooden Plate.

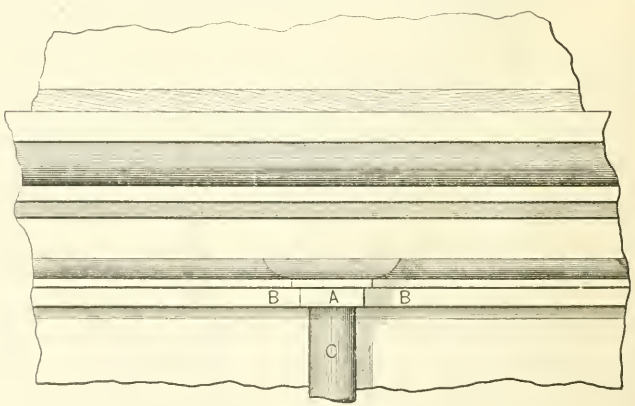


Fig. 54.—Front Elevation of Molding, Leader and Head.

THE COUNTRY CORNICE SHOP.

brace X, Fig. 53. When the molding is up set it on the wall, and drive two anchor nails into the wall plate B at 6 and 7, thus drawing the drip Y tight against the wall. The gutter is now lined with wood by the carpenter, S being the lowest point and R Fig. 53. In Fig. 55 is shown a part of Fig. 53 reversed, with the top brace bolted to the angle iron and screwed to the roof board. At 1 is shown the bolt, passing from the outside through the molding, angle iron and brace and fastened on the

inside. In putting on the top brace, shown in Fig. 55, care must be taken when loosening the nut of the bolt 2 that the bolt does not fall inside of the molding. To prevent this lay a strip of wood on to the part of brace X X, Fig. 53, before the gutter is planked, to uphold the bolt 8 when the nut is loosened. After the top brace is bolted at 2, Fig. 55, screw to the roof planks, as shown by 3 and 4. This top brace will keep the gutter from bending down from the weight of the snow and ice. In milder climates, where the snow is not considered, the top braces could be omitted.

Let D, Fig. 53, represent a square leader, meeting the lowest point of the gutter S as shown by the dotted lines. To make a turn miters are required in the molding, two flat heads, shown at A and B, Fig. 56, are placed on each end of the molding. As the water is to run to the center of the building, the leader will be placed at O, Fig. 56, with a projecting leader head to the hight of the drip molding, the face of which is shown in Fig. 54 at A, and the projection in Fig. 53 at P and E.

OBTAINING THE PATTERNS.

To obtain the patterns for the flat heads for the moldings, proceed as follows: In line with the wall shown in Fig. 53, draw a dotted line as shown from 5 to A', and at right angles to it draw a dotted line, H A', meeting the top bend of the molding H.

At right angles to D A, Fig. 57, draw the line A J. Take the distance of the top flange D F in Fig. 57 in the dividers, and placing one leg on the point J, strike an arc intersecting the line F G at G. Draw a line from A to G, which will be the miter for the top flange of the head, mitering with the top flange of the molding at right angles in plan, shown by 1 A B or A B 2 in Fig. 56. At right angles to F G, Fig. 57, draw G I, which completes the patterns. Allow lugs as shown.

For the pattern of the leader head proceed as follows: Draw a duplicate of the profile of the drip molding, shown in Fig. 53, at A, Fig. 58. Divide A into a number of parts, as shown. Now draw any perpendicular line, as B C, upon which place

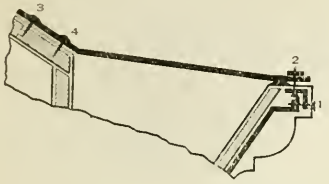


Fig. 55.—Part of Gutter with Top Brace.

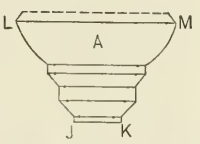


Fig. 60.—Pattern for Face of Leader Head.

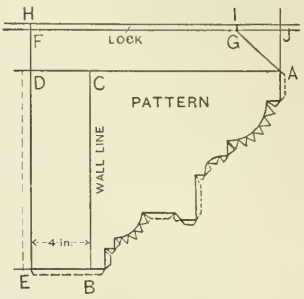


Fig. 57.—Pattern for Flat Head.

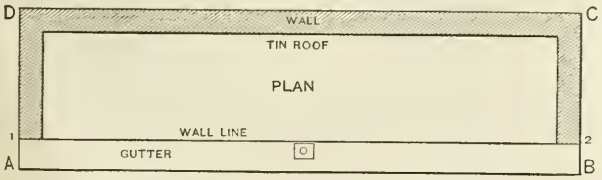


Fig. 56.—Roof Plan, Showing Leader and Gutter.

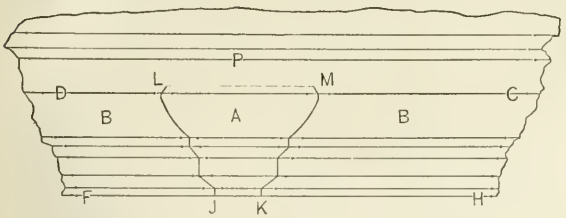


Fig. 59.—Laying off the Miter on the Sheet.

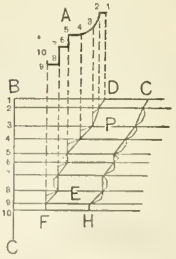


Fig. 58.—Pattern for Return on Leader Head.

THE COUNTRY CORNICE SHOP.

neat finish where the leader D cuts through the drip molding, a small head is made for the leader, having the same projection as the leader D, as shown by P E. Fig. 54 is a portion of the front view of molding, leader and leader head, the section of which is shown in Fig. 53. B B represents part of the drip molding, A the leader head and C the leader.

Having now explained the method of construction, as shown by the front and sectional views, we will proceed to take the measurements and obtain the patterns.

OBTAINING THE MEASUREMENTS.

Let A B C D, Fig. 56, represent the plan view of a tin roof, showing the brick walls and the molding on the front from A to B. O represents the section of a square leader, shown in Fig. 53 at D, and in Fig. 54 at C. When measuring the length of the molding, measure upon the wall line from 1 to 2, Fig. 56. As no re-

Transfer this angle, including the profile of the molding shown in Fig. 53, upon a piece of galvanized iron, by placing the galvanized iron underneath the detail of the molding, and pricking through by means of a scribe awl and hammer. The result is shown in Fig. 57 by A B C. In pricking through the profile on detail, it is best first to divide the profile into a number of parts, so as to obtain the stretch out, and then prick through these divisions. As the molding usually is made to represent stone after being painted and sanded, and as stone work always shows the bearing upon the wall from the side view, it is well to add 4 inches or more to the pattern of the flat head, as shown from D to E in Fig. 57. Now take the stretchout of the top flange of the molding, shown from H to J in Fig. 53, and transfer it as shown by F and G, Fig. 57, at right angles to A D; and add the lock as shown from H to I.

the stretchout of the profile A at right angles to the line B C, and from the small figures draw lines indefinitely, as shown. From the divisions obtained in the profile A drop perpendicular lines intersecting the corresponding numbers drawn at right angles to the stretchout B C. A line traced through these intersections from D to F will be the required miter pattern. Now take the distance of the projection of the leader, shown at D, Fig. 53, and with the dividers measure the distance from the miter cut D F, Fig. 58, on the lines 1, 2, 3, 4, &c.; trace a line through the points, as shown from C to H. Then D F H C, or P and E, will be the pattern required for the projection of the leader head shown by P E, Fig. 53.

In Fig. 59, B, A and B represent a sheet of iron, on which part of the bends of the molding have been lined, as shown. Let us suppose that, the length of the molding having been obtained, the leader will

come in the position on the sheet shown by J K. Now use the pattern P E, Fig. 58, and place the point F, Fig. 58, upon the point K, Fig. 59, placing the line F H of Fig. 58 upon the line K H of Fig. 59, and draw the miter line shown from M to K. Now have J K, Fig. 59, the width of the face of the leader shown at C, Fig. 54. Reverse the pattern P E of Fig. 58, and place the point F upon the point J. Fig 59, placing the line F H upon the line J F, and mark the miter line shown from L to J. As the projection of the leader head comes out as far as up to the line P, Fig. 59, when the molding is formed, we can add a small lap, as shown from L to M, to the pattern A of Fig. 59. Now, taking the right-handed snips, cut out the pattern A of Fig. 59, commencing at the point K, on the miter line up to M, over to L and down to J.

A in Fig. 60 represents the pattern for the face of the leader head which was so obtained. It will be noticed that the face A of Fig. 59 and 60 has no lap attached, the same being the case with B and B of Fig. 59. For this reason laps have been added to the pattern for the return on leader head, shown at P and E in Fig. 58. The miter cut, C H, Fig. 58, is joined to the cuts M K or L J, Fig. 60, and the cut D F, Fig. 58, to the cuts M K or L J, on the sheet B B, Fig. 59, when setting together.

FORMING.

In forming the leader head, use the ridge and gutter former for bending the curves and the hatchet stake for making the square bends. As the profile of the molding shown in Fig. 53 is rather complicated to bend in one piece on the brake, it is better if we make the molding in two sections, as shown at Z, Fig. 53; soldering the two sections in the corner of the drip, using the gutter tongs to make the drip Y and the hatchet stake to make the lock J.

Solder for Roof.

From M. A. D., *Neenah, Wis.*—Which is the best solder to use for roofing, half-and-half or a solder containing a large percentage of lead?

Answer.—Experiments have been tried with the two kinds of solder, and seams soldered with the best quality could be bent a greater number of times without cracking than those on which a coarser grade of solder was used. As a result of the experiments one would infer that seams joined by means of half-and-half solder would be less liable to crack than when a poorer grade was used.

Trouble With a Roof.

From J. M. S., *Platteville, Wis.*—We have a roof with about 6 inches fall in 20 feet. We have put on a felt roof and also one of tin in the last five years. The roof is in such condition that we will have to put on another one at once. We have thought of tearing up the roof and making it steeper, but this would incur quite an expense. One cause of the roof wearing or giving out is that we have to shovel snow off of it. The shoveling and walking on it wears it. Now if we could get something substantial we would like it. We wish to know if you can tell us of any roofing or cement that will answer our purpose.

Answer.—We would suggest the use of a heavy iron or steel roof as more suitable to the requirements of our correspondent. In all probability the bulk and weight of a cement roof would prohibit its use in this case though it has some qualities peculiarly adapted for it. A good plan to protect a tin roof, so that it will not be injured by walking over it or damaged shoveling off snow, is to build an open covering over it of boards 1 inch in thickness and 6 inches wide, laid and fastened side by side, about 1 or 2 inches apart, to cross strips. These keep the boards up from the tin and will allow plenty of air to circulate under and around the boards to dry them after rain. The suggestions given may help to provide something satisfactory or bring out further ideas from other readers.

Circular Gutter.

From M. A. D., *Neenah, Wis.*—What would be the proper way of laying in a circular gutter; sides and bottom in separate pieces with seams at the corners, or would it make a better job to lay each sheet across the gutter with seams pointing toward the center of circle?

Answer.—Providing the radius was such that the sections could be put in the full length of the tin, and the same method was to be used in either case for joining the sections, it would appear that the second method would be preferable, as seams would be avoided at the corners.

FLASHINGS.

WE HAVE RECEIVED, with the compliments of M. H. Crittenden & Son, Minneapolis, Minn., a copy of a very neat memorandum book, or combination diary and calendar, which they are distributing to the trade. On the dark colored covers is the name and address of the firm, and the statement that they give attention to cornices and skylights, as well as all kinds of steel and iron roofings. The first page of the book is intended for the name and address of the owner, and also for the name and address of the person to be notified in case of accident or serious illness of the owner. The next page is intended for data of various kinds, relating more particularly to matters which are easily forgotten, yet the knowledge of which is often valuable. Following a number of blank pages ruled for addresses we find a table giving the population of the largest cities in the United States, some interesting information about the weather bureau and the signals employed to designate the direction of the wind and the kind of weather likely to be expected, rates of postage, &c. There is also a calendar for the year 1893 and one for 1894. Another interesting feature is a list of antidotes for poisons and directions what to do in case of accidents.

I. S. THORN of 1227 Callowhill street, Philadelphia, cornice and sheet metal work manufacturer, is incorporating with his factory an annex 114 x 24 feet. He will enlarge his plant by the addition of new machinery and expects to be running in a short time with a considerably increased capacity.

THE CONTRACT for sheet copper for roofing and cornices on the Pennsylvania Railroad's new train sheds at Broad street station, Philadelphia, has been awarded to Randolph & Clowes of Waterbury, Conn. The roof alone takes 125,000 pounds of cold rolled sheet copper.

THE VULCAN CO. of 1227 Callowhill St., Philadelphia, are putting on the market the cornice machines and other tools controlled by the company. Up to the present time this machinery was only supplied to members of the company. They are now making arrangements for the appointment of territorial representatives who are to place the machinery in the hands of responsible parties. They will shortly issue a catalogue descriptive of their machinery and their plans for doing business.

THE NILES SPOUTING & ROOFING COMPANY of Niles, Ohio, have been granted a charter of incorporation, with the following incorporators: L. W. Sanford, Jacob Holzbach, W. Y. Sayers, C. A. Williamson, M. J. Flakerty, L. Holloway and E. L. Baynton. The officials of the new concern are as follows: Jacob Holzbach, president; W. Y. Sayers, vice-president; L. Holloway, secretary, and L. W. Sanford, treasurer. The firm will engage in the manufacture of the Harris patent lock joint for eaves, and will make a full line of noncorrosive spouting and metal roofing.

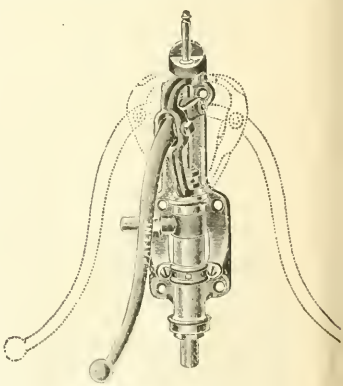
LEO J. SCHLETZER & CO., 52 Point street, Providence, R. I., distribute posters printed on tinted paper, showing various designs in sheet metal work for roofers. The illustrations presented show cornices, skylights, a large number of finials with and without weather vanes, crestings, eave troughs, &c. The firm do copper, tin and corrugated iron roofing, and are agents for Cortright's metallic shingles.

J. M. ROBINSON & CO., Cincinnati, Ohio, report the demand for sheet metal working machinery as being excellent, several orders for large and special machines being now under way, while the demand for the Globe cornice brake is also good.

IT IS STATED that the Guernsey Rolling Mill of Cambridge, Ohio, will erect a sheet mill with two stands of finishing rolls, the product of which will be used exclusively in the manufacture of roofing by an identified local concern.

Johnson's Improved House Pump.

The Lehner-Johnson-Hoyer Mfg. Company, manufacturers of plumbers' brass goods and supplies, 68 to 74 West Monroe



Johnson's Improved House Pump.

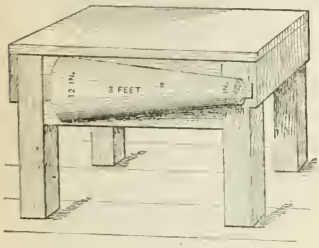
street, Chicago, are introducing to the trade Johnson's improved house pump. As will be observed from an inspection of the accompanying engraving, the pump is provided with a swivel handle so that it can be used in any position. This is a feature which will commend it for use in many locations.

The weight of a million English gold sovereigns, newly minted, is 10 tons, 14 hundredweight, 15 pounds. A million pounds' worth of fresh-coined silver pieces of British money weighs over 151 tons.

THE TIN SHOP.

Former for Wash Boilers.

From S. J., *Paterson, N. J.*—I send you a sketch of a useful former for a tin shop, and which is better than most of the devices for forming oval wash boilers, because it can be put in at any desired point of diameter to allow for difference in quality of the tin, some being more soft than others and consequently forming more closely to the roller. After the boilers are wired lay them on the bench, wired side up and ends even, and mark off the guides for forming them up as follows: With a mark on the wired edge mark a dozen or so together. For 7-inch boiler, 8¾ inches at each end and 16 inches at center; for 8 inch boiler, 9 inches at the ends and 17½



Former for Wash Boilers.

at center; for 9 inch boiler, 9¾ inches at ends and 19 at center.

They are then put in between the back of the roller and the bench and formed to the mark. An allowance for the seam is made by marking the ends ¼ inch more than half of the center space. Use such a portion of the former as will give the following sizes for the boilers when formed:

7 inch.....10 inches wide, 19 inches long.
8 inch.....11 inches wide, 21 inches long.
9 inch.....12 inches wide, 23 inches long.

For the information of any one who is not familiar with the work I will add that

7-inch boilers are of 2⅛ sheets, 14 x 20,
8-inch boilers are of 2¼ sheets, 14 x 20,
9-inch boilers are of 3 sheets, 14 x 20,

or boiler plates of same dimensions.

When finished, and the covers are fitted, any little variation in proportion can be easily adjusted. This roller will give a better view of the mark than the ordinary shop roller and allows quick hauling in and out.

The former will be found useful for many other kinds of work. It can be turned from hard wood about 3 feet long and 6 to 12 inches diameter and fastened ½ inch from bench by iron plates at the ends.

Venetian or Bent-Iron Work.

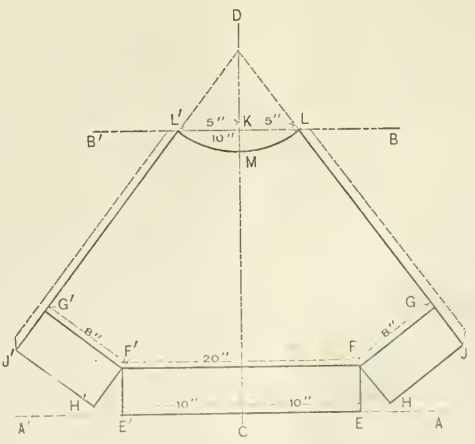
From B. T. N., *Albany, N. Y.*—Indulging in the boyish enjoyment of gazing in the show window of a store which catered to the ambitious amateur artisan of varied taste, my eye caught the above title on a pamphlet. It lay in the midst of examples of that work as designed for ornament and use, which further attracted my attention, and on closer examination I concluded every tinner would be more or less interested if a description could be given, even though no more thorough than can be made on so superficial a study of it. It seemed to me that the principal article used in the manufacture of the pretty things was nothing but narrow strips of tin varying in width from ⅛ inch upward. They were formed into designs embracing scrolls, hearts, arrows, doves and all sorts of objects. These designs were worked into candle holders, lamp-shade frames, photograph frames and stands, and to the ingenious artist there is no limit to the use of this delicate and graceful character of ornamentation. The tin strips had received a coating of some lusterless black, which is in keeping with that employed in coating the grills and irons, umbrella stands and any other heavy ornamental wrought-iron work, which is quite a fad at the present time.

Every tinner in squaring his sheets accumulates more of just such material than he knows what to do with, and it seemed to me that it might be profitably marketed to the ladies, who are interested in all sorts of fancy work, if the necessary trouble was taken to secure a few designs and make up a few samples to show what could be done with the pile of narrow strips of tin that occupied a place in the show window beside them. A neat card to explain something of how the work was done, and that only a few cents would buy the strips necessary and a pair of small pliers to bend and fasten them in place to produce the ornaments exhibited, would be all that would be required to attract attention, and the outlay would amount to very little to the tinner.

The parts are fastened together by wrapping a short piece of the narrow material around the two parts to be secured and pressing it tight with the pliers; all of the other work can be easily done with the fingers. It gives the tinner an opportunity to show that high art is not all confined to the stoves in his store, but that art work can be done in his shop with the refuse of his work, and if he desires many pretty things can be made to sell or to please his wife and adorn his home.

Pattern for Chimney Top.

From I. T., *Joliet, Ill.*—In *The Metal Worker* of March 18, "L. N. H.," Milroy, Pa., asks for a short and simple rule for describing the pattern of a chimney top oblong at the base and round at the top. The method I use is convenient, and appears to be just what "L. N. H." requires. For example, take a top that is to be 20 x 16 inches at the base and for a 7-inch round pipe at the upper end. In the accompanying diagram let A A′ represent the bottom of sheet, and B B′ the top. Draw the center line C D, making it perpendicular to A A′. As the largest side of the top is to be 20 inches, set off 10 inches on each side of C, and from the points thus obtained erect the perpendiculars E F and E′ F′. From E set off the distance cap is to lap on chimney, and draw F F′ parallel with E E′. As the top is to be for 7-inch pipe, having a circumference of 22 inches, make L L′ less than half of circumference, as 10 inches. Then take the half of small



Pattern for Chimney Top.

side of cap on tongue of square (in the present instance 8 inches), and place the square with the 8-inch mark at F, the blade at L, and draw F G D. In a similar manner draw F′ G′ D. Extend D G, and make G J and F H equal to F E, then draw H. J. G′ F′ H′ J′ is to be drawn in a similar manner. With D as center, and D L as radius, strike the arc L M L′, thus completing the pattern. Edges to be allowed for joining as indicated by the dotted lines. Then two pieces similar to L′ M L J H E E′ H′ J′ are required for the top.

Six Mexican Governors are expected to visit New York this month and arrange for a permanent exposition of Mexican products at Industrial Hall on Lexington avenue.

The Foundrymen's Association

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club in Philadelphia, on Wednesday the 3d inst. In the absence of the president the chair was occupied by Walter Wood, of R. D. Wood & Co., Philadelphia.

The Railways and Freight committees reported progress.

The Executive Committee made a general report on the progress of the association and the benefits which had resulted from its meetings. The report instanced the valuable information derived from the addresses of Mr. James Wister, on "Coke," and intimated that addresses on other subjects of interest to foundrymen would be delivered at subsequent meetings of the association. On the subject of prices the committee referred to the present low prices of castings in open market. This state of things it considered to be brought about by bad guessing and overproduction. The number of foundries had increased in greater proportions than customers for their products. The lowest ebb had probably been reached and there would be few foundrymen start in the future, the chance of gain being so limited. It could therefore only be a short time before the foundrymen would stop the production, and then when one concern had more orders to fill than capacity for filling, it was fair to suppose that future orders would be taken at higher prices. Cast iron was used as much to-day as ever, and the present price of steel castings was so low that it was only a little higher than the price of cast iron.

The treasurer reported the balance in hand to be $365.55.

R. A. Register of Register & Sons, Baltimore; L. B. Whitney of A. Whitney & Sons, Philadelphia, and E. E. Brown of E. E. Brown & Co., Philadelphia, reported progress of their respective sections of the Price Committee.

The secretary announced with regret the decease of two members of the association—Wm. H. Green of the Vulcan Iron Works, Chester, and Edmund Grinnell of the New Bedford Iron Foundry, New Bedford, Mass. These, he stated, were the first members of the association removed by death. Mr. Green had attended nearly all the previous meetings of the association and was personally known to most of its members.

The secretary read communications from Cleveland, Ohio, Grand Rapids, Mich., and other sections, expressing appreciation of the objects and aims of the association and the interest taken by foundrymen in the West in its proceedings, and asking for information with a view to the formation of similar associations as subsidiary organizations. The correspondence evoked much discussion.

H. L. Mumford thought some scheme for centralization of the subjects and matters discussed at the meetings of this and other associations should be promoted, so as to be generally available to all interested. He believed that debates on previously arranged subjects could be conducted simultaneously at the different points.

The chairman suggested that it would be well for the other associations to send the papers they proposed to consider at their meetings to this association, that the ideas promulgated might be further discussed and disseminated. He thought great value would attach to a centralization committee which would take charge of the different branches and thus forward the extension of the work of this association. He would be glad to have the question thoroughly discussed and a committee of sufficient size appointed to keep the movement going throughout the country.

L. B. Whitney thought that before a committee could be appointed it would be necessary to secure the co-operation of the branches, and in that way hold them closer.

The chairman was of the opinion that the subject necessitated a good deal of consideration. He thought it would be advisable for the sections proposing to form sister organizations to send some one to represent them at a future meeting. After further discussion Mr. Mumford moved that the following invitation be sent to the promoters of other associations:

1. The awakened interest in foundry matters is evidenced by the formation of numerous local societies throughout the country for the discussion of foundry practices.

2. The Foundrymen's Association, with an idea of centralizing and making more mutually available and valuable to the foundrymen of the whole country, and especially to the various organizations now formed and forming among them, the most advanced ideas of foundry practices, proposes as follows: That at the next regular meeting of the Foundrymen's Association of Philadelphia in June, 1893, its members will discuss the plan of laying out a line of topical discussion to be jointly carried on by foundrymen in their various local organizations all over the country, and regulated, perhaps, by a committee. The idea is suggested of having the discussions carried on at different places simultaneously and then embodied in a publication which shall be in a sense a nucleus and bond between the various organizations and a return of value for membership dues. That each organization be invited to contribute their views on the plan, either by letter or by personal representation at the meeting mentioned.

3. That in this way the foundrymen of the country may be virtually united in a common interest.

Your earnest co operation is solicited.

The motion was carried unanimously.

Howard Evans of J. W. Paxson & Co., Philadelphia, then read a paper on "Foundry Facings," which we publish elsewhere.

The appreciation of the meeting was expressed in a vote of thanks to Mr. Evans, and an interesting discussion on the paper followed.

Asked by the chairman how far refractory materials like soapstone were used, Mr. Evans replied that all materials used in fine molding were of a refractory nature. Lime was used very sparingly, as it was found to affect the eyes and the pores of the skin. It was used to a certain extent by some of the country founders, but they had to abandon it eventually. It was also used to a small extent, as a mixture. Magnesia was not used to an extent greater than found in plumbago, coal or any mineral, and was not at all necessary. Asked how much ash there should be in a good facing, he stated that in facing for pipe work there should not be over 8 per cent., but 2 or 3 per cent. was about the correct quantity. Coal for making facing was bought by analysis, and vast differences in the analyses of shipments were experienced, which occasioned much trouble. Eighty per cent. fixed carbon, 8 per cent of ash, and the balance water, was the analysis usually expected.

The chairman, in speaking of pipe blackings, remarked that a peculiar circumstance noticeable in their preparation was that at times they absolutely refused to mix with the clay water or molasses, and when placed upon the mold the blacking would not adhere, and the iron picked it up and carried it along. He was told of a good plan for mixing it satisfactorily. In pipe shops it was a usual thing to have a cask of water mixed with the clay, and to dump a full bag, or large quantity of blacking into it, and endeavor to mix it. The mixture was occasionally, after a long time, effected; and sometimes was not effected at all. The surest and quickest plan was to make a paste with a small quantity of the blacking, and lead it up from that point to the consistency of cream, by adding more water and facing. In this way a nice black wash was to be secured.

Asked whether there was any extended use of gas-house carbon in the way of facing, Mr. Evans said that it made a very good wet black for bell molds and pipe where the iron falls a long distance. It had more of a body to it than the anthracite. A number of foundries used it in the bell molds. A trouble in connection with its use was that carbon, which had been bought at $6 or $7 per ton from the gas works, had advanced very much in price, owing to it being used largely by electric light plants for making their pencils. It was now about $12 per ton, with a probability of its going to $20 during the year. The electric light plants were trying to get it all. Petroleum carbon, the residue of the oil works, was also being used, and its price had gone up from $6 to $8 50 per ton.

E. E. Brown stated that his firm had discontinued the use of gas house carbon, as the supply was so very irregular. They had not yet decided what they should substitute for their high heats. A more vigorous blast was a thing to use very sparingly.

The discussion then turned on the subject of high heats, with a view to having some information on it forthcoming at the next meeting of the association.

Wm. Wark of Dienelt & Eisenhardt of Philadelphia stated that he would probably bring to the next meeting a sample of fine molding, the equal of which he thought he could defy any molder in Philadelphia to produce. It was made by a Frenchman in dry sand, and probably the members present would hardly credit the fact of its being made in sand.

R. A. Register and Mr. McCarty of the Pond Machine Tool Company also took part in the discussions.

Regarding the rumor that soil pipe was being freighted from Besemer to Baltimore at rates only 5 per cent. advance on pig iron rates, Mr. Register stated that he had not been able to get freight bills in his possession, and that he had been informed that the railway would not answer any questions on the subject without production of a freight bill to substantiate the charges that such rates were being made.

The meeting then adjourned.

The pernicious effects of holding back the wheat crop in hope of realizing higher prices are spoken of by a Toronto correspondent, who refers to the fact that the grain thus kept in warehouse can now be sold only at the lowest price in two years; that meanwhile other sources of wheat supply have improved the opportunity to sell, and that the money which might have been realized would have mitigated, if not wholly averted, the financial stringency that has already proved ruinous to many whose business was too widely extended. On the other hand, free shipments of wheat to markets already well supplied might have precipitated and intensified the decline which has taken place. India effectually checkmates the United States in any scheme to squeeze consumers in Europe.

The Mannlicher system of magazine rifle has been adopted by Austro-Hungary, Germany, Italy, Holland, Bulgaria, Roumania and Brazil. France follows the Lebel system; Belgium, Turkey and Chili the Mauser; and England the Lee-Speed system of repeating rifle.

THE RETAIL STORE.

National Time Register.

The National Time Register Company, Columbus, Ohio, are putting on the market the register shown in the accompanying cuts. As will be seen in Fig. 1,

Fig. 1.—National Time Register.

the machine has two dials, one above the other, with a push button between. The uppermost is a paper record dial and the lower one a metal designating dial. The record dial, which is behind a glass door

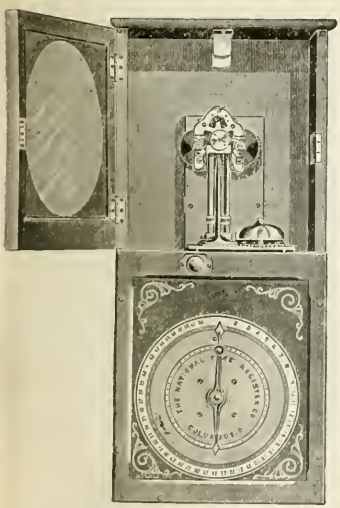


Fig. 2.—Door Open and Record Dial Removed.

securely locked, revolves on the hour post of a clock movement, thus making one complete revolution in every 12 hours. It is divided by radial lines (from center to edge) denoting time, and concentric lines (circles around center) $\frac{3}{32}$ inch apart, the latter being numbered from one up, to designate the employees, each of whom is given a number, the numbers commencing with one. Thus each employee's record is shown in one of these circular concentric spaces, by itself, and, it is stated, cannot possibly be confused with any other. Extending from the lower edge of the space in which this record dial revolves to near its center are guide arms, between which the dial moves. These guide arms, it is explained, support a moving oblong block, equipped with a puncturing point, so arranged that when the push button is pressed a small hole is made in the paper dial as it moves between the guide arms. The metal designating dial is exposed to the operative, and has numbers corresponding to the concentric spaces on the record dial, ranged consecutively around the edge; and a metal pointer or hand, swung from the center of the dial, can be moved by the operative so as to point to any figure on the plate. The movable block containing the puncturing point is connected by simple mechanism with the designating hand on the metal dial in such manner as to work in unison with it. Thus when the hand is turned to number 21 the block moves up along the paper record dial to space number 21, when, by pressing the button, a small hole is made in the paper dial at that point and signifies that employee number 21 has registered. The point is made that the record dial is always moving with the hour post of the clock, and being properly set when put on, the radial lines show the exact time at which the puncture is made. A new dial is placed on each day and the old one, containing a complete record of the time of the employees for the day previous, is filed away under lock and key for future use if necessary. This is accomplished by opening the register door, as shown in Fig. 2.

When the push button is pressed a bell is automatically tapped once, so, it is remarked, any attempt to register twice can be easily detected; that it is absolutely impossible to make more than one record at a time, and that the mechanism is so adjusted that the record is made at the instant the bell taps, thus controverting the excuse of an attempted register. Thus the employee makes his own record, but cannot favor himself one minute.

In Fig. 3 is shown a small portion of a record dial, illustrating the appearance of the record. Employee No. 1 is recorded in at 7 05, No. 2 at 7, No. 3 at 7 08, No. 4 at 6.55, No. 5 at 6.51, and so on.

If the employees have uniform hours a glance at the dial will tell if they are practically on time. From a closer examination the exact time of any individual or individuals is seen, no matter what hours they keep.

The manufacturers claim that the register is simple, durable, accurate, easily and rapidly operated; that it keeps the time of employees paid by the hour by mechanical means, thereby rendering mistakes impossible and preventing favoritism; also that the time of men doing piece work is kept in the same manner, and that these results are obtained with the least possible machinery and at a minimum cost.

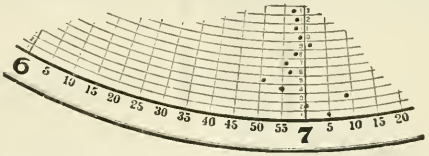


Fig. 3.—A Portion of the Dial.

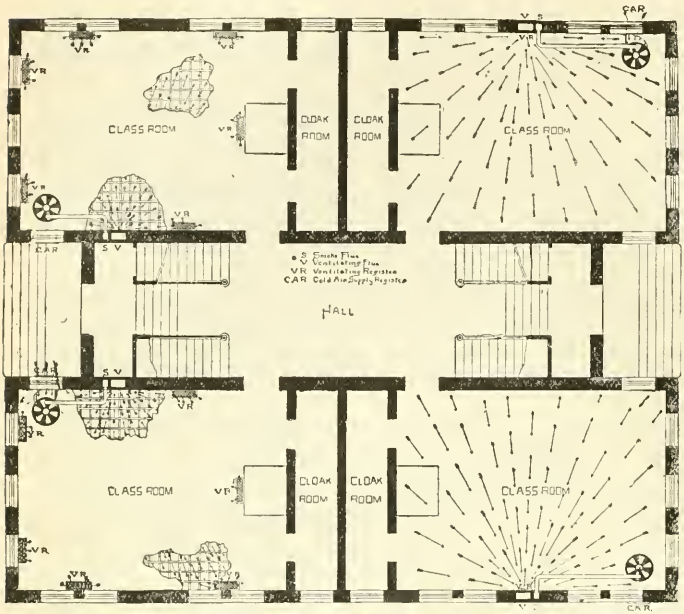
The Utility Oscillating Washer.

The accompanying cut represents a washer put upon the market by Olds Wagon Works, Fort Wayne, Ind. In this machine the washing is accomplished through the medium of compensating springs, as, it is stated, the load in the machine itself furnishes nearly all of the power necessary to operate it. A washboard is combined with the machine, attached to the under side of the lid, which is designed to be used for rubbing extra-soiled portions of the clothing, which, it is remarked, effects a saving of one handling of the clothes, thus combining in one machine a washing machine, washtub and washboard.

The Utility Oscillating Washer.

The Grossius System of Heating and Ventilating Buildings.

A system of heating and ventilating buildings, especially school houses, for which strong claims are urged, is that being introduced by John Grossius Sons, 389 Main street, Cincinnatti, Ohio, and which is illustrated by means of the accompanying cuts. Fig. 1 represents a plan view of a school building, through the center of which extends a hall, while at the right and left are four class rooms, there being two on each side of the corridor. Taken in connection with Fig. 2 of the cuts, which represents a sectional view through the building, very little description is necessary to make the operation of the system readily understood. In the first place, as soon as the fire in the heater is started the smoke passes to the flue S, thereby heating the 4 inch brick partition between the smoke and ventilating flues. The heat rarefies the air in the ventilating flue, marked V on the plan, Fig. 1, causing the air in it to ascend. This air is replaced by foul air taken from the floor of the room through the ventilating register V R. The Grossius patent school room ventilating heater, employed in connection with this system, is supplied with fresh air from the outside, and moderately heated before it is discharged into the room. The ventilating flue, being heated by the passage of the products of combustion through the smoke flue, is said to exhaust the foul air in the room, and thus create a steady circulation as well as a constant change of air in the room. The construction of the flues is a feature to which special attention is invited on the part of the company, the position being such, as stated above, that the passage of the products of combustion through the smoke flue tends to heat the air in the ventilating flue. The smoke flue, the company state, should not be less than 8 x 12 inches in size, while the other should not be smaller than 12 x 12 inches in order to produce the best results. The outlets for the foul air may be arranged in two ways, as represented in the sectional view, Fig. 2. The method designated System A shows the plan of exhausting air from several registers in different parts of the room. Space under the floor may be utilized as a duct to the ventilating flue by stripping the joists with 2-inch strips and on top of these laying the floor. System B shows how the ventilating register is placed at the line of the floor. The company state that by the method here employed each room may be heated and ventilated separately, thus rendering it unnecessary to heat the entire building when it is wanted to heat only a few rooms.



The Grossius System of Heating and Ventilating Buildings.—Fig. 1.—Plan View.

The Cuban sugar industry is concentrating itself into a small number of large estates. In 1868 there were near Santiago de Cuba 129 sugar estates. Now the number is 17, and gradually dwindling, although the aggregate yield of sugar has not fallen off in volume in the last 25 years. The new imposts and Government regulations in Cuba are said to be likely to seriously affect the sugar industry in the island, and great dissatisfaction is felt. The cultivation of coffee and cocoa is reported to be on the increase, while that of tobacco remains stationary.

St. Joseph Pump Company's Fair Exhibit

The St. Joseph Pump Company, St. Joseph, Mo., have erected their exhibit in Agricultural Hall, and, taking into consideration the large number of manufacturers who were unable to obtain space for their exhibits, the enterprise shown by this firm is commendable. The space allowed this concern was secured simply on the merits of the Perfection Elevator and Purifying Pump which they manufacture. The exhibit will occupy a space 10 x 16 feet. The company have erected a platform 7 inches in hight, which is covered with a pleasing design of moquette carpet, and inclosing their exhibit is a double railing of antique copper and brass, shaded from a light to a dark finish, which is soft and effective in appearance. The four corner posts are artistically carved, and on the top of each post are acorns finished in bronze. The front posts are 10 feet high, and are connected at the top by a large bar, suspended from which is a glass sign, containing in gilt letters the firm name and the names of the officers and directors. To the right of the entrance to this exhibit is a base 4 feet square by 2 feet in hight, on which is erected a cistern, made of a combination of hard wood and plate glass, which will permit of the inspection of the process by which the Perfection Pump purifies foul water. The wood work of this cistern is finished in pure white, and the decorations consist of marine and landscape scenes, relieved by artistic drawing in pure gold leaf and ebony. The cistern will hold 80 gallons of water, and above it is erected one of their full-sized Perfection Pumps, also made of hard wood and plate glass, handsomely painted in delicate pink and decorated with gold and bronze. This Pump is operated by the full-sized family chain, and will be constantly in motion, thus showing the effect this Pump has on foul water, whether in well or cistern. To the left of the entrance will be found a *fac-simile* of the pump just described, only miniature in form, which will be placed on the desk occupied by T. W. Moore, the company's representative who will have charge of the exhibit. Around these two principal exhibits are placed a number of full-sized Perfection Pumps, painted and decorated and finished equal to that ordinarily given the finest piano. The railing inclosing the exhibit is festooned with chain or buckets used in the Perfection Pump, which tends to relieve the plain appearance of the railing.

Fig. 2.—Sectional View.

Taking into consideration that a pump at best is difficult to exhibit, the St. Joseph Pump Company have made an excellent showing, and they will, no doubt, be repaid for the time and expense devoted to it. They invite the trade to visit their exhibit and promise to make it pleasant for all who call

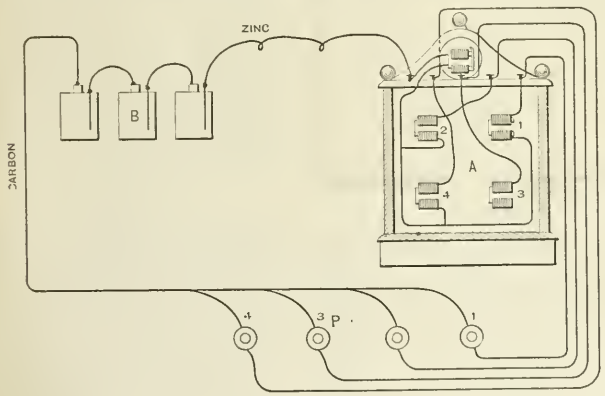
PLUMBING AND GAS FITTING.

Electric Bell Work.

BY OLIVER TWIST.

There are, doubtless, a large number of plumbers and tinners in country towns who do a little electrical work occasionally, and a larger number would probably be glad to do a little if they only knew how.

Let us suppose that Mr. Robinson has built a nice house, and, wishing to purchase a door bell, has called in your hardware store. You can then explain to him that you can fit up in his residence an electric bell that has advantages not found in any other kind. The bell may be placed in the kitchen or in any other part of the house and rung from a neat little "push" on the front door, which is much nicer than a gong fastened directly upon the door, which makes noise enough in the street to attract the attention of all your



Electric Bell Work.

neighbors. Well! That is what Mr. Robinson wants, and he gives you an order for one. If you put it in satisfactorily, the Smiths and the Joneses will want one also, and thus the tinner or plumber may fill in a "slack" time when he might otherwise be looking for a job.

Now, to help you a little more I have made a sketch, which by the aid of a little study will enable you, not only to connect up a single bell, but any number of pushes with a bell.

In order to distinguish from what part of the building the call comes we must have an indicator, or annunciator, as it is called. They are very useful in a private house or hotel, and a four-indicator annunciator, as we show here, may be placed in a kitchen and connected with the front door, dining room, parlor or chamber or any other places desired.

B represents the battery, which is made up in this case of three Leclanche cells, commonly known as the sal ammoniac or telephone battery—(two are generally enough for this size of annunciator, however)—connected up in "series," as it is called—that is, you must connect the carbon pole of one cell with the zinc pole of the next, and so on. You will notice that there are five binding posts on the top of the annunciator, one for each of the four numbers or names and one marked Z. A is a rear view of the annunciator showing how the magnets are connected, which operate the shutters or needles in front. These will be already connected when you purchase it, but it is just as well to know how they operate.

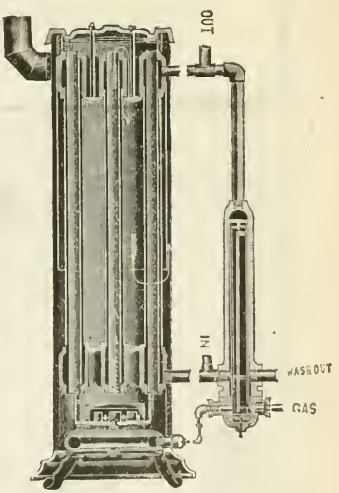
You can first locate the pushes where you desire them. Then run one wire from each push direct to the corresponding number or name on the annunciator, without connecting with any other wires on the way there. Now take a wire from the carbon pole of the battery to the pushes. This wire may be "branched" or "tapped," as shown in the sketch, as may be found most convenient for the connections. If you now take a wire from the pole marked Z to the zinc pole of the battery direct your "wiring" will be complete. You will find directions on the battery how to set it up, so that it is needless to repeat them here. A few remarks may not be out of place, however. Do not put two wires underneath one staple. Do not twist two or more wires together. Either of these may cause contact between the wires and complete the circuit, which would cause the bell to ring continuously or run down the battery.

Laying Earthen Pipe.

From R. J. M., *Trenton, N. J.*—In *The Metal Worker* of May 6, in relation to the laying of earthen drains, you very properly attach importance to the necessity of clearing out the earthen pipe thoroughly before connecting the iron house drain therewith. A very simple and practical method of accomplishing this result was adopted in laying earthen pipe in Princeton College about ten years ago, with which your correspondent, "W. J." is evidently not familiar, but which may interest him and other readers of your valuable paper. It was as follows: A rubber gasket of the full bore of the earthen pipe was inclosed between two circular boards, smaller than the pipe. This was placed in the first length of pipe laid and a stout cord attached which was carried through every length until the whole was laid. The cord was then pulled through the entire drain and the rubber gasket attached cleaned out every vestige of cement which might have remained. The pipe used in the work was without hubs, a collar being used to cover each joint where the ends of the pipe came together. If "W. J." is charged with the supervision of the laying of the earthen pipe he should see to it that the cement used in making the joints is wetted only in small quantities for immediate use, and if left unused for an interval of half an hour it should be discarded, as tempering will not make it available after a partial "setting." In applying the cement, the ends of the pipe and the hubs should be wetted, particularly in warm weather, when the porous pipe has a tendency to absorb the moisture in the cement.

Hot-Water Stove for Gas Fuel.

The accompanying illustration shows a sectional view of a hot-water stove for gas fuel put on the market by E. C. Merrill, 168 Second avenue, Pittsburgh, Pa. The arrows show the course of the burnt gases on their way to the flue, the idea in its construction being to return the products of combustion to the colder water before passing to the chimney. It is



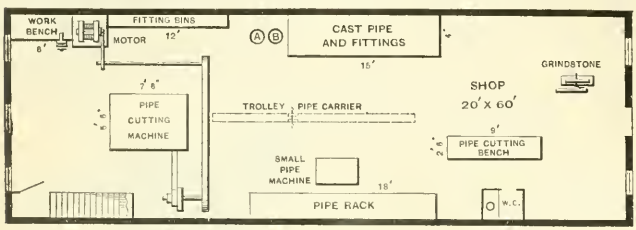
Hot-Water Stove for Gas Fuel.

claimed by this means that the water is taken from the heater at a greater temperature than that of the chimney or of the waste gases. The supply of gas is under automatic control, the temperature of water increasing the flow of gas to maintain the set degree. This thermostat is the property of the Thermovalve Company, and is, we understand, being applied to water backs of gas stoves and also of coal stoves, using gas fuel with satisfactory results. The thermostats are said to govern any kind of gas, and are not affected by the ordinary range of pressures, such as is met with in domestic fuel supply. It depends for its action on the expansive force of a $1\frac{1}{2}$-inch brass tube 18 inches long, and is so arranged that the water is brought into direct contact with the expanding metal. Another feature to which particular attention is directed is the absence of stuffing or packing boxes. The valves are tested for proper working

and also with hydraulic pressure to insure against leakage. It is said to be so simple that it can be applied by any intelligent plumber. The hot-water stove illustrated can, we understand, be used with either natural or coal or fuel gas for supplying bath and laundry water, its capacity being 1 gallon of hot water per minute, consuming a minimum amount of gas in maintaining the temperature of water when it is once heated. It is attached to the ordinary range boiler by means of the circulating-pipe connection.

A Modern Plumbing Establishment.

With some men a long business experience means an accumulation of cobwebs and junk, but with J. Toumey & Son, 132 East Forty-Second street, New York, a plan of whose shop and plant is shown and described, thirty years of business life means that to succeed against competition is to surpass it by intelligent enterprise. While only a plan of the working plant in a well-lighted basement is given, the business plant on the street floor meets all of the requirements of a modern and critically exacting trade. It is on this floor, with its large show windows, inclosed counting room, private office, telephone and drafting room, in addition to a salesroom admirably adapted to the purpose that a yearly business of a quarter of a million is transacted.



A Modern Plumbing Establishment.

The shop in the basement, however, is the center of interest to the trade, and is shown by the plan to be well arranged. It is well lighted by two windows and large glass double doors at the foot of the stairs at the front in Forty-second street, and by two large windows at the rear. It is entered from the office floor by stairs at the rear end. In the center of the shop at the rear, as indicated in the engraving, is a pipe cutting and threading machine of more than usual interest, made by D. Saunder's sons of Yonkers, N. Y. This machine was to have been a part of Messrs. Saunders' exhibit at the World's Fair, and was being slowly and carefully completed as the first of the kind ever made when the urgent necessities of their customer induced its earlier completion and the erection of another for exhibition purposes. It is known as the latest improved No. 6 pipe threading and cutting machine for power, and, with the special attachments ordered in this case, weighs 6000 pounds. It works pipe from 8 inches in diameter down to 2-inch, though the regular No. 6 works nothing smaller than 2½-inch pipe.

A universal gripping chuck of ample strength holds the pipe securely in place. The head is so arranged that the cutting off tool is always out of the way, yet ready for instant use. An arm is attached to the head to receive reamers, which not only remove the burr from the end of the pipe, but slightly bevel the inside edge, the arm being dropped out of the way when the operation is completed. The die frame is fastened to the head by massive hinges, and when the die is inserted the frame swings into place and is securely locked by a strong steel bolt. The head slides on the bed by the aid of a feed gear till the die takes hold of the pipe. By special arrangement an oil tank lubricates the different tools when in use, and the oil which drips from the work runs to a pocket at the back of the machine, from which it is pumped back to the tank when the machine is running. The Standard adjustable expanding die, for which many advantages are claimed, can be opened instantly when the thread is cut, and the pipe removed without reversing the machine. The thread-cutting chasers are removable, and are said to be of excellent quality and workmanship, and they can be sharpened by grinding, or duplicated if necessary.

Governing the speed to suit different sizes of pipe and the arrangement of gearing to secure power without the use of large pulleys, are other excellent features.

This machine possesses several attachments to which special attention is directed.

A chain hoist suspended from a trolley running on an I-beam fastened to the ceiling in line with the centers of the machine is arranged to lift large pipe and carry it to the machine, and to support one end in a carrier if necessary while it is being worked.

Not less interesting to the readers of *The Metal Worker* who could with benefit run by power many of the tools they use, is the electric motor which drives all of the machines It is a 3 horse-power Edison of the C. & C. style. It sits against the wall at the end of the work bench at the rear, occupying a space 3 feet square. Motors of this power vary in cost with make and quality from $300 to $500, and seem to possess peculiar advantages for shops where a limited and intermittent power is desirable, as they use no coal, make no ashes, and require no engineer, which together might make an expense of $3 to $5 per day. Electricity is supplied continually and the quantity required in Messrs. Toumey's shop for the motor described is furnished at 50 cents per day. The operation and management of a motor is so simple that it can be used by the apprentice safely and satisfactorily, the current being turned on by a handle placed on a small circular brass disk, from a horizontal to a vertical position. The current is then gradually applied to the motor by a lever on a graduated switchboard and the power is transmitted by a belt from the motor to the main shaft. To work the two levers mentioned is all that is required to operate the motor. Belts run from pulleys on the main shaft to the different machines. One of Saunder's No. 2 1XL pipe machines is used on pipe from 2½-inch down to the smallest sizes and is conveniently located.

Along the wall by the motor is arranged the fitting bins, next is a portable forge, then the heating stove and then large racks for cast iron soil pipe and fittings. On the opposite wall is a rack for wrought iron pipe. An ordinary pipe fitter's bench and the ever useful grindstone are conveniently located. In addition to the power pipe working machinery, a full set of hand tools and machines for working all sizes of pipe up to 6-inch is a part of the portable outfit. Such excellent facilities enable them to make a specialty of the screw joint iron pipe system of house drainage and of pipe cut to sketch.

Messrs. Toumey are to be congratulated on having so early appreciated the advantages of new and advanced appliances and adapted them for the benefit of their trade. Their plant, with the electric motor, was put in operation in July of 1892 and has been busily occupied since.

Pouring Hot Lead Into Wet Hubs.

From F. P., *Jackson, Miss.*—A singular accident recently happened to one of my men who was engaged in laying a cast iron house drain in a cellar where there was a considerable quantity of water. He was in the act of pouring some of the hot lead into the hub when the whole thing exploded and the lead was scattered in all directions, he, however, escaping with only some trifling burns. I am told that such is not an unusual occurrence where hot metal is poured into a hub where there is some moisture. Can you suggest anything to lessen the danger in a locality where wet cellars are the rule instead of the exception.

Answer.—Inquiry among the trade confirms the possibility of accidents such as our correspondent refers to occuring, in which men are exposed to considerable danger. The experience which sufferers who have placed themselves on record have had, is that as soon as the hot metal is poured into a hub where the slightest moisture exists, an explosion is certain to follow. The safeguard against such danger is, it appears, after the oakum is well calked in, no matter whether it is water saturated, or otherwise, to place a piece of tallow or other fat in the hub, which expedient, we are informed, effectually removes all danger of explosion.

Peck Bros. & Co.,

manufacturers of plumbing and sanitary work, New Haven, Conn., and 47 Cliff street, New York, have a new catalogue of their goods just from the press, which will be known as the Architects' Edition. Later another volume will be issued, designed for plumbers' use. While in the main both editions will be similar, in each will be found many hints and suggestions and much information useful to both classes. The book before us is handsomely printed, in both black and color, on fine, heavy plate paper. It contains 328 pages, 11⅝ x 9¼ inches, substantially bound in leather. The work shows much care in preparation, and the compiler, W. E. Hinsdale, is deserving of great praise for the ability displayed in its production, his efforts evidently having been ably seconded by the firm in meeting the necessarily large expense. The engravings are many in number—at least one to a page—and are of a high grade, showing evidence of being prepared expressly for this book. On four of the pages in front are given illustrations of the mills and offices at New Haven, which are said to afford a floor space of over 3 acres, the New York sales and show rooms and their Chicago branch. To facilitate the identification of articles to which reference may be made, every illustration to and including page 303 has been numbered from 1 to 450 consecutively. From page 304 to the end has been devoted to illustrations and information which will be of value to architects in making up specifications, giving sectional views, &c., of a varied line of goods, with explanations in detail. The cuts illustrate simply parts, and apply only to classes of work where the larger and more expensive fixtures in the preceding pages would not be wanted. The line of lavatories illustrated at the beginning of the book should afford an assortment to choose from capable of satisfying the most fastidious tastes. Then are given drinking fountains

and an almost endless variety of basin cocks. In appropriate places of the book are presented a large number of *fac-simile* illustrations in color, showing decorated basins and closets, so that one may get the effect of the numerous designs, tints and colors where it is not practicable to see the goods themselves. Attention is later given to bathtubs and many forms of bathing apparatus and attachments.

Country Sewerage.

From E. & A., *Pulaski, Tenn.*—Please give us your opinion of a cesspool properly constructed and ventilated up to the prescribed regulations of sanitary boards. Are they not strictly sanitary, and are they not the next best thing to sewerage? Are they not adopted by some city sanitary boards? We are in a kind of controversy here with some of our resident physicians. Our board of health approves of them, but they are opposed by outsiders.

Answer.—The cesspool question is one which is not easy of solution, because of the difficulty of dispensing with cesspools on the one hand and of their construction and care where they are a necessity on the other. Our correspondent does not state the circumstances under which his local board of health approves of the use of cesspools—whether as receptacles for the waste matters of individual houses—that is, a cesspool for each house—or a cesspool to be used as a receiving vault for the sewage of a whole town or village. We will assume, however, that he has in view the construction of a cesspool for each house. The cesspool should be constructed in such a manner as to be absolutely water tight—not of the "leaching" variety which allows the soakage of the liquid sewage into the earth. The walls and bottom should be made of brick or stone, laid in cement and well coated over with cement, or, better still, a layer of coal tar. We do not know what the "prescribed regulations of sanitary boards" may be in different places, but it appears to us that the one great requisite is that it be water tight. The cesspool of this character is permitted in unsewered portions of this city, where its construction is subject to the inspection and approval of the Board of Health. Under the Brooklyn health regulations the same rules as above are in force, and in addition the location, unless under special permit, must not be nearer than 20 feet of a dwelling. In Philadelphia the construction of cesspools is forbidden where a sewer is available. From the above it will be seen that the cesspool is not considered an "unmixed blessing," and we do not, therefore, undertake to answer our correspondent's question as to the "strictly sanitary" character of what must be always considered, at best, as but a make-shift to be adopted only where a sewerage system is not available. In those cities where they are permitted, the most exacting restrictions are placed on their care and the disposal of their contents. There is also to be considered the necessity of ventilation of cesspools, regarding which our correspondent makes inquiry, but for which the sanitary codes of the various cities where they exist make no provision. Among recommendations given the following are samples: One, recommended by the secretary of the New Jersey State Board of Health, is to have a series of pipes entering at various points below the top or cover of the cesspool and terminating in the center in an upright tube extending above the ground. Another is the erection of a wooden flue 10 feet square, set above an opening in the top of the cesspool, the foul air in its upward passage passing through various layers of charcoal. This ventilation, however, not being called for where the cesspool is tolerated, is a question that may be settled by each house owner according to the circumstances which may govern his particular case.

Washington Gas Fitting Regulations.

In *The Metal Worker* of April 29 we reviewed the new plumbing regulations which recently went into force at the National Capitol. We print below extracts from the regulations governing the practice of gas fitting in the District of Columbia, which became operative at the same time:

SEC. IX. Upon the completion of any system of gas piping in a building, and before the floors are laid or the pipes and fittings concealed, there shall be filed in the office of the inspector of plumbing, by the plumber doing the work, a detailed plan of the same, showing the location and size of each pipe, with a statement that the system is ready for inspection.

SEC. X. Upon the filing of the plan described in section IX, the inspector of plumbing shall promptly cause the system to be inspected, and tested with a pressure of not less than six inches upon a mercury gauge.

If the test and inspection be satisfactory a certificate of approval shall be issued by the inspector of plumbing.

No meter shall be attached to any pipe or system of pipes previous to the issuance of such certificate.

SEC. XI.—The sizes of pipe used shall not be less, nor the lengths greater, to the number of burners stated, than those specified in the following table:

Size of pipe. Inches.	Greatest length allowed. Feet.	Greatest number of burners.
⅜	6	1
½	20	6
¾	40	20
1	60	35
1¼	80	60
1½	150	100
2	200	200
2½	300	300
3	450	450
4	600	750

Smaller pipe than ½-inch shall not be used for ceiling outlets, except for lighting halls, pantries, washrooms, bathrooms and kitchens.

SEC. XII.—The pipe used shall be the best quality of wrought-iron pipe, with galvanized-iron fittings, and joints shall be made with white lead.

All pipes shall be suitably supported and stayed with pipe hooks, straps and screws.

All pipes shall be properly graded.

All split pipes must be removed.

SEC. XIII. All main risers shall be run in an inside partition.

SEC. XIV. Each gas meter shall be located in accordance with directions given by the inspector of plumbing.

All meters located in cellars must be set at least four feet above the cellar floor.

SEC. XV. The service pipe shall be run, and both connections with the meter shall be made, by the gas company.

SEC. XVI. No extension or alteration of any existing system of gas piping in a building shall be made without the inspection and approval of the inspector of plumbing.

SEC. XVII. Upon the completion of the building in which a system of gas piping is run, and the hanging of the gas fixtures, an application for a final test and approval of the entire system shall be made, to be followed by the final inspection and approval.

Plumbing Exhibitors.

From the official catalogue of the World's Columbian Exposition we take the following list of exhibitors of plumbing and sanitary materials:

Alberene Stove Company, New York.
Dawes & Myler, New Brighton, Pa.
Day Mfg. Company, Detroit.
Instantaneous Water-Heating Company, Chicago.
Kelly, Thomas, & Bros., Chicago.
Kilbourne & Jacob Mfg. Company, Columbus, Ohio.
Lang, E. M., & Co., Portland, Maine.
Lehner, Johnson, Hoyer Mfg. Company, Chicago.
McCambridge & Co., Philadelphia.
Mosely Folding Bath Tub Company, Chicago.
Norton Brothers, Chicago.
Oswego Indurated Fibre Company, Oswego, N. Y.
Peck Bros. & Co., Chicago.
Randolph & Clowes, Waterbury, Conn.
Smith & Anthony Stove Company, Boston.
Standard Mfg. Company, Pittsburgh, Pa.
Steel Clad Bath Tub Company, Detroit, Mich.
Stewart Ceramic Company, New York.
Strong, Boyce & Co., Indianapolis, Ind.

The Chicago Master Plumbers.

The Chicago Master Plumbers' Association held the first meeting in their new quarters at 197 East Madison street, Monday evening, May 8. The rooms have been handsomely decorated, many pictures adorning the walls, and the floor is covered with a fine carpet. At this place will be located the large library owned by the association; also the office of Secretary Alex. W. Murray. The officers of the association for the year 1893 are as follows: T. P. Culloton, president; P. M. Murphy, first vice-president; J. Barrett, second vice-president; J. Connell, third vice-president; W. T. Geary, fourth vice-president; C. Byrne, fifth vice-president; J. J. Rourke, sergeant-at-arms; P. Sanders, treasurer; Alex. W. Murray, financial and recording secretary. The board of directors consists of David Whiteford, G. A. Larson and M. Mandable.

The principal business of the evening was the election of delegates and alternates to attend the eleventh annual convention of the National Association of Master Plumbers, which will meet in Lincoln Hall, Milwaukee, Wis., Tuesday, June 13. The judges of election were Paul Redieske, Alex. F. Irons and Daniel J. Rock. The following delegates were elected: Daniel J. Rock, Alex. W. Murray, P. Sanders, J. J. Wade, M. J. Corboy, Alex. F. Irons, E. Baggot, J. J. Rourke, J. B. Breen, A. C. Hickey, M. Ryan, H. A. Blac[illegible], Wm. T. Geary, M. A. Mandable, J. G. Webber, C. J. Herbert, David Whiteford, T. C. Boyd and P. M. Murphy. Robert Griffith and Andrew Young are delegates by virtue of their being ex-presidents of the National Association. T. P. Culloton is also delegate as president of the local association. The alternates elected were as follows: C. C. Breyer, G. A. Fehr, J. R. Alcock, Paul Redieske, Chas. Byrne, J. Harden, P. J. Morrisey, M. L. Morris, J. T. Dalton, A. Watt, D. Wilson, Wm. Ryan, J. Barrett, W. Gay, J. Connell, J. H. De Veney, James H. Roach and T. Hanly. The competitors in the prize essay contest will read their essays at the next regular meeting, May 22, and the author

receiving the greatest number of favorable votes will be awarded the prize of $25.

TRAPS AND VENTS.

C. H. SCHRACK, 32 Carmine street, New York, finds a good demand for his plumbers' charcoal furnace, which is made heavy to stand rough usage, and fitting tight in all its parts, a fire can be held a number of hours. Another of his inventions is a patent sink strainer which can be put in a sink in five minutes, and can be used in connection with any sink. The device consists of a cross bar which fastens to the sink in the same manner as the ordinary strainer. The strainer fits over the cross bar and is held by a brass bolt screwing into a brass nut, so that corrosion will not prevent its being unscrewed.

THE NEW YORK GAS FIXTURE COMPANY, who recently moved their office to the factory building at 478 and 480 Pearl street, New York, have now a fine display of both gas and electric light fixtures and combination fixtures in their showrooms. The showrooms are divided, giving an elegant effect to their different manufactures. Wiring for 40 electric lights in the building has just been completed by Mead & Tichenor of 10 Whitehall street, New York.

A. A. HUNT of the Trimont Mfg. Company of Roxbury, Mass., has been visiting the trade in New York City in the interest of various Trimo pipe wrenches.

AT 153 FRANKLIN STREET, NEW YORK, John Regan has his office and showroom, where he exhibits a fine lot of gas fixtures and lavatories, water closets and plumbing fixtures of the latest design. Here is also his sheet-iron, tin and roofing shop, while at 911 Franklin street he has his pipe shop, where steam power drives machinery capable of working pipe up to 12 inches. He has recently installed the pipe work for a refrigerating plant for the Jersey City Packing Company, and is working on contracts for the plumbing work at the Seventy-first Regiment Armory, the Snake Hill Insane Asylum and the public school at Eighty-fifth street and Madison avenue.

E. B. LEONARD is just getting settled in new quarters at 14 Lombard street, Newark, N. J., where the plumbing, gas, steam and hot-water fitting department of his business has ample accommodation. To reach his office, which is located here and is of modern arrangement, it is necessary to pass through what is virtually a glass show window extending entirely across the front of the building, the entrance being in the center. This is used to display a fine collection of the latest plumbing fixtures set up as if for actual use. At 78 Boyden street Mr. Leonard conducts his stove and furnace business and at Fourth and Belleville avenues a large well-lighted shop is devoted to the tinning business.

THE FOLLOWING DELEGATES, being master plumbers of Pittsburgh and Allegheny, Pa., have been elected to attend the eleventh annual convention of the National Association of Master Plumbers, which meets in Milwaukee, Wis., from June 13 to 15: J. P. Reineke, R. J. Bradshaw, George Sands, F. J. Gray, J. O. McGinniss, J. L. McShane, J. J. Kennedy, James Hay, John Cowling and C. H. Humbert.

B. M. MARTIN, 83 South Fifth avenue, New York, makes a specialty of brewers' brass work, running his own foundry and finishing shop. His facilities enable him to do difficult job work in a satisfactory manner.

O'BRIEN & RYDER, 154 Spring street, New York, make their showroom do them excellent service by a fine display of modern plumbing fixtures. On one side a white marble platform supports several styles of water closets of different decoration and finish. Then comes a handsome lavatory in white marble and a set of urinal stalls of the same material. On the opposite side are arranged a set of earthenware laundry tubs and the office fixtures, so that, without the effect of crowding, their goods present a fine appearance.

E. ASPINALL, 98–100 Beekman street, New York City, sole agent for Twyford's English earthenware for plumbers' use, refers to what he says is the largest lavatory slab and basin made, or anywhere to be found. This particular size is on exhibition at his place of business, and the oval bowl measures 24 x 17 inches. These are also made in a variety of shapes and designs smaller in size, for numerous uses. The combined Athena lavatories, from the same pottery, present a pleasing appearance. They are cased in iron castings of a fine degree of workmanship and decorated in various colors to represent different hard woods, with beveled plate mirrors above and ornamental brackets or legs for support. The excellence of design and execution is what he emphasizes. The lavatories are supplied with fittings made in this country by Peck Bros. & Co.

E. BAGGOT, 169 and 171 Adams street, Chicago, has large contracts for plumbing, drainage, gas and electric fixtures. At present there are over five hundred men in his employ. Among the jobs on hand and being finished can be mentioned the following: At World's Fair, 57 restaurants and large kitchen for Wellington Catering Company; Virginia, Idaho and Chinese Buildings, Irish Village and Hagenbeck's Arena, Windermere Hotel, Fifty-sixth street and Cornell avenue; power house for Marshall Field's Building, Wabash avenue; Barry Bros.' Hotel; Lakota Hotel, Michigan avenue and Thirty-third street; John Quincy Adams Building, 242–246 Adams street; and Humboldt Park Refectory, Humboldt Park.

FROM HEPE, KOVEN & CO., 18 Spruce street, New York, is received a catalogue in a crimson cloth cover bearing their name and address and a cut of a circulating range boiler in silver. From the text on enameled paper in a dark shaded ink it is learned that they make a specialty of manufacturing high pressure circulating range boilers for the larger trade who distribute their goods. These boilers have a special head and bottom to secure strength and prevent leaks and are made both horizontal and upright with connections so placed as to meet local requirements. They are furnished with either a copper or iron coil on the inside, in addition to the regular connections, so that they can be connected with a steam plant and the water heated by steam. Boilers up to 1000 gallons are furnished. Expansion tanks for hot-water heating plants, air receivers used with beer apparatus and calcium light cylinders. Tanks for storing oil and water tanks for house supply either round or rectangular are made up to 10,000 gallons. The last two pages show how to connect a boiler with a water back, and a view of their plant at Jersey City, N. J. In addition to their boiler business they furnish steel plate radiating sections for hot-air furnaces.

Electric Machine Tools.

At the new works of the Crocker-Wheeler Electric Company at Ampere, East Orange, N. J., all the power is supplied by electric motors. The peculiar feature of the equipment is that, with the exception of a few short lines of shafting placed to operate small machines requiring only an insignificant amount of power, all of the larger machines are run by motors mounted upon their own frames. The electrically driven machines include planers, blowers, multiple and single spindle drills, sheet-metal shears, shapers, lathes, presses, pipe threading machines, &c. With only two or three exceptions, it was not found necessary to change in any way the form of the machine drivea. In most machines there is some place on the frame where the motor can be placed.

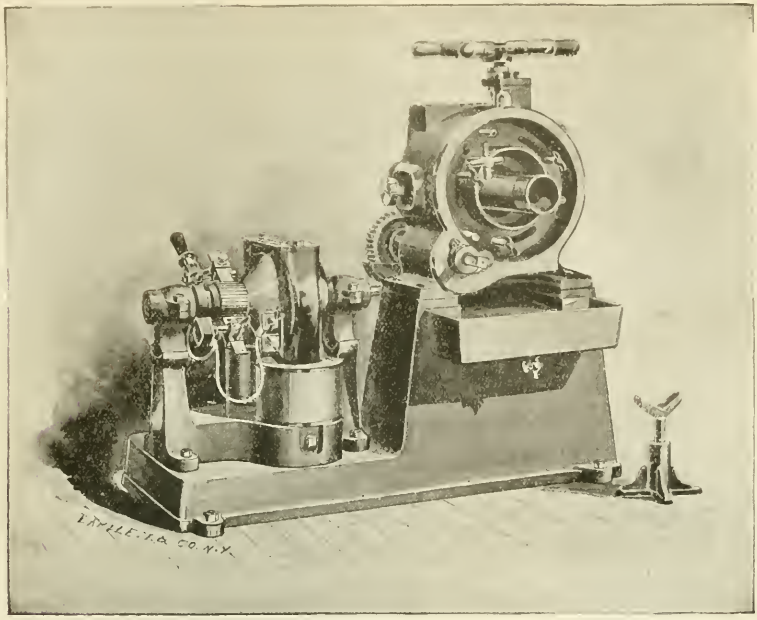
From an article on this subject by S. S. Wheeler of the Crocker-Wheeler Company, in a recent number of the *Electrical Engineer*, we take the following:

I have concentrated no little time and money on the many different problems of so adapting or modifying electric motors that they may be built directly into such tools as lend themselves to the purpose, in place of belting the motors to the countershafting here and there. Some tools invite this treatment much more than others do, and in the future I believe that the tools of newer design will owe their specific shape and construction very largely to the changes now being introduced by the use of electric power in this direct maaner. This important class of improvement is immediately suggested by the appearance of the temporary rigs, in a shop using electric power, but, like many other things, it had not been given attention by most persons until the use of electricity for power had become pretty general After adopting a line of electric bars or mains through a shop in place of the ordinary revolving shafting, and after belting a few motors to lathes and other tools and connecting them to the bars, it is easily seen that much better mechanical arrangements could be made by building in the motors as an integral part of the several tools. This construction gives rise to directly connected machine tools, a new line of machinery destined, in my judgment, to be of very great importance. The machines employed at the Crocker-Wheeler works are the regular standard tools of the market, but with motors combined, both being properly proportioned for their purposes, so that when the small flexible cable or lamp cord is connected to them from the power line they become operative and are self propelling tools, readily portable if desired. Machinery of this kind obviously has a number of important advantages. It requires no setting up. It can be moved and then used so readily that it makes temporary shifting of machinery to meet requirements of extra work in one department practicable. A single tool can be run at any time without running others, thus saving all shafting friction, &c. The tool having no belts, and the power being generated in the head stock just where it is consumed, the machine runs much more quietly, &c.

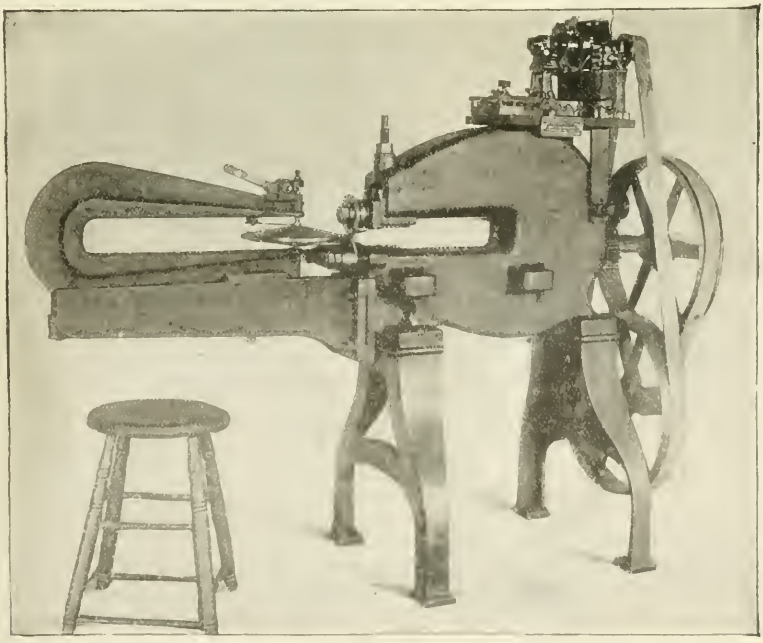
Quite a variety of direct connected machines have already been built and put in use with such success that we now propose and are prepared to design motors for all classes of machine tools. A brief description will, I think, be found of general interest. The electric lathes, for example, are built on this principle, the motor armature taking the place of the belt pulley and the field magnet frame being part of the lathe bed, securing simplicity and rigidity. . . . . .

I am glad to be able to show also another very interesting direct application, namely, the operation of sheet metal power shears. The ¾ horse-power motor while attached directly to the tool is geared up by belting, passing over intermediate pulleys, which at the same time serve as belt tighteners by being adjustable vertically. The power required for the work is much reduced by the directness of application. The machine can be stopped and started in an instant by the switch knob near the motor, and can be moved to any part of the shop and used at once without the troubles incident to lining up.

In shops already provided with a number of tools driven by belting, and where it is found desirable to introduce electric power, the motors are simply bracketed to the ordinary form of tools, and same as with all machines of this character. In connection with these direct driven tools it may be well for me to call attention to the absolute practical results which have already been obtained by the use of machines intermittently operated, only 15 to 25 per cent. of the total power supplied by the engines is expended in useful work. It is well known that a very large portion is required simply to move the



ELECTRICALLY DRIVEN PIPE-THREADING MACHINE.



ELECTRICALLY DRIVEN SHEET-METAL POWER SHEARS.

connected by means of belting. . . . Still another variety of application is shown in the electric pipe threading machine, which needs no special description, as its operation is precisely the e'ectricity in machine shops, than which no subject can be of greater interest to manufacturers.

Under the usual manufacturing conditions involving the driving of tools or great pulleys, belting and shafting, which starting from the engine room, convey the power from floor to floor, and distribute it to the different wings and parts of the factory.

STEAM AND HOT WATER.

The Master Fitters' Convention.

In preparing for the coming fifth annual convention of the Master Steam and Hot-Water Fitters' Association of the United States a circular letter of invitation has been addressed to the trade, signed by President P. S. Hudson, Secretary George H. Reynolds, 628 Rialto Building, Chicago, Ill., and the Executive Committee, consisting of L. H. Prentice, C. H. Simmons, John Davis, F. W. Lamb and H. A. Kroeschell. The following is the text of the circular letter:

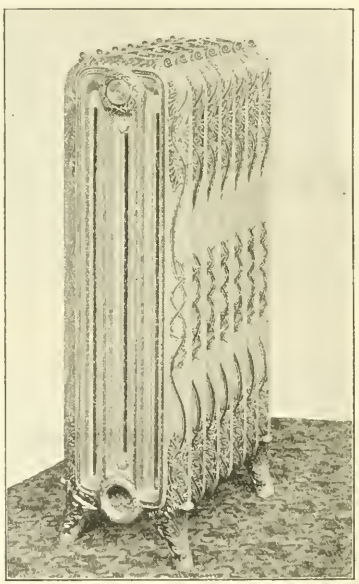
The fifth annual convention of the Master Steam and Hot-Water Fitters' Association of the United States will be held at the Revere House, in Chicago, commencing Tuesday, June 6, at 10 o'clock a.m. A cordial invitation is extended to all contracting master fitters to attend this meeting, whether members or not. We urge each and every one who receives this paper to make inquiry of others of the craft, and to advise any whom this has failed to reach that they are included in the invitation. The reading of papers by members, which was introduced at our last convention, was an attractive feature, and they were appreciated. We purpose continuing this at the coming convention, and hope they will prove of still greater interest. Certainly, every master fitter in the United States who intends to keep abreast of all that is modern and new, and tends toward progress, will visit the World's Fair, for there will be exhibited the concentrated experiences of the world. The representative villages, displaying the home life of nearly all nations, should alone be of sufficient interest to pay for the journey. Then why not make the trip so as to be here on the dates of our convention, and, after adjournment, profit by all these interesting studies that can be offered not more than once in a lifetime? The Revere House, which is located on the corner of North Clark and Michigan streets, has wholesome and ample accommodations for all. For rates see inclosed postal card, which please fill out and mail to us. Those desiring to make exhibits of their goods at the convention can secure information and particulars by addressing the proprietors of the Revere House. World's Fair transportation rates are all that the railroads will consider, which, it is hoped, will be full better than those usually granted to people attending conventions.

Accompanying the notice are postal cards, on which application may be made for rooms at the Revere House; also credential certificates for members and proxies. There is likewise distributed a pamphlet containing a list of the members of the Association.

It is to be hoped that this convention, to be held next month in Chicago, will be generously attended, and there is every reason to believe that such will be the case. It is needless to dwell upon the attractions that Chicago offers this year, and the members who attend the convention will, without doubt, be royally treated by their Chicago brethren. In addition to the interest that the convention always excites, there will, of course, be the added attraction of the fair; and, as all of the master fitters throughout the country who can possibly do so will undoubtedly visit the fair, it will be an excellent plan to time their visit to coincide with this convention, so that they may be present at its deliberations, and, if not already members, will have an opportunity to look into the association with a view to becoming members.

New Four-Column National Radiator.

The American Radiator Company, general offices at 111-113 Lake street, Chicago, have added to their extensive line the new four column National direct-water radiator, illustrated herewith. The standard hight, 38 inches, contains 8 square feet of surface to the loop, and, we are informed, requires, proportionately, a less amount of water than any other style or make of direct-water radiator. The four-column National is especially designed to fill the demand for a radiator of large surface to fit limited spaces. It is handsomely decorated, as is shown in the cut.



New Four-Column National Radiator.

The Harrisburg Boiler & Mfg. Company of Harrisburg, Pa., are about shipping three of their boilers to Havana, Cuba, to fill orders taken for them at that place. R. D. Droop of Havana has been appointed the company's agent for Cuba.

The Efficiency of Heating Apparatus.

We are permitted to print from advance pages of a catalogue about to be issued by Hopson & Chapin Mfg. Company, New London, Conn., the following observations on the efficiency of heating apparatus. It is gratifying to find in a trade publication of the catalogue sort a discussion of principles quite free from extraordinary praise of the manufacturer's own heater, but we believe that this unusual style will commend itself to the thinking members of the trade. We quote from the concluding pages of the catalogue as follows:

The foregoing illustrations and descriptions exhibit apparatus for warming, and for warming and ventilating. The most important question connected with the subject is their proper installation in any premises. Allusion has been made in preceding pages to the importance of a carefully and intelligently estimated layout and a proper plan of erection. After an active experience of several years in the warming and ventilation of every variety of buildings we are prepared to say that the plan under which any heating apparatus is erected is of the first importance and all other questions connected therewith should follow it. We know very well the reverse method of arriving at a decision is frequently taken. The subject is often approached in the view that some heating apparatus, as it is manufactured, constitutes a machine, measured in feet or

gallons, that is of itself competent or not to satisfactorily warm a given premises. A boiler is often held to be pre-eminently fit to receive the praise or blame of the entire plant, including the merit in the use of water to carry heat. It must be plain, however, to any one on reflection that a farmer's kettle, inclosed, will warm any premises if it is large enough, and that the best planned boiler, specially built for hot-water heating will fail to do so if the other links of the chain fail.

Now, there are points of great importance to govern the selection of a boiler. They are, efficiency per pound of fuel consumed; labor and skill required to maintain a desired temperature; facility for cleaning, and durability of joints and parts. These points constitute a large field for selection, and a close examination of construction and records of years' use would disclose a wide variety of results. The point we wish to make is that the legitimate ground for choice in boilers is limited to nearly the above points.

In the matter of radiators, the heat units emitted by the different constructions, especially in different locations, is a question that receives less attention than it deserves. Care is taken over the size of radiators, but little given to their location. It is our experience that within certain limits the latter question is more important than the former.

Again, short rules intended to promote quick sales are in common use. The process is to divide cubic feet by a factor. The loss of heat from a warmed apartment to surrounding air of a lower temperature is through three exits, viz.: through glass, outside walls and by escaping warmed air. The loss of heat through glass can be accurately determined; that through walls may be determined with sufficient accuracy, but the quantity of air lost from any apartment cannot be accurately measured. It may be approximated by experience under similar conditions. The construction of buildings, their location and uses, the desires and needs of the occupants, the values of heating surfaces in boilers and of radiating and air heating surfaces in radiators, vary so greatly that no fixed rule for allotment is safe. The fact is, that a plan for the installation of a fit hot water plant, competent as to the allotment of capacities, suitably proportioned in its parts, and able to accomplish the desired results, is a work of engineering, computation, skill and experience, not of commercial push alone.

In this connection it must be borne in mind that the results from an intelligent equipment of hot-water heating apparatus may not be limited to the mere production of heat. Stoves, steam and furnaces produce heat, and in great abundance. If heat alone were the object sought but little thought need be given to plans. Modern cultivation has progressed beyond the mere desire to be warm. The apartment should be uniformly warmed at every point, not merely in the center or on warm walls, but on floors and about cold windows. The several rooms of a building should be uniformly temperate and the plant yield desired warmth without frequent regulation or attention, but be governed according to out-of-doors temperature by the fire. The intent of the apparatus is to sustain heat. The quantity of fuel in combustion, the rate of combustion, the temperature of water in use, its uniform delivery at different points and at various levels in the building to accomplish a uniform or uniformly graded result, are features to be realized.

In ventilation a sufficient quantity of air of an agreeable initial, as well as resultant temperature, free from impurities, its point of entry, the exit of vitiated air, the velocity of both currents, that of the incoming air at a rate less than a perceptible current, and of the outgoing air at a velocity sufficient to insure both the heat and ventilation desired, are, or may be, demands of modern intelligence.

Cellar Drain Connection.

From F. P., *East Fairfield, Vt.*—I was much interested in the plumbing department of *The Metal Worker* of February 25, and would still further draw on your store of information by asking if the inclosed sketch shows the proper way to connect cellar drain with house drain? Would it be necessary to use trap No. 6 if a bell-trap cesspool was used?

Answer.—The sketch sent by our correspondent simply shows a trap at the foot of the vertical soil pipe line—a fresh-air pipe above the trap aforesaid, taken out of vertical soil pipe, and a cellar drain with a bell-trap. The arrangement is defective, first, because there should be no trap at the foot of a vertical line of soi pipe. A careful study of the diagram showing a sectional view of house plumbing, which appeared in *The Metal Worker* of February 25, and to which our correspondent refers, will show how the connection of the soil pipe should be made with the house drain, viz., by means of a Y-branch and a one-eighth bend, and without any trap whatever beyond the main running trap on house drain inside front wall. The next defect shown in the sketch is in the use of a bell trap and cesspool in cellar floor. The bell trap was long ago discarded for indoor use, as from the nature of its construction it is neither cleanly nor secure. If a cellar floor must be connected with the house drain our correspondent is advised to use an ordinary running or S-trap, as shown in *The Metal Worker* of April 15, with the further security of a flap or tide-water valve to protect the cellar from sewage backing up in case of house drain obstruction.

HEATING NOTES.

The J. F. Pease Furnace Company of Syracuse, N. Y., have disposed of their retail and contracting business in the city of Boston and immediate vicinity to Albert B. Franklin, 228 Franklin street, in that city. Mr. Franklin will hereafter sell and erect in that district all heaters and furnaces made by the company, and has retained the services of some of the best men formerly employed by the Pease Furnace Company at 75 Union street. John Demarest will continue to manage the New England department of the company's business and will make his headquarters at 228 Franklin street. Mr. Demarest will have general charge of the wholesale business of the company and will give assistance to the trade in laying out adjustments, securing contracts, &c.

From the D. F. Morgan Boiler Company of New York and Chicago we receive a four-page sheet, showing four different views, in a handsomely executed half-tone engraving, of twenty-eight fine houses recently erected in East Orange, N. J., in which their steam boilers have been used.

The plant of Baker, Smith & Co., at South Fifth avenue and Houston street, New York, though a large one for heating and ventilating engineers, is often taxed severely to meet their requirements. The basement contains a 75 horse-power engine to drive their different machines, including several pipe-cutting and threading machines, a pipe-sawing machine and five blacksmith forges. The basement is also used for a receiving room for casting, besides affording ample storage for a varied stock of pipe. On the first floor is the shipping and receiving office and a very completely equipped machine shop. The second floor has the counting house, the private offices and large drafting rooms, besides a large stock of manufactured goods. The third floor has the carpenter shop and the pattern makers, and in a separate room is a large brass finishing shop, where many of the valves used in their work are finished. The fourth floor is the tin and sheet-iron shop, where some nice workmanship can be seen by a visitor at any time. The large force of workmen are under the superintendence of Augustus Pierce, who has systemized their labor so that the work is accomplished with a smoothness which seems almost like inaction. Some of the work now in hand is the residence of Cornelius Vanderbilt, which will have 113 coils for indirect hot-water heating, the Scott & Bowne building, the Blake building, the Manhattan Electric Light Company's building and the Havemeyer building, all to be heated by steam. The pipe work for the Cable Road power plant was also installed by them.

F. B. Cryer & Co. have just moved into a more commodious building at Newark, N. J., just opposite the Delaware, Lackawanna & Western Railroad station. They report activity in the Steam and Hot-Water heating line, and are bringing out some new things in Hangers and Plates.

Clarkson, Scott & Co., at 118 Custom House place, Philadelphia, are a new firm of engineers and contractors who will make a specialty of heating, ventilating, drying and pipe work. Mr. Clarkson was for years one of the engineering corps of Wilson Bros. & Co., architects and engineers at Philadelphia. Mr. Scott had a long experience with the Onderdonk Heating and Ventilating Company of the same city. The new firm start out with a contract for installing a steam-heating plant at the new county prison at Holmesburg, Pa., amounting to $67,000.

The Newark Heating, Ventilating and Machine Company, 22 Atlantic street, Newark, N. J., are busily engaged in preparing for the Ventilating Fan season, now at hand. Some new things in Fans that will probably be of interest are in course of completion.

President Joseph Bond of the American Radiator Company, Chicago, is making a few days' visit in New York looking after the interests of the company.

McMann & Taylor are a new house at 42 Cliff street, New York, manufacturing and dealing in wrought and cast iron pipe and boiler tubes, plumbers', steam and gas fitters' supplies of all kinds, and hand tools and machines. They make a specialty of pipe cutting to sketch with promptness and accuracy. H. W. McMann brings a 30 years' experience, being formerly of the house of T. R. McMann & Co., Geo. W. K. Taylor was with the Eaton, Cole & Burham Company for 20 years.

Joseph T. Robbins, Newton, Iowa, is the patentee of an improvement in water heaters for warming buildings. A feature of it is the location of the furnace whereby the fuel is supported above the tubes and the products of combustion lead downward and beneath the water reservoir.

From George B. Cobb & Co., 42 Duane street, New York City, contracting engineers for heating apparatus, we have received a set of illustrated catalogues issued by the American Boiler Company, and describing the various heaters which they now make. The catalogues, of oblong shape, are very neatly printed, illustrated with fine engravings and altogether are gotten up in an elaborate and attractive style. The series is bound in various

colors, giving a pleasing effect. One catalogue is devoted to the Florida steam heaters, with which apparatus the public has long been familiar. General and sectional views illustrate its construction thoroughly, and descriptive text is likewise given. The second circular relates to the Tropic hot-water heater. This apparatus, as explained in the preface, was formerly known as the Florida hot-water heater, but in order to avoid confusion with the steam boiler by that name it has been changed to the Tropic. The Spence hot-water heater is similarly illustrated and described in a separate pamphlet; likewise the Soleil safety steam heater, which was put on the market last year. Two other pamphlets in the series give attention to the widely known Perfect hot-water heaters and to the American safety sectional steam boiler, which was illustrated in *The Metal Worker* not long ago. The Modern portable steam boiler completes the list of catalogues.

A LARGE POSTER, resplendent in scarlet ink, is issued by Le Bosquet Brothers, 82 Union street, Boston, Mass. The subjects of the announcement are this firm's steam and hot-water heating apparatus, of which several illustrations are presented and a few particulars as to size and principal merits. Prominent attention is likewise given to Le Bosquet's Patent Regulating Damper, which is illustrated on the poster.

THE LAST NUMBER of the U. S. Heater Company's "Postal Travelers" is given over to an account of their expansion tanks, for use with hot-water heating apparatus. These tanks are described as made of heavy boiler steel and tested to 200 pounds pressure. An illustration is presented, and likewise table of sizes and capacities and prices.

THE RAYMOND & CAMPBELL MFG. COMPANY of Middletown, Pa., are meeting with a large demand for their Sun boilers. Their large orders received since March 1 include three boilers for H. M. Kaufman, Windom, Lane County Pa.; eight for S. F. Littlefield, Wakefield, Mass.; three for F. T. Davis, Portland, Me.; eight for A. J. Rogers, Paterson, N. J.; four for St. Louis Steam, Heat and Ventilating Company, St. Louis, and four for H. Gray, Washington, D. C. The company have on exhibition in Chicago at the store of Rendtorff & Co., Lake street, two of their improved boilers, where they will remain from May 20 to June 3. They will then be removed to the Revere House, corner of Clark and Michigan streets, where the convention of the Master Steam and Hot-Water Fitters of the United States is to be held. Mr. Lindemuth, the patentee of the boilers, will be present at the convention.

GIBSON, SCOTT & Co. have just commenced business as steam and hot-water engineers and contractors at Ridge avenue and Buttonwood streets, Philadelphia. The firm is composed of W. C. Gibson, A. W. Scott and J. V. Adair, and with a long experience, obtained through a connection of some years with a large Western firm in the same line, should find lots of opportunities to place their work.

J. P. SCHAFFER is now located right in the midst of the heating trade, at 18 Wood street, Pittsburgh, Pa., in a large five-story building. The first floor has the office and is used to display samples of the Black Hussar steel ranges, the Novelty hot-water circulator, the Novelty hot-air furnace and a line of heating and cooking stoves and open grates. The basement is used for storage and has the tools and pipe-cutting machinery necessary for the erection of hot-water heating plants. The second, third and fifth floors are used for storage, and the fourth floor for a tin and sheet iron shop, for which, in addition to its present equipments, some special machinery is being constructed. The present location is selected to meet the requirements of a business growing as the result of the superior service rendered. Having made a specialty of heating with hot air, the use of high grade tin plate in the work and sound judgment in laying out the plan have resulted in a success which requires large quantities of registers and heating goods by the carload. One of Mr. Schaffer's inventions is his patent annular water pan for hot air furnaces which moistens the air that passes through each hot-air pipe equally.

M. E. HERBERT, 186 Van Buren street, Chicago, has the contracts for steam heating in the following buildings: Waukesha Hotel, Sixty-fourth and Hope streets; Renfast Building, 72 flats, Fifty second street and Cottage Grove avenue; Yale Hotel, Sixty-sixth and Yale streets; Rothschilds' Apartment Building, Forty-first street and Indiana avenue; Williams' Building, Twenty-third street and South Park avenue; Hasselroth Building, Chicago avenue and Franklin street; Arizona Building, 12 boilers, Forty-second street and Lake avenue; Potomac Building, Thirtieth street and Michigan avenue; Albemarle Building, 3801 Lake avenue, and Kedzie Building, Clark and Randolph streets.

A RECENT NUMBER of the *Rural American* contains a very flattering notice of the Royal hot-water heater manufactured by Hart & Crouse, Utica, N. Y. A cut is presented of the heater and a description is given, special emphasis being laid upon the meritorious features of its construction.

Prize Competitions

$25.00.

Prize Competition No. 24.

SUBJECT:

Short Methods of Figuring Discounts.

Merchants may be assumed to be able to arrive accurately at the cost of an article, list and discount being given, but not all are familiar with the shorter methods by which results may be quickly arrived at and more complicated questions in discounts be solved. This competition is designed to draw out a description of short methods of figuring discounts. Among the subjects which may be touched upon are the following:

Finding the net cost, list and discount being given;

Finding the percentage of profit, net cost and selling price being given;

Finding out at what price goods should be sold to secure a certain percentage of profit;

The extent to which it is practicable to use a single discount which is equivalent to two or more discounts.

Other matters will naturally occur to those entering this competition and we shall be glad to have any information on this subject which will be of service to the trade.

This competition will remain open until June 3, 1893.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which, in the judgment of the committee of award, are most suitable for publication and of the most general interest.

We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than June 3, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96–102 *Reade street,*
New York.
Prize Competition No. 24.

The Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 21. Closing May 13.
The Safety Line in Credit Business.

No. 22. Closing May 20.
The Best Manner of Presenting and Collecting Book Accounts.

No. 23. Closing May 27.
Three or more Subjects for Prize Competition.

No. 24. Closing June 3.
Short Methods of Figuring Discounts.

Another subject will be announced in our next issue.

Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until May 31 for furnishing and erecting complete in the United States Court House and Post Office Building, Trenton, N. J., either a hydraulic passenger elevator, including pumps, tanks, piping, car, closure of well hole, &c., or steam passenger elevator. Also a new steam boiler, injector, smoke stack, &c., according to the drawings and specifications, copies of which may be had at the office of the Supervising Architect, Washington, or the Custodian at Trenton.

An enormous microscope was constructed in Munich, according to the *Annales Techniques*, to be exhibited at the Columbian Exposition. It has a normal magnifying power of 11,000 diameters, which can be increased to 16,000 by the medium of an electric light, which throws the image on a screen. In order that the heat of the lamp may occasion no expansion of the metallic parts of the armature, and consequently displace the focus of the lenses, a bronze cylinder containing liquid carbonic acid is so arranged that a little liquid escapes when the temperature reaches a certain point, and by its evaporation reduces the armature to a normal temperature.

Florida is fast coming to the front in the canning business. New canneries are reported this month as being established in Jacksonville, Key West, Tampa, Pensacola, Fernandina and other points.

STOVE TRADE NOTES.

The Stove Exhibit at the Fair

A representative of *The Metal Worker* paid a visit to the World's Fair last week for the purpose of writing up the stove exhibits. Much to his disappointment he found these exhibits still very incomplete. In some cases manufacturers have done exceedingly well, having erected tasteful pavilions and arranged a fine display of their goods. But the section was by no means complete. Some pavilions were in course of erection by belated exhibitors, others were being painted and decorated, while quite a number were partly filled with exhibits in various stages of disorder. Not a few spaces were occupied by packing boxes wholly unopened. The enterprising manufacturers who had pushed work so as to make a creditable showing on opening day were disgusted with the work going on in the immediate vicinity, which created considerable dust and dirt and excited apprehensions of injury to handsome articles splendidly arranged to dazzle the eyes of visitors. It was like portions of a carpenter shop fitted up with parlor furniture. When all exhibits are finally in place and all work is completely done there will probably be some retouching needed by the "early birds" on the scene who have not "caught the worm," but have caught lots of annoyance from the late comers.

An Army Cooking Stove.

It appears that for some years past the Adjutant-General of the National Guard of the State of Pennsylvania has endeavored to procure a suitable stove for cooking the rations issued to the men when in camp. The experience at Homestead, as well as at all previous encampments, showed that a large percentage of the rations was wasted and the rest deprived of much of its nutriment by reason of the primitive facilities afforded. In January there was a meeting of the Fourth Regiment officers and a committee appointed to devise suitable cooking apparatus for the companies of the regiment. This committee delegated one of its number to have a stove constructed which would in all particulars meet the requirements of the case. In this work the services of Boiler Inspector James Schrader of the Philadelphia & Reading Railroad Shops, and George Schimpf, a boiler maker and steam fitter, were secured and the stove constructed. At a recent test the stove was found satisfactory in every particular. The stove is made of ¼-inch steel and stands 26 inches high, is 26 inches wide and 36 inches long. The fire place is 12 inches wide, 26 inches high and 26 inches deep, and has a lining of iron with an air space. The opening of the fireplace is on the side of the stove opposite from the oven, so that the cook is not annoyed by projecting sticks of wood, there being three sides of the stove free from obstruction. The oven is 18 inches high, 18 inches wide and 24 inches deep, the construction being such that the heat passes entirely around it before reaching the flue. The door opens out upon the ground, a swinging handle bringing it on a level and forming a table or shelf for the convenient removal of dishes. The stove pipe telescopes, and in shipment can be carried in the oven, together with the stove lids. Handles can be placed on the corners of the stove, so that it can be readily carried by four men. The claim made for this construction is that it effects a great saving of fuel, and cooking operations can be conducted in less time than with the stoves which have heretofore been employed for the purpose.

Abendroth Brothers' Display at the World's Fair.

Abendroth Brothers, proprietors of the Eagle Iron Works, and with offices located at 109 and 111 Beekman street, New York City, have a very attractive exhibit at the World's Fair, now in progress in Chicago. Before the stoves were forwarded to their destination they were placed on exhibition at Portchester, where the foundry is located, in order that they might be inspected by those interested. The exhibit consists of selections from the company's lines of cook stoves and heaters, a prominent feature being the York Grand fire place heater, similar in design, we understand, to the one purchased by the Siamese Prince for the palace in Bangkok. A companion of this stove in elegance, finish and style is the York Queen fire place heater, hundreds of which are being placed in apartment houses in New York City. These stoves are finished in the highest style of the art and decorated with nickel, art tile and jewel embellishments, in what may be designated as the renaissance style. There are also several very attractive ranges of the York series—the Norfolk, the U. S. range, the Badge, the Linwood, Pride of America, the 88 York, the Andrus water heater and the York furnace. The exhibit, we understand, is in the Horticultural Building and occupies a space 16 x 8 feet. The platform upon which the stoves rest represents a tessellated pavement. The groupings are pyramidal in form, surmounted by the trade-mark of the company. This trade mark is 3 x 4 feet in size, and is held in position by wrought-iron framework. The central feature of the display is the Columbian vase, 55 x 30 inches in size, the finish being mostly in galvano-bronze. There is also the Venus vase, 56 x 44 inches, in galvano copper bronze; the Chase vase, 64 x 50 inches, finished in galvano-bronze and of a style which may be designated as mediæval gothic; the Flora vase, the Amazon or Greek vase, finished in verd antique, with polished brass posts and banners; the Grace, finished in old brass; the Grecian or Arcadian vase, with Acanthus decoration; the Florentine, finished in cream and gold, and the Gem, with pedestal finished in white enamel. There are some very fine specimens of portrait sculpture in connection with this exhibit, the designer and modeler being George Beck, who for many years has been connected with the Eagle Foundry. The company named have a very artistic display, and it is one which is likely to attract attention, not only of members of the stove trade, but of all who admire beautiful workmanship.

The Stove Conventiom.

An Ohio stove man has been thinking deeply over the approaching convention—so deeply that his thoughts have arranged themselves in verse, and he sends us the following effusion, *à la* Kipling:

"Now, what's the molder howling for?" the big stove maker said.
"He wants more pay; he wants more pay," his secretary said.
"But what's the use of howling so and shaking of his head?"
"Because he wants his rights, you see," the secretary said.
For the molders are a-talking and a-cussing all the day,
And they say they will not work for their old wages, any way,
And if the makers don't give them a sure increase of pay
They're going on a strike some fine June morning.

"What makes my cash box feel so light?" the big stove maker said.
"Folks don't buy stoves; folks won't buy stoves," his secretary said.
"But how am I to pay my men and give them steady work?"
"That's your lookout; that's your lookout; pay day you cannot shirk."
For the molders are a-talking and a-cussing black and blue;
They don't care if they work or not, but say that if they do
They want a straight fifteen per cent. more than in 'ninety-two
Or they're going on a strike some fine June morning.

"Who's that lean chap out at my door?" the big stove maker said.
"He's your Dakota salesman, sir," his secretary said.
"Why don't he stay out on the road, and sell, and sell, and sell?"
"He hasn't sold a stove this month, and don't feel very well."
For the farmers are a-talking and a-cussing black and blue;
The rain it rains when snow don't snow, and winter ne'er gets through;
So that things look bad for wheat and corn, likewise potatoes too,
And there'll mischief be to pay some fine June morning

"But who's that bogie man out there?" the big stove maker said.
"He calls himself an editor," his secretary said.
"Well, then, why does he gnash his teeth and talk so very loud?"
"Because he wants some 'ads' right now and wants 'em in a crowd."
For the papers must be printed and the printers' bills be paid,
Then be carried through the mails and on each stove man's desk be laid
To instruct him how to think and act and how to run his trade,
So "ads" must come or there will be a circus some June morning.

"Oh, what's that row offends mine ears?" Chicago's mayor said.
"The stove men have a meeting, boss," his secretary said.
"But do they howl and yell like that whene'er they come to town?"
"Oh, no. But now they're in a row and got somebody down."
For the stove men are as meek as lambs when things go the right way,
But when they get their dander up the man should go and pray
Who thinks they don't know how to fight, and therefore that he may
Pull all their noses out of whack some fine June morning.

Exhibits of Heating Apparatus.

From the official catalogue of the exhibits of the World's Columbian Exposition we note under Group 115 of the Manufactures and Liberal Arts Building the following list of exhibitors of heating and cooking apparatus. It will be noticed that the boilers, furnaces, cook stoves, &c., are under one grouping:

Abendroth Brothers, New York.
American Heating Company, Rockford, Ill.
American Radiator Company, Chicago.
Beckwith, Estate of P. D., Dowagiac, Mich
Bailey Oven Company, Mansfield, Mass.
Bucks Stove & Range Company, St. Louis, Mo.
Buzzacott, Francis H., Fort Sheridan, Ill.
Chapman, H M , Chicago.
Chicago Clothes Dryer Works, Chicago.
Chicago Stove Works, Chicago.
Clark, Geo. M. & Co., Chicago.
Co operative Stove Company, Cleveland, Ohio.
Collins & Burgie Company, Chicago.
Co-operative Foundry Company, Rochester, N. Y.
Cortland-Howe Ventilating Stove Company, Cortland, N. Y.
Cribben, Sexton & Co., Chicago.
Daemicke, Paul J., Chicago.
Dangler Stove & Mfg. Company, Cleveland, Ohio.
Daggett, W. A. & Co., Vineland, N. J.
Devlin, Thomas & Co., Philadelphia.
Enterprise Mfg. Company, Philadelphia.
Excelsior Mfg. Company, St. Louis.
Farquhar Heating Company, Chicago.
Fuller-Warren Company, Milwaukee, Wis.
Gorton & Lidgerwood Company, New York.
Goodell Company, Antrim, N. H.
Graff & Co., Chicago.
Green, Mrs. M. A., Mountclair, Col.
Griffing, A. A , Iron Company, Jersey City, N. J.
Hambel, Mrs. A. J., Chicago.
Hall, Whitney & Co., Boston.
Howard Thermostat Company, Syracuse, N. Y.
Huette-Barler Mfg. Company, Chicago.
Jackson, Edwin A., & Bros., New York.
Johns, B. B., Philadelphia.
Kahn, F. & L., & Bros., Hamilton, Ohio.
Kelsey Furnace Company, Syracuse, N. Y.
Lawton, Mrs J. M., New York.
Magee Furnace Company, Boston, Mass.
Mason & Davis Company, Chicago.
Meisselbach & Bro., Newark, N. J.
Michigan Stove Company. Detroit, Mich.
Milford Mfg. Company, Milford, Ohio.
Miller Range & Furnace Company, Wm., Cincinnati, Ohio.
Milwaukee Gas Stove Company, Milwaukee, Wis.
New Era Fuel Appliance Company, Chicago.
Northwestern Stove Repair Company, Chicago.
Pease Furnace Company, J. F., Syracuse, N. Y.
Peninsular Stove Company, Detroit, Mich.
Powers Duplex Regulator Company, Chicago.
Pugh & Grosvenor, Casselton, N. D.
Rathbone, Sard & Co., Chicago, Ill.
Reading Stove Works, Reading, Pa.
Resor & Co., Wm., Cincinnati, Ohio.
Richardson & Boynton Company, Chicago.
Ridgway Furnace Company, Boston, Mass.
Ronalds & Co., New York.
Smith & Anthony Stove Company, Boston, Mass.
Spicer Stove Company, Providence, R. I.
Thomas, Roberts, Stevenson Company, Philadelphia, Pa.
Tuttle & Bailey Mfg. Company, New York.
Warner, J. W., Oneida, N. Y.
Wilcox Water Heater Company, Chicago.
Wrought Iron Range Company, St. Louis, Mo.

New Acorn Stoves.

Several handsome new ranges have just been brought out for this season by Rathbone, Sard & Co., Albany, N. Y. They are known as the "square oven series," and are both attractive and serviceable. It is claimed for the square oven feature that there is no useless space; that every part is available for baking, and that there is as much room at the top as on the bottom. The National Acorn, with square oven of extra size, is massive in appearance and of pronounced design. The decoration of the oven front is bold with deeply carved ornamentation, and the fire-box front is fine. The base is high and broad, being something of a departure from the ordinary. The trimmings consist of a novel form of oven door panel, with tile; nickel oven shelf, nickel towel bar and nickel knobs. The grate and fire box construction is a new feature. The new system operates as follows: A cog is slotted on the inside in two places, and, when slipped on the grate shank, these slots are engaged by two "nibs," which hold the cog and prevent its turning. A loose collar is then put on, and a small plate or cover is bolted over the ends of the grate bars, preventing the collars and cogs from getting out of place. The grate bars can be drawn out of the fire box door, and bricks or water front need not be changed. The grate itself is of new construction. Between the teeth the spaces are entirely open, giving a double draft, and permitting all loose ashes to drop easily into the ash pan without shaking the fire. The top is a double expansion one, with ventilated and lined covers and centers, reversible pipe collar, check damper, broad polished edges and full flush reservoir top. The oven is square and heated on five sides. The Acorn system of ventilation is used. The flue system is all sheet. The high shelf is new this year, large and handsome, with tight back and nickel tea pot shelves.

The Magnet Acorn, with a square oven, is of new design, the carving being of an elaborate pattern, and, in combination with nickel and tile oven-door panel, nickel outside oven shelf and other ornamentation, makes a very pretty range. It has a full width top, with broad, polished edges; flush reservoir top extending from front to back; reversible pipe collar and reed check damper; damper handle and rod removed from fire; swinging broiler door, with check damper; square oven, ventilated with fresh air; removable duplex grate with equalized draft; large reservoir heated from bottom; extra size ash pit and pan; patent oven door opener; high carved base. The Puritan Acorn is a contrast to suit those who prefer a quiet style in design. The carving on the oven door consists of four pieces of scroll work running from the corners, with rounded lines in plain cast-iron between the corners. There is a modest nickel panel on the door. This treatment in design is followed on the fire-box door and reservoir end, substituting plain iron for nickel. The base is a rich one. It has the prominent and substantial features in its mechanism. Both the Magnet and Puritan Acorn ranges have the patented removable duplex grate and the system of ventilation.

ODD PLATES.

The John Van Range Company, of Cincinnati, Ohio, report an active demand for kitchen outfits and culinary appliances. They at present have a number of orders on their books, and have recently installed complete kitchen equipments in buildings located in different sections. Prominent among the number may be mentioned the Clifton House of Chicago; the Government Mess Hall at Fort McPherson, Ga.; the Clemson Agricultural College at Fort Hill, S. C.; the Hotel Luehrmann at Memphis, Tenn.; the Windsor Hotel at Bloomington, Ill.; the Kenton Club at Louisville, Ky; the New York Kitchen at Spokane, Wash.; hotels at Hot Springs, Va., and Logansport, Ind.; the Government Mess Hall at Fort Bliss, Texas; the Kenwood at Chicago, and the Albany at Denver, Col.

In referring to the apparatus for heating and ventilating rooms recently patented by William H. Stuyvesant of Brookline, Mass., an error occurred in the spelling of the name, which is the explanation for calling attention to the matter again. The heater is made of Russia iron and stands 2 feet 6 inches in hight. The heat is supplied by three lamps placed on the floor, the cold air being brought in from outside. As it reaches the heater it is distributed into four 2¾ inch flues, which are located immediately over the lamps. The products of combustion and the foul air of the room are carried off by means of a side flue, specially arranged for the purpose. This heater is referred to as being portable, inexpensive and economical. Mr. Stuyvesant states he has been able to keep a room 12 x 16 feet in size in a comfortable condition during the coldest weather by the use of this device. The heater may be operated with oil lamps or gas, as may be most convenient. The invention is the result of Mr. Stuyvesant's investigations into the best plan for warming a certain room in his house, concerning which he had some difficulty last winter. We understand that Mr. Stuyvesant has already received a number of orders from leading scientific institutions in the country for samples of his heater, as it is claimed that it will be an economical and effective way of heating and ventilating dormitories in college buildings.

Floyd, Wells & Co. of Royersford, Pa., state that Robert Kearns is just starting out on a trip through New York State and the Northwest and C. W. Wagoner is to visit Ohio in the interest of their stoves and ranges, which they keep abreast of the times in constructive features and embellishments.

President Wm. L. Essick of the Keystone Meter Company of Royersford, Pa., still devotes his ability to producing goods that claim the attention of many of his old customers in the stove trade. In many cases the stove man is a gas fitter, and as such is interested in the Keystone meter.

The Sioux City Stove Works, which became financially embarrassed through the failure of a large concern in Sioux City, Iowa, passed on May 3 into the hands of a United States Marshal, who took possession on a writ of attachment procured from the United States Court by the Massachusetts National Bank of Fitchburgh, Mass., to secure a claim of $15,000.

We learn from a London exchange that in the course of a recent lecture on neglected points in domestic economy, by Dr. A. T. Schofield, an eminent English hygienist, the possible utilization of electricity for cooking purposes was demonstrated with good success. One of the apparatus provided was a small electrical stove—much like an ordinary gas stove in appearance; sundry grilling plates and various other patented appliances for

boiling and baking were also shown. The heat was produced by sending the ordinary electric current through a network of fine resistance wires, which were imbedded out of sight in the bottom of the saucepan, or in other cases on the side of the stove.

THE BUCKWALTER STOVE COMPANY of Royersford, Pa., are bringing out a medium priced square parlor stove of entirely new design that they claim is worth while to see before placing orders for a fall stock.

REPORTS from Salem, Ore., are to the effect that the State Board are considering a proposition for the purchase of a stove foundry, as provided by the last legislature, so as to give employment to the increasing number of convicts.

W. F. HABICHT celebrated the thirty-third anniversary of his birth by entertaining five of his nearer friends at a planked shad dinner at the Buena Vista Hotel, Gloucester, N. J. The well-known effect of a fish diet and a long connection with the house of F. M Borden & Bros. of Philadelphia will enable him to correctly interpret the most obscure order for Eastern Pennsylvania store repairs.

A VERY ATTRACTIVE CIRCULAR, printed in two colors and carrying beautiful illustrations of the Golden Rule range provided with horizontal circulating boiler, reaches us from A. Weiskittel & Son, Baltimore, Md. The Golden Rule range is a first-class construction, the manufacturers claiming that it is easy to set, can be moved by simply disconnecting the pipes and occupies less space in the kitchen than would be the case if a vertical boiler was employed. The range has sheet flues, patent oven door opener and corrugated tin lining to the oven doors. The ornamentation is of a very neat character, the embellishment of the doors of the warming closet and oven being especially noticeable. Two sizes are made, one having a 16 inch and the other an 18-inch oven.

THE MARCY STOVE REPAIR COMPANY have taken possession of their new five-story building at 74 Beekman street, New York, where they are in position to handle all orders which the trade may see fit to intrust to them. The managers of the concern, Messrs. Hauser & Dennis, are old stove men and understand the business in all its details The volume of trade has increased to such an extent, we understand, that additions have been made to the number of clerks employed.

WILLIAM HOWE of Cortland, N. Y., with several other manufacturers, has been in Niagara Falls, N. Y., making arrangements to secure considerable land. If the project is successful it is said that the Howe Stove Works of Tallapoosa, Ga., and several other industries will be located there.

"WE PROPOSE to get out a new catalogue of the Continental line of stoves, ranges and furnaces, showing all of our new goods," comes as a suggestion from the Buckwalter Stove Company of Royersford Pa. The catalogue will be ready about July 1 and the goods about August 1.

WEIR STOVE COMPANY, Taunton, Mass., are showing to the trade a new range called Glenwood II., which is a departure from late styles and a decided improvement, especially in the way of decoration. Nickel ornamentation is largely dispersed with, and fine carved designs in black, with here and there a bit of nickel in the way of relief, make this range artistic to a degree. All the latest improvements are embodied in the new style, including draw-center grate, patent door opener and several small devices for convenience.

"THE WEST SHORE RANGE FOR 1893" is the title of a four-page circular which comes to hand from the Littlefield Stove Company of Albany, N. Y. The range has a new oven-door shelf fastened to the outside by a small key, which can be operated by the fingers. This permits the construction of different grate frame supports to convert them into ash chutes for the purpose of guiding all the ashes into the ash pan. The company have also brought out a new pipe shelf composed of three parts, and is made to form a portion of a new high closet if desired, the same doors being used as upon the company's old high closet. The smoke pipe passes up outside of the new closet instead of through it, and the double elbow required is furnished by the makers. The largest sizes of the range are now made both right and left hand, as are also various other sizes, which are enumerated in the circular. In this connection it is interesting to note the definitions given of what constitutes a right and left hand range. The left-hand range is said to be one which has its fire box at the left as one stands facing the oven door, while a right-hand range is one which has the fire box at the right when facing the oven door. The West Shore range is illustrated by means of a sectional cut and its main features of construction fully described. The company state that they manufacture and can promptly furnish 336 distinct sizes and styles of ranges for hard coal or wood and 96 sizes for soft coal, making a total of 432.

THE ALBANY PLANT of Rathbone, Sard & Company was slightly damaged by fire Tuesday of this week. It broke out in the japanning room on Rathbone street. Colonel Bowditch of the firm says that the fire will delay the working of the foundry for several days, but the loss will not reach over $2,000, and is fully insured. On December 6, 1887, a fire occurred in the same part of the plant, caused by the ignition of japan. The loss was then about $17,000, which was covered by insurance.

DIGHTON FURNACE COMPANY, North Dighton, Mass., are bringing out a new range which will bear the name Royal Winthrop. The range is described as having triangular or plain grate, drop door, nickel rail, and a feature is made of the ventilated door, which is lined flush and when dropped forms a handy shelf. Another important improvement is an arrangement which permits the removal of the grate without disturbing water front and lining.

THE J. F. PEASE FURNACE COMPANY, lately at the corner of Water and Fulton streets, New York, have discontinued that office. Their business for this territory is now in charge of Franklin & Burnham, as sales agents, at room 401, 284 Pearl street, New York. It has been the policy of this company to have their own men in charge of their business for some years, so that their heaters would be properly introduced and installed, and satisfactory results obtained. When this has been done they have given over the work to competent and reliable people to carry on. The James W. Birkett Mfg. Company, 351 and 353 Jay street, Brooklyn, have the agency for Long Island, Brooklyn and New York City and will have charge of the setting up of the Economy heaters, which will be supplied by Franklin & Burnham from their Brooklyn storehouse.

NORTH DIGHTON CO-OPERATIVE STOVE COMPANY, North Dighton, Mass., have added an elevated shelf and hot closet to their Prize Oak range, which is now made complete in all the various styles.

Stove Convention Topics.

The following circular has been addressed to the members of the National Association of Stove Manufacturers by Secretary Thomas:

The subjects which will be brought up for consideration at the forthcoming annual convention will be the following:

BY REPORTS OF COMMITTEES.

Cost Accounts, Standing Committee.
Stove Terminology, Holdover Committee.
Piracy of Patterns, Holdover Committee.
Transportation Rates, New Committee.
Prices, New Committee.
Local Associations, New Committee.
Finances, New Committee.
Good of the Association, New Committee.

BY PAPERS PREPARED FOR THE CONVENTION.

Consolidation, Lazard Kahn.
Co-operation, G. D. Gibbons.
Traveling Salesmen, C. S. Prizer.
Rights of Americans, D. W. Bell.
Cupolas, Their Construction and Use, W. J. Keep.
Credits, D. McAfee.
Credits and Reports, R. G. Rennolds.
The National Association, F. W. Gardner.

The president wishes those in attendance to previously prepare themselves by investigation and reflection to take part in the consideration of these topics for the enlightenment of the trade, so that our meeting may be fruitful in beneficial results.

Head's Iron Foundry.

We are indebted to Head's Iron Foundry, Utica, N. Y., for copies of catalogues which they are distributing to the trade, covering goods for the season of 1893. Particular attention is invited to the Standard and Rival furnaces, as well as to the combination heaters manufactured by the company. The catalogues are oblong in general shape, printed in two colors, and bound in paper covers. The opening pages of one of them are devoted to an illustrated description of the Standard four-dome furnace, following which attention is invited to the Rival, furnished with steel radiators, and to the Standard Junior, a four-dome heater, which has been improved for 1893. This furnace, we understand, is substantially the same as the company's Utica Standard four-dome heater, except that a pipe is taken from each of the two front domes, through which the draft passes into a lower steel gas-tight radiator, and, after traveling to the rear of this radiator, enters the smoke pipe, whence it escapes to the chimney. A damper is placed in the smoke pipe at the rear of the four-dome radiator, and after the fire is started the damper is closed, the draft being diverted through the lower radiator. Above the latter and level with the top of the ash pit are placed perforated plates of sufficient capacity to feed all registers employed. The arrangement of parts is such that the smoke pipe where it enters the chimney is cool, for the reason that the heat generated from the fire is utilized to the fullest extent before the products of combustion escape to the chimney. The catalogue also gives attention to the Rival Junior, which has been improved for this season. The makers claim that as now presented to the trade the furnace is greatly increased in efficiency, and, while economical in the use of fuel, a steady, even temperature can be maintained. The catalogue gives a very full description of the manner in which the furnace operates and presents a picture with the outer casing of the heater broken away, showing the position of the parts. The Standard Air Blast furnace for soft coal and illustrated descriptions of the reverse motion grate, the four-dome radiator and of the grate bars employed, are features of the publication. The closing pages are given up to the Standard hot water combination heater and the Standard steam combination heater.

TRADE REPORT.

The Iron Market.

The events of the past week have not been conducive to improvement in the Iron trade, yet it is encouraging to find that it held its own, and from some points of view promises to do a little better than that. Stringency in the money market is being felt both East and West, and is causing buyers to place their orders very sparingly, and buying in limited quantities only will doubtless be largely the policy until the money market has again become easier. There can be no question that with a fairly easy money market Iron would improve, but as this is one of the things that cannot be absolutely depended upon, Iron must take its chances and go with the stream. From present appearances a favorable outcome is probably not unwarranted. There is plenty of business and nothing to interfere with a quick movement so far as regards stocks on hand. Consumers in all departments are more than usually dependent on immediate purchases to meet current requirements. Prices are firmer in Pig metal, weaker in Steel Billets, but steady in the finished article. The demand promises to be large, providing there are the usual bank facilities, but quite a large amount of business is held in abeyance, pending more definite knowledge on that feature of the situation.

Pig Iron—In the New York market is quiet, and while standard brands are holding their own very well, outside Irons are still pressed for sale. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14.25 @ $14 50 for No. 1; $13 @ $13.50 for No. 2, and $13.25 @ $14 for No. 1 Soft.

Good Irons are scarce in the Philadelphia market, and holders of such have no difficulty in securing full market prices for anything they care to offer. In the majority of cases they have all the orders they want; and, while customers are not refused reasonable quantities, it is clearly evident that sellers would prefer being let alone until they can see their way a little further ahead. For the present sales are at figures as quoted herewith for Philadelphia and equivalent deliveries, with 25¢ @ 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X	$16.00	@ $16.50
American Scotch, No. 2X	15.00	@ 15.50

The molders' strike continues at Chicago, and is having a bad effect on business there. Local Coke Iron shows no new developments. A little better trade is noted in Southern Coke, but contracts are not large; none exceeding 500 tons have transpired. Lake Superior Charcoal maintains its strength on current transactions, which are confined to small quantities. Buyers are still holding off, for they have been unsuccessful so far in their efforts to depress prices. The recent failures are making sellers apprehensive, and they are now more disposed to cultivate the small trade than the favors of large consumers, in order to divide the responsibility over a greater area.

Lake Superior Charcoal	$16.50 @	$17.00
Local Coke Foundry, No. 1	13.75 @	14.25
Local Coke Foundry, No. 2	13.00 @	13.25
Local Coke Foundry, No. 3	12.75 @	13.00

In Southern markets the situation is unchanged as far as prices are concerned, but some of the stronger Iron companies which have refused to accept the prices current are now free to accept orders. There are rumors that concessions have been made on No. 2 Foundry. Southern Charcoal Iron is quiet; but there are inquiries which it is hoped may lead to a fair business at an early date. Lake Superior Charcoal Iron is selling to a moderate extent. Buyers do not seem disposed to make engagements far into the future, preferring to keep close to shore.

Foundry.

Southern Coke, No. 1	$13.25 @	$13.50
Southern Coke, No. 2	11.75 @	12.00
Southern Coke, No. 3	11.00 @	11.25
Ohio Soft Stone Coal, No. 1	16.00 @	16.25
Ohio Soft Stone Coal, No. 2	15.00 @	15.25
Mahoning and Shenango Valley	14.75 @	15.00
Hanging Rock Charcoal, No. 1	19.00 @	19.25
Hanging Rock Charcoal, No. 2	18.00 @	18.50
Tennessee and Alabama Charcoal, No. 1	15.50 @	15.75
Tennessee and Alabama Charcoal, No. 2	14.50 @	14.75

Metal Market.

Copper.—During the week under review dealings have been of ordinary character and moderate, all told. The leading Lake Superior producer's price for Ingot has been advanced to 11¼¢, but more than enough supply to fill current orders is found elsewhere at 11⅛¢, and occasionally bids of 11¢ are accepted. The popular quotation on round lots is 10⅞¢, and up to 10⅞¢ is asked for small parcels.

Pig Tin.— The conditions that prevailed a week ago exist at the present time and the weight of excessive supplies has meanwhile forced prices to a lower level. Speculation has been quite active at the decline, chiefly in contracts involving current month, June and July delivery, but purchases by distributors and consumers continue on very conservative lines. May delivery has dropped from 20½¢ to 20.35¢; June from 20.65¢ to 20.40¢ and later deliveries proportionately. Within two weeks' time there has been a decline of 60¢ ℔ 100 lb in price of July delivery.

Pig Lead.—Prices have been moving gradually downward, under the influence of freer offering and continued narrow outlet. The market is at present in a weak, unsettled condition, with deliveries from June to August inclusive offered at 3¾¢ and buyers very indifferent.

Spelter.—There has been somewhat freer offering of Western brands for late June and more distant future delivery, and with it some softening of prices. Spot stock is scarce and commands 4½¢. Prompt shipments are also firmly held at that price, but July delivery may be secured at 4 45¢, and deliveries further ahead at 4.40¢.

Antimony.—Of jobbing quantities there has been about the usual movement and prices have undergone little or no change. Current quotations are 10¢ @ 10½¢ for Hallett's, 10¼¢ @ 10½¢ for L.X., and 10½¢ @ 10¾¢ for Cookson's.

Tin Plate.—The market is without change. Business continues slow and there is little if any improvement in the demand for either prompt or future deliveries. Sellers' figures about the same as they were last week, but somewhat deficient in point of firmness. In the retail trade the improvement which it was anticipated would come with warmer and fairer weather is as yet barely perceptible. Stocks are not by any means heavy, but supplies of all grades are held in sufficient quantities to meet the small current demand. Rumors of cutting in prices are current.

Coal.

The Anthracite Coal trade is quiet, particularly in the Eastern trade. While the companies claim to maintain schedule prices, a good deal of Coal finds its way into market at a shade below, as for some weeks past, and the talked-of advance June 1, it is surmised, can be made only on paper. Prices, however, are helped by the interruption of mining by floods, a score of the Reading collieries having been compelled temporarily to suspend. Despite this drawback Reading shipments have been very large, and the total production shows an increase over the large business of 1892. A Scranton paper says: "The special feature is the increase in the Lehigh region, which for several years has shown a comparatively small gain. The returns from the Schuylkill region are also significant, as the increase they exhibit reflects the improvement in the business of the Reading company."

Stove Coal is $4.15, f.o.b., gross circular. Commission houses are allowed 10¢ ℔ ton extra commission, making 25¢ commission to them, of which they give the

retail trade 15¢. Bituminous Coal is very quiet.

A Reading official is quoted as saying: "It is absolutely necessary to shut down. The output is nearly 1,250,000 tons ahead of the output for the same period last year." Week's production, 844,113 tons; year, 13,222,025; increase, 1,188,833. Reading Coal tonnage, 378,000 tons. Pennsylvania Railroad Coal tonnage, 321,277 tons; Coke, 105,363. Bituminous Coal regions shipped as follows: The Norfolk and Western regions, 87,858 tons; Clearfield, 68,698; Huntington, 47,554; Beech Creek, 65,988. The excess of Soft Coal production for the regions above named over last year to date is 1,121,310 tons.

Chicago Report.

Scrap.—There is very little demand for Old Material. Dealers' buying prices are as follows:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12 50	....
Machinery Cast	10.00	....
Maleable Cast	7.00	....
Stove Plate (free of burnt)	7.50	....
Burnt Iron and Grate Bars	5.00	....
Sheet Iron and Hoops	4.00	....
Plow Steel and Breaking Stock	8.00	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	8.00	....
" (Iron)—cut in single Sheets and Rings	11 00	....
Old Gas-Pipe and Boiler Tubes	8 00	....
Cast Borings	4 75	....
Turnings	6.00	....
Horseshoes	12 50	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9½¢
Heavy Brass	....	8¾¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	3 ¢

Anthracite.—Large dealers are beginning to order their stocks for the summer trade. We continue to quote carload lots of 12 net tons as follows:

	Egg, Grate.	Sto. and Ch.
Chicago, Ill	$5.35	$5.60
Milwaukee, Wis	5.35	5.60
Kansas City, Mo	8.55	8.80
Council Bluffs, Iowa	8.55	8.80
St. Joseph, Mo	8.55	8.80
Leavenworth, Kan	8.55	8.80
Omaha, Neb	8.55	8.80
Burlington, Iowa	6.85	7.10
Des Moines, Iowa	8.30	8.55
Davenport, Iowa	6.65	6.90
Dubuque, Iowa	6.65	6.90
Madison, Wis	6.85	7.10
St. Paul, Minn	7.85	8.10
Lincoln, Neb	8.70	8.95
Sioux City, Iowa	8.55	8.80
Aberdeen, S. Dak	8.60	8.85

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

C. A. Tanner & Co. and Smith, Van Horne & Co., hardware dealers of Oswego, N. Y., have consolidated under the style of the Oswego Hardware Company. They expect to elect officers next week. J. K. Smith is to be general superintendent of the mechanical department and E. A. Van Horne will look after the finances. Besides conducting a retail trade the concern will do a wholesale and jobbing business. The wholesale and jobbing department will be located in the Kinyon block, when rebuilt, together with the retail department. It is understood that travelers will be put on and Central and Northern New York covered. Both firms have been among the largest business houses in Oswego and are certain of success in the venture. The capital stock is $50,000.

CONDITION OF THE

Hardware Trade.

THE VOLUME OF BUSINESS in some sections has been diminished by the backward spring and the bad weather which has prevailed, but on the whole there is little reason for complaint. The market is characterized by little of the speculative element and purchases are confined for the most part to early requirements. In most lines of goods there is no difficulty in having orders filled as promptly as desired, but in some lines there is more or less delay. The tone of the market is steady, prices being well maintained, and in some lines, such as Bolts and Nuts, an improved tone is noticeable, while on the other hand some staple goods, like Nails, are slightly lower than heretofore. In some kinds of shelf Hardware prices are being somewhat strengthened by the action of manufacturers who have reached, or are attempting to reach, an understanding. There is some complaint in regard to collections, and the financial condition induces a conservative course on the part of careful business men.

Advices from Chicago.—The volume of business in the Shelf Hardware trade, which has been steadily diminishing since the spurt early in April, shrunk last week to the smallest proportions for years. The complaint of dullness is universal. Salesmen have returned from several Western districts, as they found it undesirable to continue to solicit business during the unfavorable weather and the wretched condition of the country roads, which has checked traffic. The weather is held responsible almost entirely for the dullness of trade. The fine prospects which were so glowing last month have completely disappeared, and everybody is now speculating in what the future has in store. It is feared that in the advent of more favorable weather the farmers will be so busy seeding that continued dullness will prevail in Hardware circles, making the remainder of May and perhaps June a steady per cent. of bad trade. Collections are exceedingly slow and money is tight. The heavy Hardware trade is in a little better condition than Shelf Hardware, but not very much.

Notes on Prices.

Cut Nails.—The Cut Nail market has developed little change since our last report. In the Eastern market prices are represented by the quotation of $1.10, which is now quite generally named for carload lots at mill, having been in a few cases shaded. Small lots from store in New York are quoted at $1.35 to $1.40. The Western market is in a more satisfactory condition, but there is some unevenness in quotations named by different mills in the same district. The volume of business is only fair.

Advices from Chicago.—Steel Cut Nails are in a little better demand, but the volume of business is by no means satisfactory to manufacturers. They quote factory lots at $1.30 to $1.35, Chicago, while small lots are selling from stock at $1.35 to $1 40.

Wire Nails.—The Wire Nail market is perhaps a shade weaker than last week, and the quotation of $1.50 for carload lots at mill is more generally made than at our last report, so that $1.55 may now be regarded as rather exceptional. The action of some of the mills in naming the former figure naturally induced others to follow, and the fact that nearly all the large jobbers are holding stocks purchased at lower figures has enabled them to meet or undersell the manufacturers' prices. The mills are generally well occupied on orders which are not, however, coming in as freely now as a few weeks ago.

Advices from Chicago.—Wire Nails are again irregular, manufacturers are no longer adhering to the uniform price which was established last month. Their trade has been confined almost entirely to carload lots, the large buyers being well fixed with contracts for some time to come. The trade is, however, not demoralized, quotations running about $1.52½ to $1.55, Chicago, for large lots from factory. Carload lots are selling at $1 60. Jobbers' prices are $1.65 to city trade, and $1.70 to $1.75 to country trade.

Barb Wire.—The Barb Wire market is quiet and without material change. We quote $2 45 to $2.50 for Four Point Galvanized in carload lots at mill. Small lots delivered in New York are quoted at $2.70 for Galvanized and $2.30 for Painted.

Advices from Chicago.—Barb Wire shows no change whatever, either in the character of orders or in selling price. Manufacturers' quotations are still $2.20 for Painted and $2.60 for Galvanized. Jobbers' quotations are $2.30 to $2.70, respectively.

Cordage.—Notwithstanding the collapse of the National Cordage Company there is very little change to note in the Cordage market. Whatever may be the outcome of the National Cordage Company's affairs, it is thought by well-informed parties that lower prices will not be the result, inasmuch as it has been recognized for some time that they have been selling at a loss, giving their attention, it is thought by many, principally to manipulations of the stock market, which proved so disastrous to their interests. Under proper business management, it is thought that the price of Cordage, especially in view of the condition of the Hemp market, must be higher. What the outcome of the present somewhat complicated condition of things will be is uncertain, as it is thought by some that the National Cordage Company will attempt to carry out their projects, while others regard this as improbable and suppose that the organization will go to pieces. The fact appears to be that the company attempted too much in their efforts to establish a monopoly in the manufacture of Cordage, while at the same time they endeavored unsuccessfully to obtain control of the Hemp market. Their failure in both of these regards, together with their attempts to float the company's stock, is regarded

as the cause of their downfall. The plants of many of the manufacturers are undoubtedly antiquated, old methods of making Rope having been superseded by new and improved machinery. Precisely what John Good's position in the market will be remains to be seen, but there appears to be little doubt that he will occupy an exceedingly influential position, and it is thought not unlikely that he will be a controlling factor in Cordage interests.

Wrought-Iron Pipe.—The Wrought-Iron Pipe market continues, as it has been for some time, in an unsatisfactory condition, owing to the low and irregular prices which are prevailing. The somewhat advanced list of prices which were adopted by the manufacturers April 13 are regularly maintained. The discounts remain about as before. The revised list of April 13 is given below:

Butt-Welded.

Inside diameter.							
Inch.....	⅛	¼	⅜	½	¾	1	1¼
Black.....	$0.04	.04	.04½	.06	.07½	.11	.14½
Galv.....	.05	.05	.05½	.08	.10	.14	.19

Lap-Welded.

Inside diameter.									
Inch..	1½	2	2½	3	3½	4	4½	5	6
Black..	$0.24	.33	.50	.64	.76	.90	1.06	1.28	1.65
Galv....	.28	.38	.57	.70	.90	1.05	1.31	1.60	2.00

Inch....	7	8	9	10	11	12	13	14	15
Black.....	2.10	2.75	3.75	4.75	6.00	7.00	8.0	9.50	11.00

It is understood that manufacturers are conferring as to measures by which the market may be put in a better condition and more remunerative prices secured.

Glass.—Nothing has transpired during the past week of especial interest in the Glass trade. Prices remain firm and unchanged, owing to the influence of the Glass associations. Jobbers who are not members of the National Window Glass Company are not disposed to cut prices, as consumers and dealers seem to have accepted the National prices as the ruling ones. The factories report themselves busy, but from the comparatively light demand for Glass from dealers it would appear that factories are working on contracts yet unfilled. The cold, rainy weather of the past two weeks has lessened the immediate requirements of the trade, while the extreme weather of the past winter and the backward spring have delayed building projects, so that the demand for Glass for new work may not come until later in the season. Collections are reported as being slow. No official announcement has been made as to the results of the meeting of the Executive Committee of the National Window Glass Company in Chicago during the past week. It is understood, however, that there is a movement on foot to revise the long list of prices, and that the new schedule will be established upon a higher basis than the present one. The scale of prices for next season's fire, the necessity of a larger number of apprentices in Glass factories from which to draw blowers to supply the demand for experienced workmen, and the time at which the factories shall stop work for the summer rest, are questions which require immediate attention. Plate Glass remains unchanged in price, though the demand has been somewhat lessened by the bad weather. The National Glass Company are working quietly, perfecting their organization among Plate Glass manufacturers. Prices on Glass remain unchanged, as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Trade Notes.

L. Schwartz, 187 South Fifth avenue, New York, makes a specialty of heavy Ash Cans, which he calls Engineers' Ash Cans. In addition to being made of heavy material they have a heavy band at the top and bottom, and at the bottom on the under side they have an inside band of angle iron. Heavy handles on each side make them well suited to the purpose and the usage they get.

The Zucker & Leavitt Chemical Company, 12 Grand street, New York, are represented in the Industrial Exhibit of the New York Press Club Fair by one of their Electric Motors.

McLeod, Ward & Co., 91 Liberty street, New York, are now prepared to furnish their Fan catalogue, which specially treats of Ceiling Fans for cooling. Very appropriately, in view of the approaching season, the catalogue says "keep cool" and it claims that the Van Houten Rotary Ventilating Fans are the best made, and of elegant design and finish, adapted to be run by steam, gas, water or electric motors. Ventilating churches, factories and all kinds of large buildings by either exhaust or pressure fans their engineers accomplish with results that are highly satisfactory. The Lundell motor is one of their newest motors and specially adapted for use with Cooling Fans, being securely fastened to a new Fan Motor Staud, from which the power is transmitted by pulley and belt to the Fans. The setting of Electric Motors is a feature of their business and they install them to run ventilating fans, elevators, pumps, machinery or cranes, either traveling or jib. They furnish Motors from 1 to 100 horse-power. The following are a few of the various uses for which they have set Motors: David Brown, 63 Beach street, New York, 1 horse-power to run printing press; Adams House, New York, to run Ventilating Fans in dining room and kitchen; N. S. Kaplan & Co., 369 Broadway, New York, 6 horse-power to run elevator; Lawrence, Turnure & Co., 52 Wall street, New York, 1 horse-power to run Exhaust Fan.

Eppelsheimer & Co., 164 Bleecker street, New York, make a specialty of Molds and utensils for hotels, restaurants, confectioners, ice-cream makers and chocolate manufacturers. They say that previous to their entering into the manufacture of Molds the leading confectioners imported those of the most artistic design, and that it was necessary to give at least four months' time on special designs. In their shop orders have been executed in a week for designs which had to be modeled by an artist before the work of making the Mold could be started. They issue a 40 page catalogue of every thing the cook, pastry cook, confectioner and baker of the largest and most fashionable caterer requires, from an egg beater to a machine ice crusher, or from a copper stew pan to a cream freezer.

From C. F. & E. Biele, 45 and 47 West Broadway, New York, some interesting items concerning the Showcase trade are learned. A large portion of their varied designs of Showcases is sent to the South American countries, though shipments to Europe and Asia are frequent and large. The American-made goods, as compared with the heavy, massive productions of France and Germany, possess ample strength and are more attractive in their delicate appearance and handsome finish.

One of the old-fashioned shops where you can get almost anything done is run by John N. Blasi, 54 West Broadway, New York. He does blacksmithing, machine work, plumbing, steam and gas fitting, sets steam pumps, hoisting engines, elevators, and puts in electric call bells, besides doing jobbing of all kinds. Establishing the business in 1858, the many trades mentioned are the outgrowth of the demands made on a progressive man. He manufactures a line of store and warehouse trucks, dry goods and platform trucks, box presses and porters' tools and a platform elevator that runs by hand power.

The New York Steam Wire Works, operated by Hopkins & Co., at 90 West Broadway, New York, was established by James Hopkins in 1840. After following the business in the regular way for some years he patented the process of crimping heavy wire and weaving it into a diamond-shaped web, both being advances over the old square web where the cross sections of the heavy wire were fastened by smaller wires. The company now make some very handsome brass grill work for house and office decoration, besides an extensive line of wire goods. The seasonable goods now in demand are trellises, tree guards, mosquito netting and "chicken" wire.

Some complimentary observations on the World's Fair and an invitation to inspect their exhibit of "decorated art ware for the dining room" comes from Manning, Bowman & Co., 57 Beekman street, New York, on a tinted folder with a steel engraved frontispiece and a view of their factory. With it is a 16-page price-list in a seven-color effect, showing their Pearl Agate Pots with decoration, and some of their other specialties.

The Lightning Dasher Egg Beater Company, Toledo, Ohio, state that since January 14 last over 50,000 of their Egg Beaters have been sold and they are shipping daily from 100 to 150 dozen.

The Utility Churn and the Paragon Washer are the subject of an advertisement this week of the Olds Wagon Works, Fort Wayne, Ind. The appearance of the goods is shown by illustrations and the advantages are noted in the text.

Charles Thomas, 315 West Second street, Elmira, N. Y., successor to J. F. & E. R. Waugh, distributes a neat illustrated circular relative to the Waugh Circular Shears, well known to tinners and sheet-metal workers. Cuts show the Nos. 1 and 2 with bevel and squaring attachment, and the Nos. 3 and 5 Circle Shears. Price-lists are also given in the circular.

Silver & Co., on May 1, removed their office and factory to 304-310 Hewes street, Brooklyn, N. Y., their New York sample room and sales room being, after the same date, located at 20 Warren street. In making this announcement to the trade they state that eight years of continual progress, prosperity and success in the making

of Kitchen-Furnishing Goods and Household Inventions has compelled them to make these changes, as they had outgrown their old quarters. They now have largely increased facilities, with complete manufacturing plant especially arranged for the manufacture of their various specialties.

THE STARK MACHINE & TOOL COMPANY, Buffalo, N. Y., are building two Back-Geared Single-Action Power Presses, weighing about 15 tons each. They have also recently taken contracts for two of their 11-Foot Combined Foot and Power Shears, cutting No. 20 stock by foot and No. 14 by steam power.

THE COVER of the 1893 catalogue of the Niagara Stamping & Tool Company, Buffalo, N. Y., is of fire-cracker paper, and the printing in silver ink gives a very pleasing effect. The catalogue contains over 100 pages of convenient size, and is got up with much care, and evidently at no little expense. A fine grade of paper is used, with the advantage of bringing out the cuts well, and also making a good letterpress effect. In compiling this catalogue it has been the aim of the Niagara Stamping & Tool Company to associate their various machines so as to facilitate comparison. An alphabetical index begin the volume, and the notices of goods opens with illustrations of bar folders; then come forming rolls, sheet iron folders, Niagara incased machines, Raymond machines, stove pipe crimpers and beaders, double seamers, &c.; a large variety of tinners' stakes, and likewise tinners' small tools. In view of the very great number of articles noticed in the catalogue it will be impossible to give even a general enumeration. Suffice it to say that a very extensive line of tools and machinery for working sheet metal is presented, and it is interesting to learn that nearly all of the goods are manufactured by the Niagara Stamping & Tool Company. One large section of the book is given up to power presses, and a large assortment of tools and appliances for canneries is noticed toward the end of the volume. Altogether, it is a very elaborate, serviceable and interesting volume for those who are concerned in sheet-metal work.

A. G. MOORE & CO. are introducing to the Stove trade their Boston Petty Ledger, which is shown in an advertisement in another column, and which, it is claimed, is especially adapted for the use of stove and hardware dealers.

NOTICE IS ISSUED to the trade that the Booth Copper Company have succeeded to Booth & Son, coppersmiths, who were established 40 years ago. The new location of the concern is at 122 Adelaide street, Toronto, Ontario. Some of the specialties of the firm are Copper Range Boilers, Copper Pantry Sinks, &c.

THE PROGRESS STOVE & TIN WORKS is the name of a concern lately incorporated at Louisville, Ky., with a capital stock of $40,000. The incorporators include Lawrence Richardson, F. F. Henley and J. F. Murphy. Mr. Richardson, we understand, is at the head of the company, who recently purchased the plant at Twenty sixth and Rowan streets from the Irwin Mfg. Company.

A SPECIAL TRADE SALE of Cutlery is announced by Haydock & Bissell, 12 Murray street and 15 Park place, New York, among the Special Notices in this issue, the time of the sale being Tuesday and Wednesday, May 16 and 17. The sale will comprise several thousand dozen of Table Knives and Forks, Pocket Knives, Carvers, Butcher Knives, silver-plated Tea and Table Spoons, nickel plated Shears and Scissors, &c. It will also include 100 gross first quality Table Knives and Forks. This is referred to as the last sale of Cutlery for the spring of 1893 and is worthy the attention of Cutlery buyers.

J. H. MELLOR & CO., at 826 Fulton street, Brooklyn, make a handsome display in their showrooms with the different goods for which they are agents. Tiles, both plain and decorative, come from the Beaver Falls Art Tile Company, Beaver Falls, Pa., and Columbia Tile Company, Anderson, Ind.; Gas-Logs from W. H. Galloway, Philadelphia, Pa.; Grates and Fire-Place Linings from the Peerless Mfg. Company, Louisville, Ky.; Fenders, Andirons and Fire Sets from Frank H. Graf, New York, and Mantels from L. Schwartz & Co., Buffalo, N. Y. These goods are arranged with regard for the artistic that makes the store truly a beautiful place.

THE CAMBRIDGE IRON & STEEL COMPANY, Cambridge, Ohio, manufacturers of iron and steel sheets, have now in course of erection a building 74 x 143 feet in size, which will be used for a galvanizing plant, in which the Bayliss process of galvanizing will be installed.

THE HANDSOME steel office desk made by Christian D. Then, 589 North Clinton street, Rochester, N. Y., which was illustrated recently in our columns, appears to have attracted attention on the other side of the water. *The Ironmonger* of London reproduces the cut and description of the desk in its issue of April 29, with the suggestion that sheet-metal furniture of this kind would be highly appreciated in India and other hot climates, where white ants soon play havoc with ordinary wood furniture

JOHN KANNOFSTKY, JR, recently moved his tin and sheet-iron business to a new shop at 486 Pearl street, New York, where he has better accommodations.

LUFKIN RULE COMPANY, Saginaw, Mich., have engaged as their direct representative C. M. Avery, who is well and favorably known in the jobbing Hardware trade. The company advise us that their new line of high quality Reliable and Rival Steel Measuring Tapes are meeting with a favorable reception at the hands of the trade, as evidenced by increased orders for the goods.

BOAS BROS., 80 Beekman street, importers of Enameled Kitchen and House-furnishing Ware, are about to move into more extended quarters, having secured the first and second lofts at 235 Greenwich street, on the corner of Barclay street.

THE WORKS of the Shepard Hardware Company, at Buffalo, N. Y., were entirely destroyed by fire on the night of May 8. The fire broke out at 7 o'clock in the north end of the company's main building, which was a very large one, being 550 feet long, 60 feet high and 262 feet wide, covering about 3½ acres of ground. The fire department responded promptly, but when it arrived the whole structure was a mass of flame and the intensity of the heat was such that it was almost impossible to approach the building. The offices of the company were located in another building, which also took fire; but, owing to the energetic efforts of the firemen, this building was not destroyed, and few if any of the company's important papers were burned. The main building was valued at $50,000 and was insured for $35,000. The loss on the contents, including machinery, patterns and stock, will, it is thought, reach $200,000, on which an insurance of $140,000 was carried. By the destruction of the factory over 400 men are thrown out of employment. The weekly pay-roll was more than $4000.

W. H. SILLS, 86 Lake street, Chicago, dealer in Mica, is distributing as souvenirs to the trade very pretty glass paper weights with views of the World's Fair buildings in colors. They are really artistic, and will be highly appreciated by all who receive them.

THE CHICAGO STAMPING COMPANY are now occupying new and commodious quarters, corner Congress and Green streets.

THE NUBIAN IRON ENAMEL COMPANY of Cragin, Ill., have been favored by the management of the World's Fair with a good order for Nubian to use on all the smoke stacks on the grounds. The company recommend it specially for such work as this, where metallic surfaces are exposed to the weather, while it is equally adapted to coating grates, stove pipe and other interior fixtures.

IN A NEAT CIRCULAR J. H. Williams & Co., Brooklyn, N. Y., manufacturers of Drop Forgings, announce that their exhibit at the World's Columbian Exposition will be found in section C of boiler-house extension to Machinery Hall. A full line of their standard products, as shown in their catalogue, together with a variety of special Drop Forgings of all kinds, will be in charge of their traveler, D. E. MacCarthy.

MAJOR E P. GRAVES, ex-county clerk of Bath, Steuben County, N. Y., has purchased an interest in the Corning Mfg. Company, makers of furnaces, tinware, &c. The business will be enlarged.

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CHICAGO, MAY 11, 1893.

Tin—

Straits pigs.....22½¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland and Melyn Grade	IC, 10 x 14	@ $3.75
	IC, 12 x 12	@ 6.75
	IC, 14 x 20	@ 6.75
	IC, 20 x 28	@ 13.50
	IX, 10 x 14	@ 8.75
	IX, 12 x 12	@ 8.75
	IX, 14 x 20	@ 8.75
	IX, 20 x 28	@ 17.50
	DC, 12½ x 17	@ 6.50
	DX, 12½ x 17	@ 8.50
Allaway Grade,	IC, 10 x 14	@ 6.50
"	IC, 12 x 12	@ 6.50
"	IC, 14 x 20	@ 6.50
"	IC, 20 x 28	@ 13.00
"	IX, 14 x 20	@ 8.00
"	IX, 20 x 28	@ 16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14.14x20	@$6.00
IC, 14x20.90 lb	@ 5.75
IC, 14x20, 100 lb	@ 5.85
10 x 20	@ 9.00
20 x 28	@12.00
IX, 10x14, 14 x 20	@ 7.50
BV Grade.—IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—	
IC. 14 x 20	@ $5.62½
20 x 28	@ 11.25
IX. 20 x 28	@ 14.25
Worcester Brand and equal.—	
IC, 14 x 20	6.12½@
IC, 20 x 28	12.25 @
IX, 14 x 20	7.62½@
20 x 28	15.25 @

American Tin Plates.

Charcoal Plates.—Bright.

Irondale, A. A.—	IC, 14 x 20	$7.00
" "	IX, 14 x 20	9.00
" "	IXX, 14 x 20	11.00
" "	IC, 20 x 28	14.00
" "	IX, 20 x 28	18.00
" "	IXX, 20 x 28	22.00
Florence.—	IC, 10 x 14, 12 x 12, 14 x 20	$6.75
	IX, 10 x 14, 12 x 12, 14 x 20	8.75
Palma.—	IC, 10 x 14, 12 x 12, 14 x 20	$7.50
	IX, 10 x 14, 12 x 12, 14 x 20	9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, Tissue Packed, IC, 14 x 20	$9.25
Royal, extra, IC, 14 x 20	7.25
Merlon, IC, 14 x 20	7.00
Almond, IC, 14 x 20	6.50
Mint, IC, 14 x 20	6.25

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (205 lb), 20 x 28	@$12.00
Palm (205 lb), 20 x 28	@ 12.25
Crescent, IC, 20 x 28	@ 12.50
Crescent, IX, 20 x 28	@ 15.75
Empire, IC, 20 x 28	@ 12 75
" IX, 20 x 28	@ 16.00
Hickory, IC, 20 x 28	@ 15.90
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20x28	@$14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.00
" IX, 20 x 28	@ 18.25
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@ 21.50
Merchant's Old Method (extra heavily coated), IC, 20 x 28	@ 15.00
Merchant's Old Method (extra heavily coated), IX, 20 x 28	@19.75
	$23.60
Iroudale A:	
IC, 14 x 20	$6.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Westmoreland:	
IC, 14 x 20	$6.25
IC, 20 x 28	12.50
Juno:	
IC, 14 x 20	$5.75
IC, 20 x 28	11.50
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20	$9.50
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20	11.00
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28	19.00
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28	22.00
Neville, Stamped, IC, 14 x 20	6.25
" " IX, 14 x 20	7.90
" " IC, 20 x 28	12.50
" " IX, 20 x 28	15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.00
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.50
" IC, 20 x 28	13.00
Knoxall, IC, 14 x 20	6.25
" IC, 20 x 28	12.50
Globe, IC, 14 x 20	7.00
" IC, 20 x 28	12.00
Miami, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
" IX, 20 x 28	15.00
" (Redipped), IC, 20 x 28	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50

	Per box of 56 sheets.	
X, 14 x 56	29.50	16.50
XX, 14 x 56	32.50	18.20
X, 14 x 60	31.50	17.65
XX, 14 x 60	35.50	20.90

Sheet Iron—

Black.

Nos.	Common American	Refined.
10 to 16	℔ 2 7-10¢	3 3-10¢
17 to 20	℔ 2 8-10¢	3 4-10¢
21 to 24	℔ 2 9-10¢	3½¢
25 and 26	℔ 3¢	3 6-10¢
27	℔ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ A, 10½¢; B, 9½¢ dis. 5%
Craig Polished Sheet Steel....℔ 8½¢

Galvanized.

List on following page.
Juniata or first quality.....dis. 70&2½%

Copper—

Ingot.

Lake.....13¢@13½¢
Casting Brands.....12¢@12½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.

Copper, Bronze and Gilding Tube, 3¢ ℔ b additional.

Brazed Brass Tubing.

(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 lb.

Above 5-16 inch to 3 inch inclu...35¢
Plain, above 3 inch.....45¢
Plain, ¼ inch.....45¢
Plain, ⅛ inch.....60¢
Plain, 3-16 inch.....$1.00
Plain, ⅛ inch.....$1.50
Fancy Tubing, Brass, to No. 20 incl.....43¢ ℔
Bronze Tubing, 3¢ ℔ more than Brass.

35 @ 10

Roll and Sheet Brass

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 lb casks.....6½¢
Less than Casks, ℔.....6½¢

Lead—

Soft Pig Lead.....4½¢
Bar.....4.60¢@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....25¢
Sheet.....6¢, dis. 10%

Solder—

½@½.....13½¢@13½¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....13¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain	60&10%
1¼ and under, Galv	52½&10%
1½ and over, Plain	70&10%
1½ and over, Galv	60&10%
Boiler Tubes, list Oct. 24, 1892	.65@65%
Casing, list Nov. 16, 1892	55&5%
Inserted Joints Casing, list Nov. 16, 1892	55%
Steel Boiler Tubes	27½%
Cold Drawn Seamless Steel Tubing	50%

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted.....55%
Austin's Corrugated.....60%
Gordon & Gilbert's Corrugated.....55%
Ritchie's (Galv. Iron only) Cor'd.....55%
Ritchie's Spiral Lock Seam, Galv'd.....50%
Austin's Spiral Ribbed Pipe.....55%
Plain Adjustable Elbows.....55%
James A. Miller Bros. (Galv'd Iron only) Corrugated.....55%

Furnace Fittings—

Discount from Excelsior Steel Furnace Co.'s list.....50%

Steel Roofing—

Perfection.....$3.75 square
Climax.....3.50 square
The Lloyd Spanish Tiling.....$4.50 square

Metallic Shingles—

Cashman's.....$4.25 square
Merchant & Co.'s Spanish Tiles:
Copper, 14 oz.....$46.00 square
Steel, galvanized.....$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine.....7½@8 ¢
Iron Paint, Bright Red.....℔ b, 2 ¢
" " Brown.....℔ b, 1½¢
" " Purple.....℔ b, 2½¢
" " Ground in oil, B. Red.....℔ b, 6½¢
" " Ground in oil, Red..℔ b, 6½¢
" " Ground in oil, Brown.....℔ b, 6½¢
" " Ground in oil, Purple.....℔ b, 6 ¢
Linseed Oil, Boiled, in bbls.....53¢
Linseed Oil, Raw, in bbls.....50¢
Mineral Paints.....2@4¢
Orange Mineral.....10¾¢
Pure White Lead in Oil.....6¾@7¾¢
Dry Red Lead in bbls.....6¾@6¾¢
Red Lead, American.....6¾@7¾¢
Red Venetian, English, dry...$1.65@$1.70
Red Venetian in oil; asst'd cans, 8¾¢; kegs.....7¾¢
Sperm Oil.....75¢
Sipe's Japan Oil, in bbls, ℔ gal.....34¢
Spirits Turpentine, in bbls., ℔ gal...35¢@
Asphaltum, Trinidad Refined, ℔ ton...$15
Tarred Felt, 1 Ply, ℔ roll 100 lb.....$1.05
Tarred Felt, 2 Ply, ℔ roll 108 sq. feet.....$1.50
Tarred Felt, 3 Ply, ℔ roll of 108 sq. feet.....$2.00
Roofing Pitch, ℔ bbl. of 300 lb.....$3.20

NEW YORK, MAY 12, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots..℔ b, $0.75
No 1 guaranteed to be 99 % pure and over), in ton lots.....℔ b, .90
Lots less than 1 ton, 10¢ ℔ b additional.

Antimony—

Cookson.....℔ b, 11½¢
Hallett's.....℔ b, 10¾@11¢

Brass—

Planished.....net
Roll and Sheet...35@40%

Brass and Copper Tubes
Brazed Brass Tubing—

List May 20, 1889.

	Per b.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above 3 inch	.45
Plain, 5-16 inch to No. 20	.45
Plain, ¼ inch	.60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu...	.43

35&40%

Copper and Bronze Tubing—

3¢ ℔ b more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¼ to 3½ inches inclusive....17¢ ℔ b
Over 3½ to 5 inches inclusive....18¢ ℔ b

Piston Rods, Finished True, Smooth and Straight

Over ¼ to 3½ inches inclusive....18¢ ℔ b
Over 3½ to 5 inches inclusive....19¢ ℔ b

Clips—

Buffalo Bumper Nos. 1, $1.25; 2, $2.40 per doz.....40&10%

Conductors—

Corrugated. *Round or Square*

Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—

Galvanized.....50

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.....15@25¢

Ingot.

Lake.....12¢
Ansonia Grade Arizona.....11¾¢
Ansonia Grade Casting.....11¢
Planished.....net
Sheet and Bolt.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering*, in Current Hardware Prices.

Damper Clips Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

Lap or Slip Joint.....list, net

Elbows

Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four Piece.

4 in.	5	5½	6	7 inch.
$0.78	.87	.90	.95	1.20 per doz...20%

Elbows and Shoes—

Flat Crimp.

Tin.....35%
Galvanized.....35%

Corrugated.

Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—

Black.

Nos.	Common American.	American.
10 to 16	℔ b, 2 8/10¢	3¾¢
17 to 20	℔ b, 3 ¢	3¾¢
21 to 24	℔ b, 3¼¢	3¾¢
25 and 26	℔ b, 3¼¢	3¾¢
27	℔ b, 3½¢	3¾¢
28	℔ b, 3½¢	4¢
American B. B.		℔ b, 4¢@4½¢

Russia, Planished, &c.

Genuine Russia, accord-ing to assortment.....℔ b, 12@13¢
Patent Planished....℔ b, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ b, 8¾¢

Galvanized.

Nos.	B. B.
10 to 16	℔ b, 4 2-10¢
17 to 22	℔ b, 4½¢
23 to 24	℔ b, 4¾¢
25 to 26	℔ b, 5¢
27	℔ b, 5¼¢
28	℔ b, 5¼¢
29 and 30	℔ b, 6¼¢

Filter Joints—

Lee's.....33½%

Lead—

American Pig.....4¾¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....15¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ b.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ b...05¢, 10&5%
Sheet Lead in whole coils, ℔ b, 05¾¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing.....10¢
Fencing, Painted Sheets.....20¢
Netting, Painted Sheets.....20¢
Door Mats, Galvanized.....25¢
Window Guards, Paneled.....15¢
Tree Guards, Paneled.....15¢

Mitres Eave-Trough—See *Eave-Trough Mitres.*

Paints Oils &c.—

Lead, Ann. White, Dry or in oil:
Kegs, lots less than 500 lb ... 7 @ 7¼
Kegs, lots 500 lb to 5 tons ... 6¾ @ 6¾
Kegs, lots 5 tons to 12 tons... 6¾ @ 6¾
Kegs, lots 12 tons and over... 6¾ @ 6¾
Lead, White, in oil, 25 lb tin pails, add to keg price.....@ ¼
Lead, White, in oil, 12½ lb tin pails, add to keg price.....@ 1
Lead, Red, Paris, and ½ bbls... 6 @ 7
Lead, Red, kegs.....6¾ @ 7¼
Ocher, American.....½ @ 1¾
Red, Venetian, American ... per 100 lb...1.00@1.10

Linseed Oil:
City, raw, ℔ gal.....@ .50
City, boiled.....@ .53
Western, raw.....@ .50
Spirits Turpentine:
In regular bbls.....@ .30¼
In machine bbls.....@ .31
Putty:
In barrels and ½ bbls.....01¾@.02¾
In tubs.....01¾@.02¾
In tin cans.....01½@.02½
In bladders.....01¾@.02¾

Roofing Material, &c.:
Asphaltum, Trinidad Refined, ℔ ton.....$30.00@35.00
Asphaltum, Rock, ℔ ton.....$14.00
Coal Tar Felt, 1 Ply, ℔ b.....2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.....$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.....$1.85
Roofing Pitch, ℔ bbl.....$2.24

Pipe, Drain—.....50%

Pipe and Fittings, Cast Iron Soil—

Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive.....60@60&10%
Other sizes.....55@55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 inches.....65@60&10%
Other sizes.....55@55&10%

Pipe, Spiral—

Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

For discounts see Current Hardware Prices.

Rivets and Burrs—

For discounts see Current Hardware Prices.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, May 20, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street.
PHILADELPHIA.....220 South Fourth Street.
BOSTON .....146 Franklin Street.
PITTSBURGH..... Room 509 Hamilton Building
CHICAGO.....59 Dearborn Street, cor. Randolph.
CINCINNATI.....Rooms 22-24 Pickering Building.
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....312 The Cuyahoga

BRITISH AGENCY: The Ironmonger, 42 Cannon street, London, England.

Comparison of Wages.

The wages paid per day in different trades seem strangely at variance with the amount of information that some workers must have and the responsibility they bear. This applies to the good workman, and not to the large body below the average or to the higher class at the top. Considering the money invested in tools by the carpenter and the supervision which he is expected to maintain over the other workmen on a building, his wages seem all out of proportion to those of the bricklayer. The tinner has stored away a fund of knowledge and can consult no higher authority in case of difficulty, yet has to meet difficulties requiring sound judgment, deep thought and a personal skill that is second to that required in no existing handicraft, but his wages, nevertheless, are not munificent. The plumber, without realizing it, is a veritable scientific cyclopedia compared with his frequent associate, the marble cutter, yet the latter receives much higher pay. It has been said that a man's business is as dignified as he makes it, but we are not prepared to admit that the old trades which are so indispensable have degenerated below the better-paid trades, as the difference in recompense would suggest.

Spiders and Flies.

Some astonishing figures presented in a report recently issued by the Inspector-General of Liquidations in Great Britain furnish food for reflection. The report in question is the first rendered under a new act of Parliament regulating the winding up, compulsory or otherwise, of public companies, and embraces those companies wound up during the year 1891. It shows that the loss to the British public who held shares in the collapsed concerns reached the enormous sum of $94,858,815. The Inspector states, moreover, that when the cost of winding up and other expenses are added, the total loss will probably approach $100,000,000. This is for one year only, and in but one country. Nothing could demonstrate more fully the extreme, almost criminal, credulity—or perhaps gullibility would be a more suitable term—of the investing public on the one hand and the unscrupulousness of some company promoters on the other hand. The mass of successful fraud represented in these figures is said to be great. In the majority of cases, too, the perpetrators escaped scot-free, only a few of the persons who shared in the plunder having come under the grasp of the law. Seldom is one brought face to face in so striking array with the facts of the case on this subject, and the lesson the figures teach us we should do well to lay to heart. For this condition of affairs is not confined to England. The old game of the spider and the fly is going on merrily in every country where the company promoter is abroad, and the matter touches persons of all conditions.

Small Investors.

A large proportion of the losses in the companies treated above represented, as we understand, the contributions of very small capitalists, many of whom had perhaps invested the savings of a life time of industry and frugality in what they had too easily been persuaded were sound and paying concerns. Those who have little to spare should think more than twice before investing even the smallest amount of capital in any concern whatever, however plausible and promising, of which they are not fully assured, by investigation and incontestable proof, that it is sound and that its promoters are reliable men as to character and of sound financial reputation. Such information can be readily obtained in all cities, from mercantile agencies, banks, or other sources which are above suspicion. It is mere justice to oneself, to those dependent on one, and to the community at large. The trouble is that men are everywhere found who will not put themselves out to take these necessary precautions, but are satisfied to take the word of those interested in getting their money, or who allow themselves to be deluded by the glowing terms of a prospectus. So that one is almost tempted to agree with the strong opinion of old Thomas Carlyle, that men are "mostly fools." Of course the tale of successful fraud above recorded only includes corporate operations which shelter themselves more or less under the cloak of the law. But the daily instances of men who ought to know better being fleeced by the more vulgar and petty arts of crooks and confidence men, and by means of tricks and impostures which are as old as the hills, show that much and continued warning is needed to induce people to shield themselves against the wiles of that unsavory host, be they promoters of bogus companies or petty sneak thieves, who live upon the money extracted from the pockets of others. It is said that the number of those who "live by their wits"—that is, dishonestly—in New York City alone exceeds 30,000. The inference is that the honest and hard-working balance of citizens are fools to allow them to do so.

Training of Tin Platers.

Are skilled workmen indispensable for the production of good tin plates? A manufacturer of American roofing plates, of whom we asked this question a few days ago, said his own experience demonstrates that they are not necessary—at any rate for terne plates. The authority in question has for several years given considerable study to the manufacture of tin plate, and is himself a competent plater. He has for some time tried the experiment of running a few pots with boys instructed in his factory, and has found that after two or three weeks' experience they are able to perform the whole operation of tinning roofing plates with complete success. Under the general supervision of a competent foreman, with tinning machines of a simple type, the boys in his factory are now turning out in large quantities roofing plates of a high grade, the demand for which is so great that, even while running the factory night and day, it has been found impossible to keep abreast of orders. By this means the manufacturer has been enabled to economize very considerably in the item of wages, and can put his plates on the market at a price which competes successfully with that of imported plates of similar quality. In addition to this he avoids the troubles and trials which seem inseparable from the employment of skilled labor. Of course this experience does not apply to the production of bright plates, for which some skilled labor seems to be at present necessary.

Disposal of Old Tin Cans.

"Wanted, 10,000 goats," is a head line in a recent issue of the Pittsburgh *Dispatch*, which is calculated to arouse curiosity. On investigation it is found that the ruminants are proposed to be supplied to the city Board of Health for the astonishing purpose of consuming the mass of old tin cans which is accumulating around the city garbage furnace—at least the *Dispatch* says this is the only method the superintendent can think of for ridding himself of a

daily increasing incubus! His furnace can't burn up the carloads of these articles which are daily thrown away from hotels, restaurants and private houses in the city and dumped into his care, and the digestive organs of goats are the only things, so far as he knows, strong enough to dispose of old tinware. However this may be, it is a solid fact that the question of disposing of the quantities of old tin cans thrown away in cities is one which is greatly exercising the municipal mind, and an effective solution of it is much to be desired. Surely, among the ingenious devices which modern invention has brought out for tuihzing waste matter of every kind, some method of disposing of this class of waste, which really contains valuable material, should be available. The difficulty lies largely in the bulky nature of the cans. Sash-weight makers use them in their manufacture, but as they only offer about $1 a ton for the material, and this on condition that the cans are flattened out, it is not much worth anyone's while to cater to that trade, as the operation of flattening a ton of cans would cost more than the sum offered for them. The tin and solder contained in the cans are of some value, and a number of methods have been announced for separating them. We do not know whether any one of them, however, has proved a commercial success, although it is said that the extraction of tin from old cans is carried on as a regular industry both in London and Paris. Some of the newest garbage cremating systems are claimed as capable of destroying old tinware, though how its annihilation is effected is not quite clear. Still, what is required is not destruction but utilization of this waste material.

Glass-Roofed Streets.

Some attention has been paid in English papers to a proposition for covering the principal streets of London with glass roofing, the roof being supported by iron girders, and ventilation being secured by free passage of air from end to end of the streets, and by the openings from the sides at street crossings. The object appears to be to keep the streets dry, which purpose would doubtless be measurably attained; but other inconveniences would be introduced. A street under glass would be intolerably warm in bright summer weather, and it would smell like a stable. To cover sidewalks with glass roofing would, however, be a real improvement in cities, keeping the sidewalks dry, conveying rain water into gutters much more effectively than the canvas awning now so much in vogue, and not interfering with that thorough and constant change of air necessary to keep city streets in a wholesome condition.

Electric Ventilation.

The use of fan blowers driven by electric power has become quite extensive. A suggestion, the source of which we cannot at present trace, for a different application of electricity in ventilation appears to have in it a germ of practical usefulness. The plan is to place resistance coils in the lower parts of ventilating flues, and to pass an electric current through them. The resistance of the coils will heat them, and, in turn, they will heat air in the bottom of the flue and thus produce an upward draft. Of course, this would be too expensive for purposes of general ventilation; but it could probably be made effective for water-closet ventilation in buildings lighted by electricity, thus supplanting gas burners now used for similar purposes. There would be no dripping and running down of condensed water in the flues, as now sometimes occurs when gas burners are used in them for creating draft; and no personal attention would be required, as when an electric fan blower is employed.

A Hot Blast.

Odd things happen, and this experience of an old reader who writes for the first time may interest the boys.

The room was only a small one, yet it could not be heated. An 8-inch hot-air pipe from the furnace had failed, and the same result had attended the use of a 9, 10 and 12 inch pipe, when the old gentleman, who was rather irascible, invited the boss to stop his idiots from coming any more to tear up his house. He said he would show us how to heat that room with a certainty that defied failure and with the furnace just as it was. He had been told that it was impossible to get hot air into the room if the other air could not get out, but he said he did not propose to have a breeze of cold air coming in all around the doors and windows to irritate him just to please a cuss of a heater man, so all the doors and windows were as air tight as thick felt could make them. There was no chimney in the room where a ventilating register could have been placed, even if he would have permitted it, for when it was suggested he stated he did not buy coal to heat air to be wasted going up a chimney to heat the stars, and that ventilation was only a scheme to give lazy chaps a job of figuring money out of other people's pockets. We went by his house every day, and after about a week could see him in his wrapper reading in this little room, which he used for a den, and he seemed perfectly comfortable no matter how cold it was. This excited curiosity beyond control, and the boss asked him to show him how he overcame the difficulty. He did not say a word, but took him into the cellar and showed him a small blower hitched on to the hot-air pipe, then took him into the room and showed him a large wheel with a crank to turn it and a belt connecting with a pulley on the blower. He laid his thermometer on the register and in a few minutes pointed to the temperature registered, then set a chair over the register, tied a handkerchief to it and turned the wheel a few times, blowing the handkerchief violently about and raising the temperature as registered by the thermometer. He motioned the boss to feel his muscle, patted his stomach, hung his coat on the rack, said something about exercise, digestion and warmth, and then invited the boss to leave and reflect on his inability to solve a heating problem that was so simple.

The Furnace.

BY TINK.

Furnace heating, though old, is living yet,
And 'tis many a year since the first one was set.
Through mistakes and queer notions its long life has run,
Yet promises fair to continue right on;
Quite holding its own with many a scheme,
Such as heating with gas, hot water and steam,
And pipes in the streets, through which heat may pass
And go through a meter tremendously fast.
'Tis a wonder it lives in these fast, later days,
When steam, hot water and other new ways
Are pitted against it by men who deride
Its old-fashioned features; with arrogant pride
Praise their new systems quite up to the skies,
And tell what *moist* air from their heaters arise.
It sets me to thinking, and the longer I do,
I wonder greatly why it is true
That in old age, prolonged to such length,
It continues to have such remarkable strength,
Increasing with years, to the dreadful dismay
Of my hot-water friend just over the way.
So I take extra pains satisfaction to give,
That my old friend, the furnace, may prosper and live.
And I tell all men that give me the chance,
That are they but willing to go half the expense
That hot-water plants are well-known to cost,
Not beat me down, and let me be the boss,
I will warm their house perfect for many a day
With a good hot-air furnace in the old fashioned way.

Spiral Coil of Pipe 530 Feet Long.

An unusual job in pipe bending has just been finished by the Brooklyn Tube Bending Company of 75 York street, Brooklyn, N. Y. The pipe is 1-inch galvanized iron and is bent in the form of a flat spiral, 2 feet in diameter at the center and 17 feet extreme diameter, there being 17 turns 4 inches apart. The lengths of pipes are 18 feet long and are united by right and left hand threaded couplings. The coils are kept flat and in position by 32 radially arranged iron straps, placed in pairs, one each side of the coil and bolted together. The pipe was bent cold by a machine arranged somewhat like the ordinary straightening machine. It is first forced through a cylinder of the same diameter as its outside and then passes between two semicircular guide rolls, also of the same diameter. These guide rolls can be set so as to produce any desired degree of curvature in the pipe passing between them. There is no flattening of the pipe, the true circular section being truly maintained. Under a water test of 120 pounds, although the contract only called for 50 pounds, there was no sign of leakage.

Some time since the Department of Public Works asked for bids for an engine for the new high pressure pumping station to be built at 181st street and the Harlem River, New York. Six bids were received, the aggregate sums for furnishing the engines, pumps and other appurtenances ranging from $180,000 to more than $300,000. In each case the bidder was desirous of contracting for machinery exclusively of his own design. It was decided, therefore, to reject all bids received, and to prepare plans and designs for the engine wanted and readvertise for bids. The total estimated cost of the new pumping station and engine is $850,000.

WORLD'S FAIR NOTES.

In Favor of Sunday Opening.

Members of the Chicago World's Fair Directory passed a resolution on the 12th inst. that the World's Fair should be open Sundays on and after May 21. They took this action upon the recommendation of Director Edwin Walker, the leading legal adviser of the board. After many hours of thought Mr. Walker, in consultation with Lyman J. Gage, Henry B. Stone and others, came to the conclusion that Congress had no authority over anything other than the exhibits, and that the directory was free to act in accordance with the terms of the resolution which Mr. Walker presented. His resolution does not propose to open the exhibit buildings, the great structures in which the products of all countries are housed, but merely the grounds about them—the Plaisance and the State and Foreign buildings—providing those in control of them so elect.

Inasmuch as the big exhibit buildings may not be entered by the visitors, the directory proposes that a charge of but 25 cents be made to enter the grounds Sundays. The action of the directory was taken in accordance with what is believed to be public sentiment.

Members of the National World's Fair Commission are disposed to resent the assumed right of the local board to open the gates, even if the exhibit buildings remain closed. They have declared that the directory could not, without the sanction of the commission, put such a resolution into operation, and they have previously threatened that legal proceedings would be instituted if their concurrence was not secured before Sunday opening in any form was attempted.

Foreign Exhibitors Object to Single Judges.

Commissioners representing Austria, Belgium, France, Germany, Great Britain, Italy and Russia have addressed the following protest to the National Commission against single judges:

We believe it would be far more satisfactory if the jury system which has been elaborated at the various great exhibitions of the world could be adopted, a system, that is to say, under which the awards are made by juries of moderate size, representing a certain number of groups, the decision of these juries being subject to revision by a jury of each department, and if necessary by a single superior jury, on which foreign commissions should be duly represented.

We think that the opinion of a single expert would be less satisfactory to an exhibitor than the opinion of a number of such experts acting as a jury. We think that duly qualified experts would shrink from the responsibility of making individual reports.

We believe it would be impossible to examine during the time of the exposition all the individual exhibits in the way we understand it is proposed, and we consider that proper weight should be attached to the reputation of the exhibitor, to the excellence of his manufactures, and not solely to the merit of the special articles which he may have produced solely for the purpose of exhibition.

With regard to the proposal that the awards should be of a single class, we understand that this has been definitely decided by the National Commission, and we do not propose formally to raise any objections, but we consider that the idea of graduated awards is preferable, and we would suggest that at all events some distinction may be made on the diplomas as to the degree of merit appertaining to each exhibitor's production.

We would further impress on the National Commission the necessity of definitely informing foreign commissioners of the number of judges allowed to each country, and of the classes in which they should be appointed, and the proportion which foreign judges would bear to American judges; that a definite date should be fixed on which the jurors should commence their work, and that no alteration should be made in this date; also that a definite date should be fixed on which the jury of revision should receive the reports of juries of first instance.

In making these suggestions we have endeavored to formulate what we consider to be the most moderate concessions which we believe foreign commissions have a right to demand on behalf of the interests of the countries they represent, and we feel that unless these concessions are made foreign commissioners must reserve to themselves the right of declining to take part in the work of the awards, and, if necessary, of placing the exhibits of their respective countries *hors concours* and withdrawing them from the consideration of the judges.

The difficulty about the system of making awards at the fair arises from the fact that even those who prepared the plan do not know exactly what it means. John Boyd Thacher of New York is acting chairman of the committee. Mr. Thacher wanted to ignore all precedents, do away with juries of awards, and have a single judge examine the articles offered for competition in a certain group. He worked on that scheme nearly two years. Some months ago the Board of Control took up Mr. Thacher's plan and modified it. The Board of Control recognized the one-judge system to the extent of ordering that one judge should examine the articles and write the reports, which were then to be signed by other members of the jury.

"It's the single-judge plan," Mr. Thacher gleefully exclaimed, after his long fight with the Board of Control.

"It's the old jury system, pure and simple," said members of the Board of Control, and both quit the contest feeling that a great victory had been won.

It may be that the plan indorsed by the Board of Control is none other than the old-fashioned jury system, but exhibitors did not so construe it, and complaints have been pouring in on Director-General Davis for months. Exhibitors criticised the one-judge plan no less severely than they did the long delay in naming foreign judges who were to pass upon exhibits in the international work.

The matter will again be considered by the National Commission, in view of the decided position taken by the foreign exhibitors.

Demand for Engineering Tests.

Dissatisfaction is expressed by engineers, by manufacturers of boilers, engines, motors and railway appliances and by fuel companies with the methods of making awards at the World's Fair. It is understood that no sort of test is to be made of any engine, motor or fuel or mechanical device whatever. It is greatly to be deplored, these engineers say, that the exposition authorities have seen fit to neglect such an important matter. Here, they say, is an opportunity such as never before existed for the world to acquire a fund of information valuable beyond all computation to engineers and to manufacturers. Every type of engine, steam generator, gas and other motor; all methods for the transmission of power by compressed air, electricity, wire rope; all sorts of carrying machinery and numberless other mechanical devices are here gathered together ready to have their comparative merits shown, and the opportunity is to be passed by. It is understood that no provision has been make for comprehensive scientific tests as suggested by the American Society of Mechanical Engineers. It is urged that not only practicing engineers but business men desiring to engage in some line of manufacturing could refer to the reports made and have an actual, unprejudiced account of the performance of any engine or machine in which they might be interested, instead of being forced to rely on the assertions of manufacturing agents.

This would not necessitate any competition, the engineers say. All tests of each class of exhibits could be made on the same line and the results published by the World's Fair authorities. They agree that even if Mr. Thacher would carry out his single-judge idea and provide means of making tests it would be a big thing. It would be better for all concerned, they say, to have fewer judges and spend some of the money thus saved in making the tests.

As for the manufacturers who have exhibits at Jackson Park, they seem to have taken it so entirely as a matter of course that tests were to be made that most of them expressed great surprise when it was intimated to them that such was not the case. Had they known, many of them say, that no tests were to be made they would not have spent so much money in making exhibits. Some go still further and declare they would have made no exhibits at all. In brief, it would seem that all concerned are extremely anxious that tests be made.

In December, 1892, a committee appointed for the purpose by the American Society of Mechanical Engineers, at the request of the Committee on Awards of the World's Columbian Exposition, presented a report on methods for physical and mechanical tests of steam engines and other machines. After dwelling upon the great opportunities afforded by international expositions to keep pace with the developments of other nations in the various departments of science and art and for careful tests of the relative merits of the various products, manufactures, machines and methods developed under different conditions in various parts of the world, the committee recommended a most elaborate series of tests, going into great detail for the guidance of the National Commission. Although submitted in due form and in good season, is is said, this report was practically ignored by the Committee on Awards. Its suggestions have not been acted upon. Whatever merits the exhibits of engines, boilers and motors may possess will from present indications not be disclosed at the fair. All exhibits of this class will be there exclusively on appearances.

State Commissioners Aggrieved.

States rights at the fair was discussed at a recent meeting of the Executive Committee of the National Organization of State World's Fair Officials. The Executive Committee consists of E. C. Hovey of Massachussetts, chairman; A. B. Farquhar of Pennsylvania; B. F. Havens of Indiana; Donald McNaughton of New York; J. D. Apperson of Iowa; C. P. Mattocks of Maine; J. C. Wyman of Rhode Island, and J. G. Gwynn of Missouri.

For several months the State executive officers have felt dissatisfied at the way things are running at Jackson Park. It is said that they have not been treated with dignity at the hands of the exposition authorities, and that not only has no official ceremony been used in dealing with them, but they have received no recognition upon public occasions, and beyond being held re-

aponsible for their States' exhibits being ready on time they have been left to shift for themselves.

This has gone on for some time, according to some of the commissioners, and the Executive Committee was appointed to see that hereafter the State officials received the courtesies they claim they are entitled to. One of the Executive Committee says :

"We want our position at the exposition defined. Our State governments have sent us here to represent the functions of the different States at the fair. We have been treated with scant courtesy, and have never been asked to participate in any of the public functions of the fair. Representing as we do the great commonwealths of the United States, it seems hardly right that we have never been asked to meet officially any of the representatives of foreign powers. Our position seems to be only that of overseers of exhibits. We were sent on here by our States to direct foreign attention to our different sections. As yet I have to see the opportunity that any of us has had of meeting any of the foreign commissioners other than in a purely personal matter."

Germany's Great Display.

Germany takes a position of such prominence in all departments of the fair that it almost looks like a German exposition. Germany's exhibits are the pride of all who either claim allegience to that country or are of German descent. The German Building, overlooking Lake Michigan, is the showiest of all the foreign buildings. The exhibit made in Manufactures Building is the furthest advanced of the exhibits of foreign governments in that building with the possible exception of Great Britain. In every building on the grounds the German exhibits are far along, and there are some critics who claim for many of these greater excellence than that possessed by other exhibits.

The great feature of the exhibit in Manufactures Building is the open courtyard fronting on Columbia avenue, where is to be shown the handiwork of the German gold and silver smiths and the porcelain art work, in which the artists of the German Empire excel the workmen of all other countries. There is a space of 161 feet, separated from the broad passageway by a fence of wrought iron, with three gates also in wrought iron, which combine massiveness with artistic workmanship. The fence is in itself one of the most interesting displays not only of the German exhibit, but of the entire exposition.

As a background to the gold and silver exhibit is built a portico with saracen pillars of porcelain and having for a centerpiece a huge painting on porcelain tiles, the work of Prof. A. Kips of Berlin. This is flanked on either side by an allegorical painting on porcelain, and to the north and south of this are alcove rooms, a part of the whole which ends in curved walls which in turn are joined to iron gates.

Armbruster Bros. of Frankfort-on-the-Main furnish for the exhibit the beautiful wrought-iron fence which separates this section of the exhibit from Columbia avenue. The style of the work is rococo and the central one of the three gates is said to be the largest piece of wrought-iron art work ever made. It stands 40 feet high and is 22 feet in width, and the gates alone weigh 18 tons exclusive of the elaborate posts and surmounting top piece. The side gates are 30 feet high and 15 feet wide, and each pair weighs 13 tons. The iron was hammered and wrought from crude bars entirely by hand work. The fence complete represents the work of 150 of the firm's most skilled workmen for a total period of almost six months. Fruit and flowers and delicate leaves have been hammered from the iron until they look to be the work of a skillful goldsmith, instead of the brawny wielders of sledge hammers over huge anvils. The central gate is the principal feature of this exhibit. Huge bars extend from the top to the bottom, filled in between with delicate tracery work, and the top and bottom are each marked by molding in keeping with the whole. Towering high above the top piece is a basket of flowers, hammered out of iron, and looking as life-like, save for the color, as would a basket of wax fruit or flowers. The total length of the fence is 161 feet. After its completion it was set up both in Frankfort and Berlin and the news of its excellence brought thousands to view it. The Emperor himself paid it a visit and expressed his admiration of its workmanship in unmeasured terms of praise. It is probable that the fence will remain in America at the close of the exposition.

Baden makes an exhibit at the north end of the inclosure. There are three artistic iron gates, which serve as a background, the central one of which stands 20 feet high and has beneath its ornamental top piece the word "Baden," wrought in iron. The work of the jewelers of Baden will be shown in cases directly in front of this. These gates are the work of Bieler of Offenburg, Baden. The Bavarian countries have contributed three more ornamental wrought-iron gates for the south end of the inclosure.

Passing around the north end of this block and walking south one comes to some exhibits of wonderful interest and beauty. The first is a collection of old-fashioned German wood stoves. This strange article is made of earthenware or porcelain, as the case may be. Each stove is 10 or 15 feet high, with folding doors to the grate, and decorated in the highest style of art. One can only compare it to a church altar in pottery or porcelain. The style of the room is rococo and renaissance. Next comes an extensive exhibit of cooking ranges by H. Koloseus of Aschaffenburg. They are 6 x 13 feet in size, faced all around with beautiful tiling and mounted with polished steel and brass.

The third block of the German exhibit contains more splendid exhibits than both of the others put together. The first of these exhibits is that of the great cutler, J. A. Henckel, at Solingen. Forty feet of upright showcases, with plate-glass doors, are filled with his table, pocket and surgical cutlery. Lying down in the front of this show case is a magnificent pair of lady's scissors. The blades reflect everything about them like mirrors, and the handles appear to be of gold exquisitely chased. Crowds of ladies bend over them, and gaze wistfully at them; and yet they will probably never find a purchaser, as they are 6 feet long and weigh 200 pounds. Other familiar articles of cutlery in the same neighborhood are on the same Brobdingnaggian scale. There are carving knives and forks, of perfect finish in every way, that are 4 feet long, and that would be a good load for a man; and numerous butchers' knives and kitchen knives are just as large. But all of them are as elegant in every respect as those of smaller size.

The next exhibit is equally interesting for its intrinsic merit and on account of the exhibiter, Prince Stolberg, who is one of the hunting associates and boon companions of the German Emperor. The exhibit consists of decorative iron work from the Prince's immense works at Ilsenburg, in the Hartz Mountains. The articles are antique shields, breast plates, helmets, swords, battle axes and spears, and then a line of more peaceable articles, such as tables, screens and cigar presses.

The next attraction is a needle exhibit by Funker Bros. of Siehen, mainly noticeable for a large picture of a steamer on a rough sea, all done in needles, which are skillfully made to resemble the sheen of the water. There is a rare exhibit of hammered copper goods by Peter Seitz of Munich, consisting of vases, chandeliers, lanterns, crucifixes, champagne coolers, and what not. Immense vases, 4 feet high and 3 feet wide, graceful in shape and elaborately chased and decorated, are shown, which have been hammered out of a single piece of copper at a cost of $500. The next exhibit is that of the Gaggenau Iron Works, the specialty of which is a patent process for a permanent and artistic enameling of iron. The articles exhibited include vases, console tables, card tables, decorative shields, flower stands, alcohol lamps, match safes, inkstands and a whole line of kitchen and dining-room ware. These articles are made of iron, and exquisitely painted so as to resemble the finest earthenware. So handsome are some of the designs, and so elegant the workmanship, that one forgets that it is ironware. At the immense works of the company, of which a large painting is displayed, 1200 workmen are employed, while the work is protected by at least 100 patents.

The last booth on the east side of the block is that of Armbruster Bros. of Frankfort-on-the-Main, the manufacturers of the great triple gates of the German exhibit on Columbia avenue. In the Armbruster booth one will see smaller articles which display even greater skill. These articles are candelabra, chandeliers, candlesticks, andirons, shields, railings, door trimmings, flower stands, signs, German creats, screens, brackets, picture frames, jewelry boxes, yes, and vines and flowers, all hammered by hand out of iron.

In all exhibits are made by more than 3000 German firms and individuals. These include the exhibits in the various buildings, but the greater part of the number are to be found in the German exhibit in Manufactures Building.

The Belgian Exhibit.

The little kingdom of Belgium has a very fine exhibit in Manufactures Building, conspicuous for daintiness of design and fine workmanship. In a few lines something really ambitious has been attempted, as for instance in plate glass A plate 18 x 12 feet is shown, which is an inch thick, without a flaw, and so clear that it is almost invisible. In hammered iron work the Belgians have not exerted themselves to make anything ponderous, but they have produced a few specimens of small size that are unequaled for intricacy and delicacy. One reproduces the branch of a tree, with flowers, birds and leaves complete in the smallest detail.

American Exhibits.

While there is a very great deal to be seen in every department, and visitors can now feel repaid for taking the trouble to make a trip to the fair, there

is hardly a section in which belated exhibitors are not seen hard at work completing their booths or installing their goods. So incomplete are the various departments that it seems invidious to enter upon the work of describing what has been done and necessarily omitting exhibits which will in a short time be fully as attractive as any. Another week or two will, however, make a great difference in most of the buildings.

American Tin-Plate Exhibit.

For a time the outlook for an exhibit of American tin plate was decidedly dubious. This would have been a serious omission, reflecting severely on American tin-plate makers. Through the energy of H T. Duff of Wallace, Banfield & Co., Irondale, Ohio, the gap is being filled A large portion of the south gallery of the Mines and Mining Building was secured, and workmen are now busy in the erection of an ornamental pavilion to be constructed wholly of American tin plate. In it will be shown specimens of the metal in its various stages, beginning with the crude materials and crowning the whole with the best specimens of the American tin-plate maker's art. The exhibit will be known as that of the Associated Tin Plate Manufacturers of the United States.

Singer, Nimick & Co.'s Unique Exhibit.

A novel feature will be introduced in the exhibit of Singer, Nimick & Co. of Pittsburgh in the Mines and Mining Building. While they will show numerous samples of their tool steel, circular saw blanks, plow and cultivator steel, spring steel, &c., all arranged most tastefully, they have added to these an exhibit of a very wide range of finished products made from their steel, contributed by their customers. These are displayed in glass cases, and comprise such articles as bicycle drop forgings, sewing machine parts, watch springs, mechanics' fine tools, files, deep drawn cups and sockets for various purposes, table ware in its various stages from the crude steel to the silver-plated product, &c. This exhibit is intended to show the requirements which must be met by steel makers in the production of steel for a great variety of special purposes.

In the Electrical Building.

The Western Electric Company of Chicago are preparing an exhibit which aims to reproduce the very lightning of the heavens. A row of incandescent lights has been attached to a zigzag frame work about 60 feet in length, suspended from the ceiling, and through this will be sent intermittently a current of electricity. At the end it will be absorbed by a ball of incandescent lights with colored bulbs, the effect being that of a ball of fire dropping from an electric flash. There are four of these lightning lines of light radiating from a common center, the top of a 40-foot pillar. Around this pillar, 2 feet in diameter, are twined strings of incandescent bulbs of red, white and blue, 2000 in number. The pillar itself will be coated with bits of broken glass, so that light will be reflected in dazzling brilliancy in every direction. These lights will not all be kept burning at the same time. By an ingenious mechanism the current is made to pass from one row to another, beginning at the base of the column, and the effect will be a creeping upward of the three colors in succession until they reach the top, when they will shoot out along the zigzag lines like a lightning flash, to be absorbed by the balls at the ends. These balls will have the three national colors, but there will be a magical intermingling of light, as they will continually revolve at the rate of 60 to 80 revolutions a minute.

The same company have reproduced for their pavilion an ancient Egyptian temple, the ceilings of which are covered with multi-colored glass, representing jewels, above which will be placed moving electric lights, the effect being a constant succession of colors of great brilliancy. The pillars of the temple are made of glass and within the hollow center will again be placed electric lights, producing the same effect. The Egyptian eagle above the open doors, which in daylight looks like a surface picture, is also of glass, behind which there will be kept burning electric lights. The company's sign is also of glass, but so constructed that, with moving lights behind it, it will seem to flash forth the light of the diamond, sapphire and other precious stones.

Department of Machinery.

Workmen are still in possession of Machinery Hall, and represent almost as large a number as the visitors who are roaming around the huge building, watching the work and inspecting such of the exhibits as are completed. Few persons can have an adequate conception of the difficulties experienced by the management in the performance of such work as requires the employment of skilled labor. The exceptionally large force required renders the proportion of really competent workmen so small as to constitute them the exception rather than the rule, notwithstanding that every effort is made to secure all who are available. As a natural result of this condition of affairs, not only does the work progress slowly, but through the ignorance and carelessness of the incompetent element, much of it is found upon completion to be so imperfect as to require more time to correct the faults than should have been necessary for the entire work under ordinary circumstances. Outside of the work pertaining strictly to the installation of exhibits—which is, of course, done by the exhibitors themselves, and for which they are solely responsible—the various features of the general equipment of the buildings are progressing rapidly toward completion. There are now but few instances, if any, in which delay to exhibitors is occasioned from want of necessary connections with steam, water, compressed air, or oil, service pipes; and the distribution systems for electric currents, for lighting and power transmission, are being completed as rapidly as the installation of the exhibited generators and their motive power will allow. The capacity of the steam, water and fuel-oil supply is far in excess of the present requirements, and all work pertaining thereto will be completed long in advance of the exhibits dependent upon it. While up to the present time the responsibility for delay has undoubtedly, been divided between the exposition management and the exhibitors, it may now fairly be said to devolve almost entirely upon the tardy ones of the latter class; and to their efforts we must now look for the completion of one of the most important of the many departments of this great exposition. With reference to the power plant, the progress has not been as rapid during the past two weeks as might have been fairly expected Though, in some few instances, the work has been completed upon both engines and the dynamos and generators which they are to drive, their operation is delayed for want of the belting. As many of these latter are of 72 inches width, the work of putting on and splicing requires considerable time. None of the large engines are in operation except for one hour or so occasionally, though several are entirely ready for continuous service.

The Allis quadruple expansion is waiting for the 72 inch belt which will connect it with the second of the Westinghouse dynamos. The Fraser & Chalmers and the Buckeye 1000 horsepower triple expansion engines, for similar duty, are waiting for the same reason, as is also the Atlas 1000 horsepower twin tandem compound. Most of the isolated engines scattered throughout the main building and annex are in operation, driving the line shafting. The paper mill of the paper trade exhibit has made wonderfully rapid progress, though judging from its magnitude and the amount of work still to be done, it will require several weeks before it can be ready for operation. Outside of the power plant, nearly all of the completed exhibits are confined to the annex, although there are a few notable exceptions in the main building. The hydraulic basin still presents the appearance of a depressed roller-skating rink—the water not yet having been admitted—though this is due to the fact that the pumping machinery to be supplied by it is composed of numerous exhibits, but few of which are completed. Of machinery in operation the most conspicuous is that of the textile class, there being a large number of looms busily engaged in weaving fabrics containing various souvenir patterns—the latter, of course, being offered for sale, and finding ready purchasers in such visitors as will have but limited opportunity for visiting the fair. A few of the stamping press exhibits have machines running on souvenirs, consisting mostly of hardwood medallions embossed in some memorial design. The classes of wood-working machinery and machine tools are well represented by completed exhibits, so far as the actual placing of machines and clearing up of spaces may be so considered, though but few are yet in operation. Notwithstanding the fact that the limit of the time in which delayed exhibits were to have been admitted to the buildings, there is still a very large amount of unoccupied space. Also, there are many spaces in which the material still remains untouched in the packing cases, apparently totally neglected. Throughout the entire building the floor is more or less obstructed by scaffolding and material for the construction of platforms and pavilions, arrangement of exhibits, and miscellaneous rubbish from empty packing cases, &c. While to those who will have the opportunity of frequent visits there is sufficient to occupy a full day's attention, and they may see it later in its entirety; for such as desire to see it only as a completed exhibition it will be well to defer their visits for the present.

The Colorado River Irrigation Company have just been incorporated under the laws of Colorado, with an authorized capital of $7,500,000. Several New York and Western capitalists are interested. The plan is to excavate a canal 150 feet wide and 10 deep, and the tract to be irrigated comprises 3,000,000 acres, of which one-third are in lower California.

ROOFING AND CORNICE.

New Designs of Terra Cotta Roofing Tile.

A form of roof covering possessing many features concerning which architects, carpenters, contractors, and, in fact, all having to do with building construction cannot fail to be deeply interested is now being introduced to the trade by the Celadon Terra Cotta Company, Limited, of Alfred Center, N. Y. The covering consists of vitrified terra strong clay, which is manipulated in much the same manner as pottery is manufactured. The clay is subjected to great pressure between bronze dies, which give the pattern desired, after which the tiles are dried on plaster forms and baked in seggers. The tiles when completed are dense, strong and highly non absorbent. In color they vary from different shades of buff and red to a dark chocolate. The process of manufacture employed, howing to the roof, it is claimed, "that mobility of expression which is the charm of nature." The company make five sizes of the Conosera tile, with which, it is stated, can be covered in a superior manner any size or proportion of cones or towers. One form of this tile is represented in Fig. 5 of the illustrations. The company also supply glass tile, interlocking with those made of terra cotta and intended for skylights. Most of the designs and combinations pro-

Fig. 1.—Rhinoceros Pattern of Roofing Tile.

Fig. 2.—Grecian Pattern.

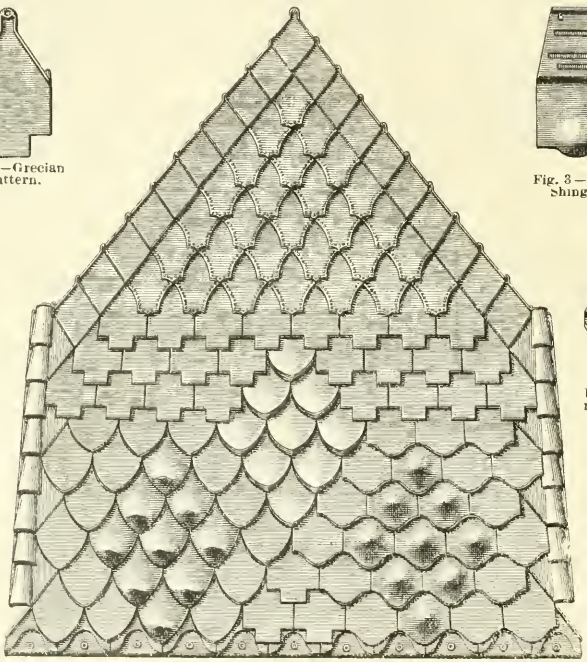
Fig. 3.—Horn Shingle.

Fig. 4.—Concavo.

Fig. 5.—Conosera Pattern of Tile.

Fig. 6.—Diamond Shape.

Fig. 7.—Wave Pattern.



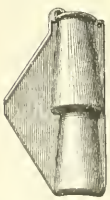


Fig. 8.—Gable Tile.

Fig. 10.—Showing One of the Many Combinations in which the Roofing Tiles may be Employed.

Fig. 9.—Eave Tile.

NEW DESIGNS OF TERRA COTTA ROOFING TILE.

cotta roofing tiles made by a special process from a peculiar clay, which, when laid in position, give effects both artistic and highly ornamental. These results are possible by reason of the special construction of the tiles and the almost limitless combinations in which they may be employed. These tiles have a heavy and substantial appearance, and yet they weigh much less per square, we are informed, than what are often designated as Spanish tile, and are sufficiently strong to be walked upon. The illustrations which we have pleasure in presenting to our readers show some of the various patterns of tile made by the company and one of the innumerable combinations in which the tile can be used. The material employed is a superior quality of tough, ever, is such that they can be glazed any color required. One of the strong features of the tile here illustrated is a deep flange which permits of the interlocking of different patterns, thus enabling the use of any number of styles desired in a single roof. The tile are also adapted for siding as well as roofing, and afford the opportunity for new and novel effects in exterior decoration. The manufacturers state that the interlocking character of the tile enables a wind proof and storm tight roof to be secured under circumstances where pan tiles have proven unsatisfactory. One of the novel effects claimed for these tiles is the seeming change in form presented by them under different conditions of light and viewed from varying standpoints, given to the roof, it is claimed, "that mobility of expression which is the charm of nature." The company make five sizes of the Conosera tile, with which, it is stated, can be covered in a superior manner any size or proportion of cones or towers. One form of this tile is represented in Fig. 5 of the illustrations. The company also supply glass tile, interlocking with those made of terra cotta and intended for skylights. Most of the designs and combinations produced by this company are new and fully covered by letters patent. The company are represented in New York City by E. L. Hyde of 30 Cortlandt street.

FLASHINGS.

The Slatington-Bangor Slate Syndicate of Slatington, Pa., have just issued from the press a neat little pamphlet of a size convenient to carry in the pocket and entitled, "Slate Manual and Descriptive Price-List." Within its covers a great deal of information of interest and value to the slate roofer is presented, prominent among which may be noted sizes and prices of various kinds of roofing slate and rules for measuring slate roofing.

"Decorative Metal Ceilings" is the title of a very neat pamphlet which reaches us from Lyles & Mills of 231 William street, New York City. Numerous designs of paneled and embossed steel ceilings are presented, together with illustrations of moldings, cornices, &c. Several illustrations are also given of buildings in which the company have introduced their work.

The adoption by the Chinese of galvanized iron for roofing, to which allusion was made recently, is reported to be growing rapidly. The advantages of metallic roofing, as demonstrated in the houses of Western residents in China, seem to have at last struck these most conservative of people, and latest advices from China say that the transformation, which only commenced lately, is very quickly becoming general.

The Crown Ventilator Company, 356 Fulton street, Brooklyn, are putting out a new chimney cap which can be nested for shipping or sent flat, and any tinsmith can readily put it together.

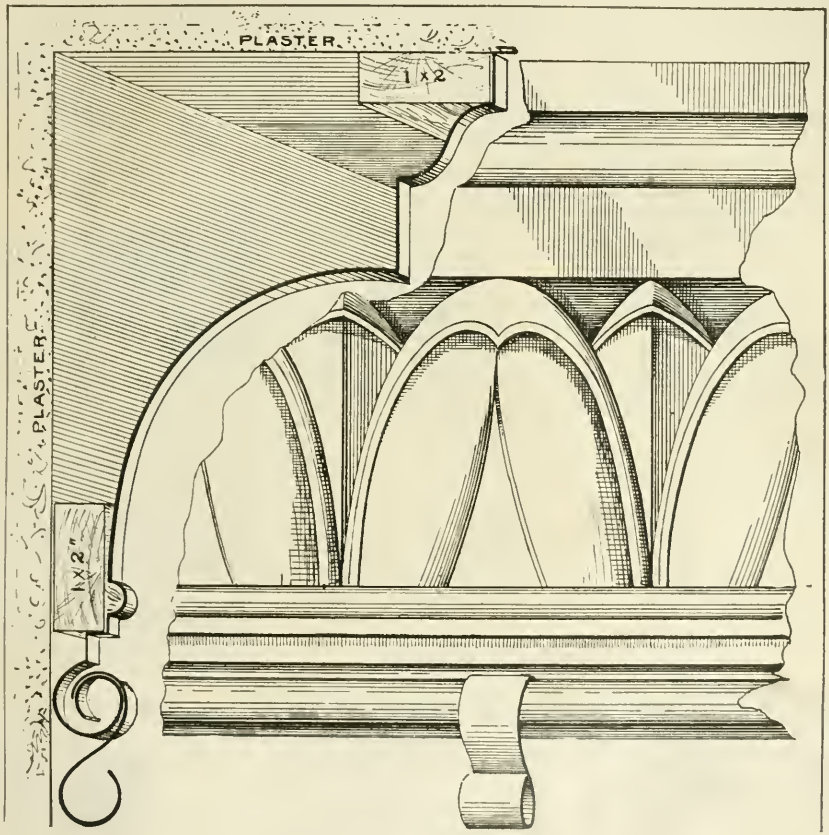
A good fire-proof roofing, and one unaffected by the sun's rays, not melting or running, is, says the London *Plumber and Decorator*, obtained by adding burned lime (not slaked) to coal tar. Boil together in the proportion of 15 pounds of lime to 100 pounds of tar. The lime must be pulverized, and to avoid the tar boiling over, stir the lime slowly in the boiling tar. The mixture must be applied while hot. It would be interesting to know if the admixture of lime counteracts the corrosive action generally complained of when coal tar is used on metal roofs.

Bowers, Galpin & Co. of Binghamton, N. Y., manufacturers of gutters, gutter pipe, roofing, &c., are about to build a new factory. The structure will be 600 x 150 feet, one story in hight.

The Illinois Roofing and Supply Company, 203 Lake street, Chicago, have issued a very handsome 100-page catalogue of their specialties. It is bound in a neat paper cover with an embossed gilt title. The contents cover a full description of the Perfection lock seam roofing, giving directions for laying it; Climax cap seam roofing, pressed standing seam roofing, semi-steel V crimp roofing, beaded siding and ceiling, ornamental patterns of siding and ceiling, steel clapboards, Imperial pressed steel brick, rock-face brick siding, pressed corrugated iron, curved iron, Cushman metallic shingles, Imperial 2 and 3 ply prepared roofing, corrugated iron doors and shutters, ready-mixed paints, &c. Part second of this catalogue deals with tinners' supplies in general, as, for instance, eave troughs, miters, roof gutters, hangers, corrugated conductor pipe, round pipe, spiral lock-seam pipe, adjustable elbows, one-piece elbows, conductor hooks, chimney tops, ventilators, ridging, crestings, spun balls, galvanized iron, roofing tin, sheet copper, tinners' tools, &c. The articles are all priced, and a discount sheet accompanies the catalogue, making special discounts on sundry goods. The entire arrangement shows great care, and the catalogue cannot fail to be appreciated by the trade.

Metal Cornice and Picture Molding.

Fred. F. Bischoff & Co., 24 and 26 West Lake street, Chicago, have brought out a new design of metal cornice, which is herewith illustrated. In this design the picture molding is combined with the cornice, thus saving the extra expense of the molding, as well as making a more complete finish to the cornice. The illustration shows a profile or sectional view, as well as a front view. This cornice is not only pleasing in relief but is stated to be cheaper than plaster or other material, and will also serve a useful purpose in hiding cracks in ceilings and walls to which new buildings are subject. The steel cornice can be used in connection with plaster or steel ceilings.

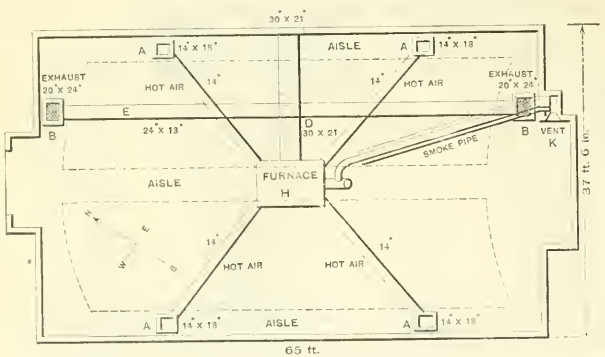


Metal Cornice and Picture Molding.

THE LETTER BOX.

Warming a Church.

From J. J. WILSON, *Troy, N. Y.*—I read with much interest in your issue of April 15 your answer to "W. D.," Oxford, N. S., in regard to warming a church. The suggestions you make and the advice given are good. There is no doubt that a number of your readers, notably the younger portion, would like to have a more detailed explanation of this work, especially as it should be done according to modern practice and using the existing conditions of building. For the special benefit of your apprentice readers I have made the inclosed plans and details. If we expect to elevate our trade as an art we must seek to more fully educate our apprentices. The secret of the elevation and high standard maintained in the plumbing trade are due in a great measure to the manifest interest and supervision given the young seekers after knowledge by those qualified to do so. I know of a large plumbing shop, not many miles from Pittsburgh, where each journeyman and master workman in the tin and sheet-iron trade would resolve to furnish his trade journal with one contribution each three months—that is, four contributions per year—on some class of work in the line he is most familiar with. I am sure all would be agreeably surprised at the beneficial effects in elevating the standard of work and intelligence among the embryo tinners. In regard to warming a church, not having the elevation to determine exact cubic contents, I have assumed contents quoted by you, viz., 36,000 cubic feet. I have located furnace in center of church and connected thereto four 14-inch warm-air pipes, each 18 feet long, and connected at floor line with four 14 x 18 inch register boxes and floor borders. The area of 14-inch pipe is $154 \times 4 = 616$ square inches, and with an assumed velocity of flow through warm-air pipes of 5 feet per second per each square foot of space, allowing for friction in flow, turns, &c., the area of warm-air pipes is sufficient to furnish



Warming a Church.—Fig. 1.—Plan of Rearranged Pipes.

problems in plumbing work, contained in *The Metal Worker*, are placed upon a blackboard; the apprentices, with chalk in hand, are brought forward and catechised until the problem is fully solved and the work intelligently comprehended. As the master plumber said, "Since I commenced this routine, which rarely takes over half an hour per week, I have put dollars in my pocket. I find that my young men take more interest in my business, are

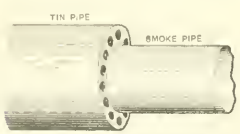


Fig. 2.—Smoke-Pipe Casing.

anxious to become first-class workmen, and they all endeavor to reason out and perform practically such duties pertaining to the trade as may be intrusted to them." Here is a pointer for some of the progressive master tinners. If a church with two changes of air per hour, or over 72,000 cubic feet of warm air per hour, the total area of warm-air pipes being 4^5_8 square feet. The exhaust registers at each end of the church are so located as to be entirely out of the way in entering the vestibule, aisles or chancel, and also admit of a straight duct to cold-air box. The two exhaust ducts are each 24 x 13 inches, and have a combined area of 624 square inches, equal to the combined area of the four 14-inch warm-air pipes. The reason such an area is used in exhausts is because the inside air is of a much warmer temperature than the outside air, and, hence, has not the expansive qualities of air at a lower temperature. The exhaust ducts are connected to the cold-air box by a main trunk 24 x 26 inches, which is qual to the combined area of the two exhaust ducts. The cold air is brought from a north by east point and is $30 \times 14 = 420$ square inches, being a little over two-thirds the area of warm-air pipes, and where the main trunk of the two exhausts join it an enlargement is made to $30 \times 21 = 630$ square inches, so that this part of the duct will be able to carry off full capacity of the two exhaust ducts. A hinge damper is also located at this point, so that either cold-air box or exhaust ducts can be turned on independent of each other, or part of flow to furnace taken from each. The operation is intended to be as follows—viz.: Before church assembles the exhausts are open to the furnace,

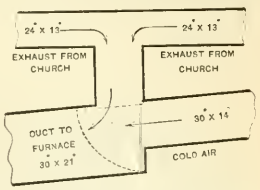


Fig. 3.—Mode of Connecting Exhaust and Air Supply.

the cold-air box is closed, the air from the church then passes to the furnace, is heated and delivered in the church again. As soon as church is ready to be occupied, the damper in cold-air box is reversed, exhausts are closed, cold-air box opened and air from outside brought to the furnace, heated and delivered through warm-air registers to the church. The smoke pipe is incased in a tin pipe which has a head on the end near the furnace with an opening through which the smoke pipe passes and is perforated so that air can pass between the tin casing and smoke pipe. The air becoming heated, it is delivered into smoke flue; this relieves the air of cellar from becoming excessively heated, and also permits of the ventilating register K being used in smoke flue without affecting the draft of the chimney, as this heated air passing to the flue keeps it warm and accelerates the velocity of air which passes through the vent register. It is understood that this register is not intended to fully ventilate the church, but it causes a movement of air to exhaust from the church, which is highly con-

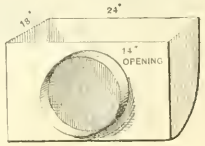


Fig. 4.—Register Box and Collar.

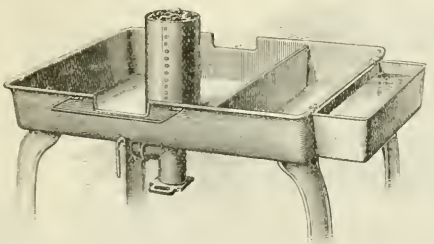
ducive to quick and efficient heating. In regard to details: Fig. 1 is a plan of the church with pipes rearranged. Fig. 2 shows end section of tin pipe, with perforations for air to pass between it and smoke pipe to the smoke flue. Fig. 3 gives side elevation of exhausts, main trunk connection to cold-air box, enlargement of same where the exhausts are connected, and location of hinge damper, to control flow from exhaust duct and cold-air box. Fig. 4, detail of register box to be used, in which by using angle collars in side elbows can be dispensed with, and this style of box allows of increased elevation of warm-air pipes. In churches, especially, provisions

should be made for ventilation by building a proper size vent shaft, with the smoke-pipe exit passing through its center, and while there are some constructions whose architecture compels the placing of the shaft at some remote point of the building, by the judicious locating of a series of exhausts or vents connected to a main trunk or duct, and that in turn connected to shaft, practically successful results can be obtained.

Tinning Copper Wash Boilers.

From J. E. B., *Troy, N. Y.*—I have noted the inquiry of "C. F. T.," about tinning old copper wash boilers, that appeared in *The Metal Worker* of March 18. I have a set of saucepans, jelly molds, &c., owned by the proprietor of the works where I am employed, to retin once in a while, and I thought, perhaps, my method of procedure would interest some of your readers.

When the coppers come to the shop a package of whale bleach (Soapine) comes with them. It is dissolved in a pail of warm water, the helper rolls up his sleeves and gives the coppers a thorough scouring to remove the grease, using as accessories Soapine, a wad of waste, and some fine, sharp sand. The finer the sand the smoother the coppers when finished. In the meantime a forge in the smith shop is made ready for business. A piece of sheet iron is cut and formed into a cylinder 7 inches in diameter, 1 foot deep and placed over the tuyere, all soft coal being removed, as it would blacken the outside of the coppers and make a neat job difficult. A charcoal fire is now made in the cylinder, the general position of the cylinder and fire and general arrangement of forge being shown in the illustration.



Tinning Copper Wash Boilers.—Forge Arranged for Tinning.

The tin is prepared in the following way: About 2 pounds are placed in a hand ladle sufficiently large to hold double the amount and melted. As soon as melted the metal is removed from the fire and kept constantly stirred with a stick of wood shaped like a big wooden spoon until it is all finely pulverized. When properly done it has the appearance of sea sand. The first time it is tried the result may be failure, but very little practice will insure success. The tin is then sifted through fine wire cloth or other suitable material, and what goes through is kept separate from the portion that is sifted out. Muriatic acid saturated with zinc is used for flux. The coppers, previously scoured, are now thoroughly rinsed to remove any sand. They are then wiped dry outside to insure against any tin sticking there, and all are given a coat of acid internally. Those that are to be tinned both inside and out are coated with acid on both sides. When all are coated, the first one is again coated and the sides sprinkled with the finest tin, the bottom with the coarsest. The copper is then held over the fire and the tin on the bottom of the mold melted first, and next the sides. The handle side is then turned down and melted, the copper being revolved as the tin melts until the handle side is again down, which is given an extra heat. The copper is then removed from the fire and the surplus tin shaken out. It is then held, handle side down, and what little tin remains is collected around the rivets and chilled there with a wet wad of waste held outside.

The advantage of this method is that as the acid and tin are affected by heat at about the same time, the advantage of having them both in the right place at the right time is evident; also where coppers are to be tinned both inside and outside, it is indispensable unless a dipping pot is used. Care must be taken not to get the coppers too hot, which is my objection to using sal ammoniac, unless it is dissolved in the acid.

Pump for Driven Well.

From J. W. *Fulton, N. Y.*—In ply to a letter of "H. A. C.," Bainbrrge, N. Y., that appeared in *The Metal Worker* of April 22, concerning driven wells and small pumps connected with $1\frac{1}{4}$-inch pipe, would say that I have had some experience in that line which may interest him. I have driven a well of this kind where I have used $1\frac{1}{4}$-inch pipe with a No. 1 pump with a hoist of nearly 23 feet, and the pump worked so easily that a child could operate it without trouble. I think there must be something wrong at the bottom of the pipe in your correspondent's case. I had to take my pipe out after I had it driven. The difference in soil sometimes makes a difference in the working of the pump. In hard, stony ground the pump will not work as easily as in loamy land.

Boiler Connections.

From MILWAUKEE GAS STOVE COMPANY, *Milwaukee, Wis.*—In your issue of May 6 we note the "sharp criticism" from "S. H. D.," Watkins, N. Y., on the method we advocate of connecting the hot-water circulating pipe to the top of the boiler. The article in question scarcely requires an answer, for the positive injunction, "the hot-water pipe should never be taken from the circulating pipe," is entirely neutralized by the contradictory statement that "there is no objection to connecting the circulating pipe to the top of a boiler if all of the other connections are properly placed." Right here let us advise all plumbers to see that all connections are "properly placed." When this method was first advised we met the same opposition from almost every plumber with whom we came in contact, and to stop useless arguments we settled down to a standing offer to pay the cost of all connections if the results obtained were not as we represented. We have now many converts. Several hundred gas stoves and heaters connected in this manner with tanks from 30 to 200 gallons capacity are under our observation, and we have yet to hear of a single complaint. Coming to the vital question—Will cold water be drawn through the heater instead of hot water from the boiler when the hot-water circulating pipe enters the top hot-water outlet of the boiler? our answer is that this will take place when the laws of nature are reversed and hot water ceases to rise.

Copper Bronze for Tin.

From C. & R., *Portland, Maine.*—We have seen tin tea kettles that were covered with either a bronze or lacquer or solution that made them so closely resemble planished or burnished copper that it required careful inspection to discover that they were not copper. Can you give us the information to enable us to do this work?

Answer.—This result may be accomplished by electro plating, and doubtless that is what our correspondents have seen. Inquiries as to the value, for the purpose mentioned, of the bronzes used on hot-water and steam heating radiators find opinions differing. A quality of bronze specially adapted to this use might, however, be furnished by some manufacturer or importer of bronzes.

Brazing Steel.

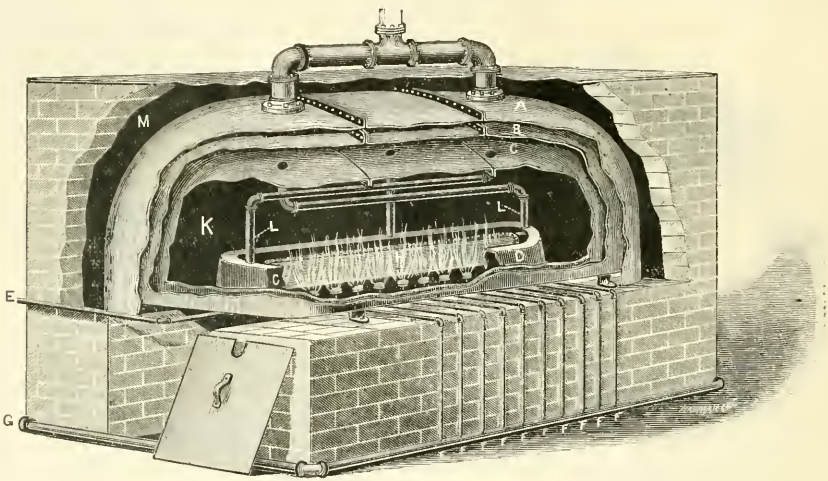
From G. W. B., *Baltimore.*—I would ask for information, through the columns of *The Metal Worker*, regarding the process to be used in brazing steel.

Answer.—In the brazing of steel greater care is required than with iron, as the former is more liable to injury by overheating. The parts to be joined are filed or scraped so as to be bright and clean, then secured together by wire, riveting or other means. Granulated spelter and borax are to be mixed with a little water and placed over the joint, and the article held over a clean charcoal fire until the moisture is evaporated, so as not to displace the spelter. The article is then to be brought to a cherry-red heat, so that the borax will fuse, also the spelter. After the spelter has run through the joint the article is taken from the fire and allowed to cool; or, if the steel is required to be soft, so that the article can be bent slightly without breaking, it should be left in hot ashes over night, so as to cool slowly. If the article is of small size, the joining can be done by means of silver solder and the blowpipe. It may be found convenient to secure the article in the desired position by placing it on a piece of charcoal and fastening it by means of small wire staples, which can be run into the charcoal. The joint can then be moistened with borax and water and the silver solder placed on in small pieces. The blowpipe flame is then brought against the joint, causing the silver and borax to fuse. If difficulty should be experienced in obtaining the proper degree of heat by the above method, small pieces of charcoal can be piled about the joint and the blowpipe flame applied as above described.

STEAM AND HOT WATER.

The Ware Hot-Water Heater.

The Ware Automatic Heat Generating and Regulating Company, 403 Market street, Philadelphia, are offering to the trade a new form of hot-water heater, using gas for fuel, a broken view of which is shown in the accompanying illustration. In construction it consists of an outer water chamber of the shape of an elongated beehive, and two inner chambers of a hight about one-fourth of their length, a cross section of which would show a sharp-pointed oval. The outer chamber receives the return pipe at the bottom and supplies the flow pipe at the top. The inner chamber at the bottom connects with the outer chamber by a pipe, and another pipe leads from the top of one end of the inner chamber clear back to the other end, where it enters the outer chamber: These chambers are made of sheet metal, and are incased in a brick wall, with an arching galvanized sheet-iron roof. They are set over a space that would ordinarily be an ash pit, at the back of which is a collar, to which the pipe that runs to the chimney is connected. In this space a series of independent specially constructed atmospheric burners for gas are so located that the tops of their flames are divided by the sharp edge of the inner water chamber. The heated products of combustion, instead of passing direct to the chimney, rise and impart their heat to the inner walls of the outer water chamber, when they drop below the line of the burners into the space from which the chimney connection runs. The result is that the heat generated is utilized very completely. The burners are independent, so that one, or as many as are desirable, may be shut off as required. A pilot light is so arranged that it burns continually, and, by a specially devised and sensitive thermostat, the gas to the other burners is automatically turned on or off as the temperature of the apartment in which it is located varies from 70° to 72°.



The Ware Hot-Water Heater.

Erecting a Heating Apparatus.

BY HELIOS.

After securing an order to erect a steam heating apparatus, look over the building carefully, and if the owner has floor plans of the building take them and make a copy, then lay out all your radiation and run all the steam and return mains. Make them as short and direct as possible, yet keeping them out of the way, so as not to interfere with the comfort of the occupants. Lay out all the work on the plan, for it will save time in placing the work, and what will not work out on the plan all right will not in the building. Look at the chimney that is to be used and see that the flue is of the right size, that it is straight and the same size its entire length, that there are no openings into it for fire places or stoves, and see that the top is above the highest point of the roof and that there are no buildings near that will interfere with the draft. Be sure that the flue is all right, as the entire success or failure of the apparatus depends upon the boiler having a perfect draft. Set the boiler on a good solid foundation. Be sure that it is level and secure. If you use a portable sectional boiler be careful and follow the directions that come with the boiler for its erection. Be sure that all joints are tight. If the boiler is brick set, use good mortar and first quality brick, and if any part of the brick setting is used as a flue have all joints well filled up and the flue plastered smooth and kept full size, and be sure that everything is in perfect order. After the boiler is all set up, remove the earth, rubbish and dirt of every kind; clean everything up. There is nothing that is so annoying to the owner of a building as to have workmen come into a building, fill the cellar full of dirt and rubbish and leave it, so clean everytning up and you will make a good impression at the atart.

Connect the smoke pipe from the boiler to the smoke flue, and do not have over one elbow in it if possible. If without any, so much the better. Next place the radiation in the rooms they are to warm. Screw on the valves and mark on the floor the place for the pipe to come through; then take a feeling gimlet and bore through, and see where the pipe is coming through, that it is out of the way of all timbers and that there is nothing in the way of making the connection. Use a plumb bob for laying out the holes for all risers, and be sure that they are plumb and straight. If the floor has to be taken up cut the hole for the pipe before taking it up. Use great care in taking the floor up, and cut it off close to a joist, so that a strip can be nailed on to hold the flooring in place. After the connections are made replace the floor in good order and secure with screws. Never use nails. If the building is occupied try and keep everything as clean as possible. Clean up the room you are working in before going into another. Keep your hands off the walls, doors or wood work, and when you leave the room leave it in as good order as it was when you entered. When all openings have been cut to run the steam pipe through, commence at the boiler to run

the main steam pipe. Take a ball of twine and run it through the cellar for a line for the main steam pipe; bore the holes over this line for the pipe hangers, screw them up and regulate to grade the pipe. Never connect the steam or return pipes to a boiler without placing flange unions in them at the boiler, so if at any time it is necessary to make repairs to the boiler it can be done without cutting the pipe. This may save hours of time and a large expense in making new connections. Run the main steam pipe, having the highest point at the boiler, and let it drip away from the boiler in the direction that the steam flows. The main steam pipe should have a fall of not less than ½ inch in 10 feet. Leave all necessary openings for drip pipes in the main, so that no water can collect in them, for if there is any place where the water cannot drip out it will cause that awful hammering noise so often heard in an imperfectly erected apparatus.

After the main steam pipe is in place run all riser and radiator connections. Be sure and allow for expansion and contraction of the piping. Place tin pipes around all steam pipes where they pass through floors or partitions, and place ceiling and floor plates around all pipes. One of the most important parts of a one-pipe steam warming apparatus is to have tight radiator valves. A valve that will not shut tight and keep all steam out of the radiator will cause no end of trouble. If the valve leaks the steam will pass into the radiator and fill it with water. When a valve is opened and the steam strikes the cold water it will cause a hammering noise, and if the air valve is opened it will force the water out. If you have automatic air valves on the radiators without drip pipes from them and the radiator valve does not close tight, the radiator will fill with water and run out the air valve and all over the floor. The best plan is to always use automatic air valves on the radiation and run drip pipes from the air valves. But in running the drip pipes never use black iron pipe, as it will soon fill up with rust and be of no use. Use only the best valves, for they are the cheapest in the end. After you have run all the piping to the radiation screw on the valves and connect to the radiator with the union on the radiator valve. Never connect up a radiator without using a union radiator valve, as the carpets have to be taken up, and with a union valve it is only a very little work to unscrew the union on the valve, and the radiator can be removed. After all the radiation is connected to the steam pipe, run the return pipe in the cellar; also connect all necessary drip pipes from the steam to the return pipe.

On a one-pipe steam apparatus keep the return pipe above the water line in the boiler, if it is possible to do so. If not, keep all you can above. All returns must have a pitch to the boiler of ½ inch in 10 feet. Hang the return pipe under the steam pipe and keep it as near the steam pipe as possible at the far end. Place automatic air valves on the end of each branch main steam pipe and on the return pipes above the water line at the boiler. After all the connections have been made, start the fire and see if there are leaks in any of the joints. If there are, stop them; do not leave the job with a leak of any kind. If everything about the apparatus is all right, while the piping is hot paint all steam and return pipes and all iron work on the boiler one coat of black asphaltum varnish. This will keep the iron work from rusting. When the radiation is hot, clean it off, and if the radiators are to be bronzed, mix your bronze powder and bronze liquid in a clean dish. Do not have it too thin, but just right so that one coat will cover all in good shape. Be very careful in applying the bronze not to cover all the wall and floor around the radiator. Place old papers between the radiator and wall and on the floor. Be sure that the radiators are covered all over; leave no places on them where the iron work will show through.

No steam apparatus is complete without having the steam and return pipes in the cellar covered to prevent the radiation of heat in the cellar. Any of the sectional pipe coverings on the market will make a good job; or they can be covered with asbestos paper and hair felt. If hair felt is to be used, first cover all the pipe and fittings with asbestos paper. Cut this in strips to go around the pipe, thoroughly wet it and cement to the piping when it is hot. Be sure and cover all the pipe and fittings. Now take two boards about 6 inches wide and 8 feet long and nail a strip across the ends, leaving a space about ½ inch between the two boards. Take the measurement around the pipe and lay the hair felt on top of the two boards. Measure from the end of the felt to the space between the two boards, take a knife and cut down between the two boards, cutting off the felt. Place the felt on the pipe and secure with heavy twine. Wind the twine around the hair felt about ½ inch apart. Next cover the hair felt with heavy cotton cloth or canvas sewed on. In placing the cloth over the hair felt have it put on smooth and leave it all in good order. Before leaving the job clean up everything, leave nothing in the building, and be sure that everything is finished up in full accordance with your contract, for if you have to come again to do any work it will cost double what it would to have finished all before leaving. If you want to make a success of the heating business be very particular in doing your work. Use only the best materials, have the heater and radiation of ample capacity, do everything in a workmanlike manner and every apparatus placed will bring you orders for many more.

HEATING NOTES.

The New Jersey Heating & Mfg. Company, at 36 Mechanic street, Newark, N. J., in addition to installing steam heating plants, have a power plant and pipe cutting and threading machines, and make a specialty of cutting pipe to sketch.

A German paper reports that in Aix-la Chapelle a whole street block of houses is being built so as to be entirely warmed by steam from a single boiler, which also supplies the engine to work the electric light, while all the cooking is to be done by gas.

Early in the fall of 1892 Curtis & Curtis of Bridgeport, Conn., manufacturers of pipe cutting and threading machinery, applied for space at the Columbian Exposition in which they hoped to make even a better showing than they did at the Paris Exposition, where they were awarded the medal for pipe cutting and threading machinery, but they were informed that there was no room, and that they could not obtain so much as 6 feet square, and with much regret they were obliged to give up the idea. On April 15 they received a telegram from Superintendent Robertson, asking if they could occupy a space by April 28. They answered "Yes," and by great efforts they shipped their entire exhibit on the third day thereafter. They say that, while their display is not as elaborate as it would have been had they had more time, they still feel that they are well represented. Their position is one of the best in Machinery Hall, being 15 x 17 feet on the corner of two of the chief aisles, and officially known as Annex Section 13, Column J 38. Walter Wright is in charge, and Messrs. Curtis & Curtis hope that all their friends, customers, and in fact, all who are interested in their class of machinery, will make their space headquarters while at the exposition.

Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until May 31, for all the labor and materials required for the alterations in the heating apparatus of the U. S. Court House and Post Office Building, Philadelphia, in accordance with drawings and specifications, copies of which may be had at the office of the Supervising Architect, at Washington, or at the office of the custodian, at Philadelphia.

John Davis whose foundry is at Second avenue and Eleventh street, Brooklyn, takes pride in the fact that a leak was found in but one out of 130 hot-water boilers made for John A. Scollay.

The demands for steam and hot-water boilers for heating purposes made upon the Gorton & Lidgerwood Company, 96 Liberty street, New York, are greater than in the same month of preceding years. The service rendered by their goods during the past winter has been the cause of their receiving many pleasant letters from customers.

John A. Scollay, at 71 and 74 Myrtle avenue, Brooklyn, reports an increasing business in hot-water heaters. Another store next door has been secured to give him the necessary accommodations to meet his demands.

The American Radiator Company, 92 Centre street, New York, have secured a well qualified representative in J. D. Murphy, who will travel from this office. He spent several years with the large steam fitters' supply house of John Maneely & Co. of Philadelphia, and afterward assisted the management of the Steam Engineering Company of the same city in installing heating and ventilating plants. With a fund of information and a lively interest in his business, pleasure as well as profit to the trade should result from his visits.

It being necessary to have sufficient space to display samples of the Capitol, Bolton and Hecla heaters, John W. Mills, representing the United States Heater Company of Detroit, has removed from the Ogden Building to more commodious quarters at 100 Lake street, Chicago.

The office and salesroom of the Wilcox Water Heater Company have been removed from 238 Lake street to 297 Wabash avenue, Chicago.

A telegram from Cape Town announces that the mining engineers of the Southwest Africa Company have reported the discovery in the company's territory of extensive deposits of copper ore a few miles north of the Otavi mines in Damaraland.

TIN PLATES.

The New Castle Steel & Tin Plate Company.

Contracts were made for iron buildings and machinery of the New Castle Steel & Tin Plate Company, at New Castle, Pa., during the latter part of April, 1892, and the excavations for foundations were begun May 18. When almost finished the large iron building was blown down by a severe storm on the night of November 17. This was at the expense of the contractors, but it caused a delay of about three months in that building. The extreme cold weather, the mercury having been down to zero for weeks at a time, caused further delay in outside work. Their year is not yet up, however, and they expect to get the plant ready for operation by the second week of July.

The main building is 250 x 110 feet, built by the Youngstown Bridge Company, with columns of the unusual hight of 24 feet. In this building will be four mills and four sets of cold rolls, with room for two additional mills. These are arranged in a continuous line lengthwise of the building, as follows: Two hot mills, Corliss 30 x 60 inch engine, hot mill, two sets cold rolls, space of 10 or 12, two sets cold rolls, hot mill, Corliss 30 x 60 inch engine, and connected direct with the crank of this engine a three-high bar mill to roll the largest-sized billet that is used in tin-bar practice The first two mills mentioned are arranged "old country style"—*i. e.*, one is used for roughing and the other for finishing, each of the remaining ones being used for both roughing and finishing. The engines have unusually heavy fly wheels, weighing from 40 to 45 tons. On one side of this line of rolls are four double heating furnaces, while on the other side are located three sets of shears connected to a single shaft, which is driven by a small engine. Four excellent cranes are placed almost in line with the rolls. The four boilers, 84 x 18, 108 flues each, will be placed just outside the building. The boilers and engines are furnished by the Bass Foundry & Machine Works, Fort Wayne, Ind.; the mills by the A. Garrison Foundry Company of Pittsburgh; the cranes by the Phœnix Hand & Power Crane Company of Cleveland and the castings for the furnaces by the Lloyd Booth Company of Youngstown.

Alongside the rolling mill is the washhouse, 362 x 60 feet and 24 feet high, which will contain 12 tinning stacks, with Morewood five-roll tinning machines and three annealing furnaces of the "St. Louis" plan.

A separate building, 40 x 70 feet, is provided for the machine shop, in which the rolls will be turned and general repairing, &c., done. Power for the machine shop comes from the same shaft which drives the shears in the mill.

A gas furnace for heating billets is located just outside the mill, which will be run by producer gas, and is the design of John Stevenson, superintendent of the wire nail, rod mill, and the Shenango Valley Bessemer steel plant of New Castle, and Robt. Gray, superintendent of the J. P. Witherow Works of New Castle.

A railroad will be built through the plant. The plant was built under the general direction of George Greer, the president. The remaining officers are: Charles Greer, secretary; Wm. S Foltz, treasurer, and Harry Herbert, superintendent. The foundations and brick work, including furnaces, were built under the direction of George Hartland & Sons. The machinery, pipes, &c., were set by George W. Gageby, formerly of Johnstown, Pa. The engines and boilers were designed by Mr. Stevenson. The plans for steam and water piping were gotten up by Mr Gray, and the fittings were supplied by Atwood & McCaffrey and Wilson & Snyder Mfg. Company of Pittsburgh. The design and plans of the rolling mill and tinning department were made by George Greer after visiting all the leading plants in the country The works will employ from 200 to 300 men, besides boys.

The railroad facilities are excellent, four different lines having access to the plant.

The P. & L. E. (Vanderbilt system) and P. & W. (B. & O. system) enter by means of a large trestle, while the Pennsylvania lines and the W. N. Y. & P. come in from the northeast.

Pure clear water is supplied from the company's own dam on Big Run, a considerable stream that comes from the east and runs near the works.

A large brick and cement cistern, an elevated railroad water tank and three large Worthington steam pumps distribute an abundant supply of water throughout the entire plant. Within 1500 feet of the works the fine ores of the Lake Superior region are smelted into pig metal at one of the most modern and complete blast furnaces in this country and taken direct to the Shenango Valley Steel Company's plant and converted into the soft Bessemer steel suitable for all the requirements of the very finest sheets for tinning and for deep stamping. It is probable that before the mill is started the direct process of converting the pig will be in operation at the Shenango Valley plant.

SCRAP.

JOHN HAMILTON, Pittsburgh, Pa., manufacturer of Hamilton's Best Re dipped American Roofing Tin, is meeting with an excellent demand for this brand of plates, and is shipping the product about as fast as made. Mr. Hamilton has recently furnished a number of boxes of this brand of roofing plate to George W. Johnson & Son, Wheeling, W. Va., for roofing a new building now being erected there by that firm This order, we understand, was secured in the face of very strong competition, foreign plates being offered at extremely low prices. Mr. Hamilton is also meeting with a good demand for his roofing plates from railroad companies, and has already furnished several large lots to be used in roofing car sheds and other railroad buildings.

THE GLENDALE TIN PLATE COMPANY are reported to be turning out 500 boxes of roofing plates weekly from their Pittsburgh works. Three brands of terne are made, namely, Optimus, a guaranteed redipped plate of high grade; N F., a first quality, heavily coated plate, claimed equal to M. F., and Bonus, a fine charcoal roofing plate, all coated by the palm oil process, hand dipped. They are made from black sheets of American rolling, and are said to be meeting with great success. An extension of the works is in contemplation. The company's selling agent is W. P. Loughry, 81 John street, New York City.

EASTERN TIN-PLATE MERCHANTS report trade as extremely dull. This is attributed in part to the present unsatisfactory condition of general business, but largely to the extraordinarily backward season, which has retarded building operations some six weeks beyond the normal period. This condition is expected to right itself, however, as a good deal of building is in prospect, and a considerable demand for roofing plates should develop in the course of a month or six weeks.

IT IS REPORTED that the Youngstown Tin Plate Company recently organized at Youngstown, Ohio, for the manufacture of Tin and Terne Plate, are considering the advisability of removing their plant to Girard, Ohio. Citizens of the latter-named place have offered the concern 2 acres of ground and a suitable bonus in order to secure the industry, and it is understood that this offer is now under consideration.

ANOTHER DEPARTMENT in the Falcon Tin Plate Mill of Niles, Ohio, will be put in operation this week One set of rolls will be started turning out the black plates, which will be afterward coated. This will give a number of men employment. The balance of the mill will be started as soon as the different departments are in readiness. Arrangements are being made to inclose this plant by a high fence.

CANNERS' REQUIREMENTS in British Columbia will probably be considerably above the average this year. Preparations are being made for an exceptionally busy season, expectations pointing to a larger catch of salmon in the Fraser River and other points than in any year since 1889. The probable output is put down at 600,000 cases of cans. The demand for coke tin for canning purposes, in all parts of the country, is reported to be active and growing; and should the Southern fruit crop come up to expectations, that branch of trade should receive a decided impetus this year.

THE NEW TINNING PLANT of the Morewood Tin Plate Mfg. Company at Elizabethport, N. J , is now complete, and the works are in full operation. Six bright tin stacks and two pots for coating terne plates are running night and day to keep pace with orders. The company are in possession of one of the most complete tinning establishments for its size in the country. The bright and roofing plates turned out are generally indentical with the brands manufactured at the same firm's works at Swansea and Llanelly, Wales.

THE NEW TIN-PLATE MILL of the Falcon Tin Plate & Sheet Iron Company went into operation on May 9, starting with 30 hands. It is stated that this number is to be increased to 75 workmen.

THE TINNING PLANT of the Laufman Tin Plate Company, at Butler Junction, West Penn Railroad, Pa., is reported to be fully active. The daily output of the works is now 100 boxes of roofing plates. Under their former name of Pittsburgh Electroplating Company, the Laufman Tin Plate Company were among the pioneer tin-plate manufacturing concerns of the United States. Their terne plates are all produced by a process of their own, and are double-dipped, pure palm-oil process plates. The office of the company is in Pittsburgh, Germania Bank Building.

THE ADDITIONS to the rolling mill and tinning plant of the American Tin-Plate Company, Elwood, Ind., are progressing rapidly, and will, it is said, be available by July 1 or shortly after that date. These additional facilities will bring the capacity of the works up to 4000 boxes of tin and terne plates weekly, doubling the present output.

THE INDIANA Tin Plate Company, Atlanta, Ind., have eight tinning stacks in operation. The plant is said, by one who has recently visited it, to be one of the best of its size thus far built in the United States.

A CARLOAD OF TIN ORE from the Harney Peak tin mines has been received in New York this week by the Crooke Smelting and Refining Company, Burling Slip. A portion of the metal, when smelted, is to be sent to the World's Fair for exhibition.

THE AMERICAN TIN PLATE COMPANY, Elwood, Ind., report quite a pressure of orders for their plates, of which they are now turning out three grades under the brand of "Elwood," namely, "Elwood Coke," which are guaranteed equal to "J. B." imported plates; "Elwood Charcoals," equal to "Allaway"; and "Elwood Ternes," equal to "Worcester" grade. These are all claimed to be of even better quality than the corresponding grades of imported plates, and are of full weight. They are now made of standard sizes, but with the company's recently installed bar mill, which is about to be started up, they will be ready to furnish them in any sizes required. The American Tin Plate Company say that quite a pressure has been brought to bear on them to stamp their terne plates, but that so far they have declined to do so, holding that stamping a plate impairs its quality, as the stamping with small letters fractures the fiber of the metal, so that when placed upon a roof it will not stand as well as one that is not stamped. They feel a pride in their plate, and wish to give the purchaser an article which will be lasting. The company state that they have had considerable argument on this head with large dealers in the West, but they have all accepted the views of the firm, and take their plates unstamped. About 2500 boxes a week are now being turned out from the Elwood works.

THE LEECHBURG FOUNDRY & MACHINE COMPANY, Pittsburgh, have recently commenced the manufacture of chilled and sand rolls and have received orders for this class of product from Wallace, Banfield & Co., Limited, Irondale, Ohio, and the United States Iron & Tin Plate Mfg. Company, Demmler, Pa., and others.

The startling novelty of a surplus in the Spanish national budget, if followed by an improvement of roads in the interior, might signalize the beginning of national rejuvenation and development.

Prize Competitions.

$25.00.

Prize Competition No. 20.
(Reopened.)

SUBJECT:

A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

This competition closed May 6, but in view of the importance and practical nature of the subject and the exceptionally few replies which have been received from the trade we re-announce it as above and extend the time up to which responses will be accepted to June 10. The interest of this competition and the importance of having some satisfactory method of accomplishing the desired result is referred to in the following letter from a correspondent who, it will be observed, calls attention to the carelessness in this regard which is characteristic of some merchants, and expresses the hope that among the contributions received will be many of practical value:

The answers to the competitions which have been recently published in *The Metal Worker* have been read by me with more than usual care. Competition No. 20, "A reliable system for securing the correct charging of all goods sold on credit," to me, is one of much interest, and I trust you may soon find a place for the answers to it in your paper. There is no other leak about a store, in my opinion, that requires more thorough calking than that occasioned by allowing goods to go uncharged. It is not unusual to hear a proprietor, when looking over the day's business, inquire, "Has this been charged?" It is the proprietor's place to have the business so systematized that errors of this or of any other kind should be of rare occurrence; and when an error is made, under some unusal circumstances, a remedy should at once be provided to prevent its happening again. The proprietor should hold himself personally responsible for such mistakes, because he has failed to provide against it. From the large amount of credit business done, and done by many firms whose system in other things could not well be improved upon, I look for very satisfactory solutions of this question in the replies which you will publish.

We hope, therefore, to hear from many in the trade with practical suggestions or descriptions of systems in use whereby the charging of all goods is assured. How to avoid charging undesirable parties without giving offense, and how to avoid charging small amounts are also points which should naturally be considered in replies.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

This competition will remain open until June 10, 1893.

The following prizes will be awarded:

First prize.....	$12.50
Second prize....	7.50
Third prize.....	5.00

The prizes will be awarded for answers which, in the judgment of the committee of award, are most suitable for publication and of the most general interest. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than June 10, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96-102 Reade street,
New York.
Prize Competition No. 20.

The committee to whom the contributions in Prize Competition No. 10 were referred have awarded the prizes as follows:

First Prize of $50 to FRED. MACEY, Grand Rapids, Mich.

Second Prize of $25 to H. P. KING, Portland, Ore.

Third Prize of $15 to G. T. EVANS, Pittsburgh, Pa.

Fourth Prize of $10 to FERDINAND TUSCH, Brooklyn, N. Y.

Other Competitions which have closed are now in the hands of the Committee of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 22. Closing May 20.
The Best Manner of Presenting and Collecting Book Accounts.

No. 23. Closing May 27.
Three or more Subjects for Prize Competition.

No. 24. Closing June 3.
Short Methods of Figuring Discounts.

No. 20. (Reopened.) Closing June 10.
A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

Another subject will be announced in our next issue.

The Philadelphia Board of Health has issued a bulletin reminding citizens of the necessity for cleanliness in every respect, that garbage collections be avoided; also filth of every description; that drainage be kept free from obstruction and whitewash freely used. Offenses against the law governing these matters will be promptly punished. Pestilence comes only by invitation.

PLUMBING and GAS FITTING.

To Local Associations of Master Plumbers.

We take pleasure in printing the following item at the request of the Milwaukee Master Plumbers' Association:

In order that the Master Plumbers Association of Milwaukee may be prepared to receive all delegates, it is requested, and is very important, that each local association send to A. R. Schwind, Recording Secretary, 123 Sycamore street, Milwaukee, the number of delegates and accompanying ladies, so that the association may better prepare for their reception. It is the intention of the association to meet the delegates at the depot, and it is requested that delegations inform the secretary as soon as possible of the name of the road over which delegates will arrive, and the time of arrival. Delegates will, by giving this their immediate attention, greatly facilitate the work of the local committee.

Aerating Pump.

The aërating pump illustrated in Figs. 1 and 2 is being offered by the Sandwich Enterprise Company, Sandwich, Ill. The

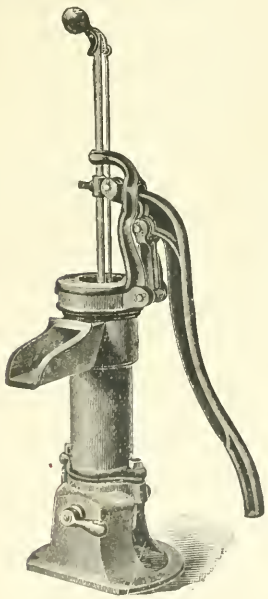


Fig. 1.—Aerating Pump.

pump, as shown in Fig. 1, has a brass cylinder; steel piston rod, guided; brass valve plunger; compressed steel handle pins; is painted and striped with gold bronze. As illustrated in Fig. 2, a stream of air is forced down to the bottom of the cistern, agitating the water and mixing the air with it, to take out odors, and to purify the water. In operation the ball at the top of the rod is tipped so that the letter A is uppermost, and the lever at the base is turned the same way. Then by working the pump handle the air is forced to the bottom of the water. After the ball and lever are turned to their original positions and the pumping continued, water is drawn from the cistern as with an ordinary pump. The manufacturers

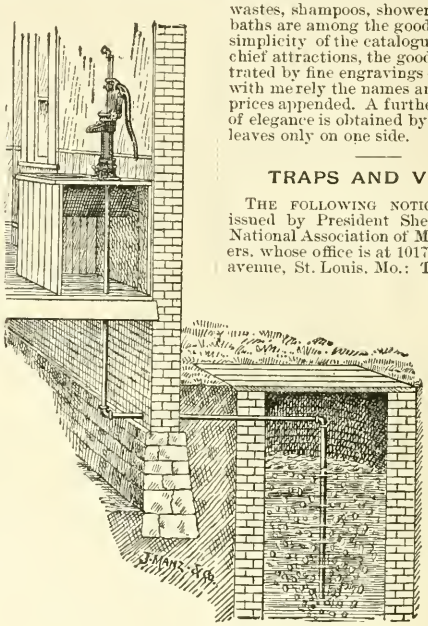


Fig. 2.—Operation of Aerating Pump.

state that a few minutes' pumping air each day will sweeten the foulest cistern, and that when once sweet a few strokes of air after pumping water will keep it pure.

The Henry McShane Mfg. Company,

Baltimore, Md., publish fine catalogues of some of their specialties. One of them relates to galvanized iron and copper range boilers, expansion tanks, air receivers, &c. In mailing this catalogue to the trade they call attention to the superior grade of this class of work, which they are now manufacturing. They add that they have spared neither pains nor expense in equipping their plant with the latest improvements in machinery for this work. Their galvanizing works are provided with testing apparatus and the boilers are carefully tested after galvanizing, to make sure that the seams have not been affected by heat during the process. The catalogue, printed on a fine grade of paper, shows general and broken views of the goods noted, besides giving tables of capacities, sizes and prices. The binding is in rough white paper, with printing in red ink. A larger catalogue issued by the same firm is of oblong shape, built up of separate sheets, like a pad, and bound at the top by a cord. The goods noted are included under fine sanitary specialties. Lavatory legs, towel racks, brass sponge holders and soap cups, brackets, brass traps of many kinds, basin wastes in various designs, bath wastes, shampoos, showers and needle baths are among the goods noted. The simplicity of the catalogue is one of its chief attractions, the goods being illustrated by fine engravings on fine paper, with merely the names and the lists of prices appended. A further impression of elegance is obtained by printing the leaves only on one side.

TRAPS AND VENTS.

THE FOLLOWING NOTICE has been issued by President Sheehan of the National Association of Master Plumbers, whose office is at 1017 Washington avenue, St. Louis, Mo.: The Executive Committee of the National Association of Master Plumbers will meet at the Hotel Pfister, Milwaukee, at 10 o'clock a. m., Monday, June 12, to transact such business as may come before it. Any one having any business to present to the committee will please forward the same to this office immediately.

JAMES ARMSTRONG of New York and Brooklyn finds with the growing popularity of wrought-iron pipe for drainage an increased demand for his special recessed pipe fittings, which are made for pipe from $1\frac{1}{2}$ to 10 inches diameter and of variety to meet all requirements.

THE ISOTHERMAL & PLUMBING COMPANY of 1721 Chestnut street, Philadelphia, are introducing a new feature in regard to heating and plumbing. They offer to heat any house, supplying fuel and all services, examine, repair and clean heaters, inspect private or public plumbing, drainage and lighting arrangements, weekly, monthly, or otherwise, and make necessary repairs, prepare plans and specifications for plumbers and undertake general plumbing work, undertake disinfection of buildings and perform any and all duties pertaining to heating or plumbing. They have competent workmen on hand day and night for emergency

service at any hour, and they state that their facilities in this direction have been much appreciated. They also deal in heating and plumbing supplies and carry a line of heaters, baths, closets and other goods in stock. They are putting upon the market Billings' thermostatic regulator for hot-air furnaces, and Billings' rheostatic governor for stoves and ranges, and are issuing circulars descriptive of these devices.

THE ESSEX LEAD WORKS, started by Frank Kellogg at Newark, N. J., a few years ago, has grown into a plumbers' supply house capable of furnishing all that the modern plumber needs. A boiler and engine of 100 horse-power drive the machinery, and are located in a basement. Another portion of the basement contains the lead-pipe making plant. From the melting furnace the lead runs directly into the pipe press, which is supplied with a steady hydraulic pressure by three pumps, and lead pipe is turned out and coiled ready for shipping in a few minutes. A variety of dies enable the making of different thicknesses of pipe, as well as all the standard sizes. The balance of the basement is used for carrying a stock of cast-iron pipe both of standard weight and extra heavy. On the first floor is the office and a display of sanitary specialties and modern porcelain plumbing goods. The rest of this floor is arranged to utilize space and for the convenient handling of a line of supplies for plumbers, gas fitters, machinists, factories and mills. The line comprises everything from the rough fitting to the handsomest nickle-plated fixture. Another special line is the Tanite emery wheels and grinding machinery, which find a ready market in so great a manufacturing center as Newark. Meeting the demands made upon them as they grew, the Essex Lead Works have found it necessary to secure another building at 57 Mechanic street, a few doors away, where they carry wrought-iron pipe and other bulky goods and have stabling for their teams.

IN 1826 the house of C. S. Osborne & Co., now at the corner of Lawrence and Mechanic streets, were established at Newark, N. J. The house have devoted their energies to tool making in two different lines—plumbers' tools and tools and machinery for working leather. The plumbers' tools begin with gas pliers and pipe tools, taking in calking tools, chisels, wooden tools, ladles and solder pots, all of which are high grade, excellent quality being a characteristic of their goods. Washer cutters are to the plumber the most interesting of the leather-working tools, but they attract a wider interest in other sources. A shipment is now being prepared to go to Hindostan, while to Europe, Australia and South America frequent shipments are made. The growth of the business with years finds the basement of their works full of forges, steam hammers and power presses, and in another building the engine to drive the various machinery is located. A visit to the engine room impresses one that the engine was put in yesterday, and pride is taken in stating that it has been working over 23 years, and though the demands made upon it to-day are great, it runs quiet and true. On the first floor is the office and shipping department at the front, while the wood-turning department lumber-drying and storage rooms occupy the rest. Most of the tool handles are made of rosewood, though turn pins and plumbers' tools are made of something tougher, like hickory and maple. The second and third floors contain the polishing and finishing shops and the general machine shop. Recently a special room has been added, with ample side light and a skylight, which is used for making special tools for manufacturing their own goods.

AN AMENDMENT to the municipal plumbing regulations of Wilmington, Del., has been adopted, which rules that in outdoor water-closets all ventilation pipes shall extend above the roof of the closet to a point to be designated by the plumbing inspector. It also provides that in no case shall such a pipe terminate within 12 feet of any window or other opening of any adjoining building.

THE OLD DOMINION MFG. COMPANY of Shendun, Va., are increasing their plant and facilities for producing goods. They are now building the third dry kiln, and on its completion, they say, the total drying capacity will be equal to about 80,000 feet of lumber. We are advised by those in charge that an average of about 7000 feet of various hard woods used in the manufacture of closet seats, tanks, tank boards, bathtub rims, washtub rims, &c., is being cut up each day. The firm also make their own metal work for water closet tanks, such as valves, ball cocks, levers, &c., having recently sent down 20 additional men for this department. They are now employing 212 men altogether, and C. H. Rose, heretofore looking after the New York end, has found it necessary to assume charge of the works at Shendun, which he has done since April 1. Otto Hahn, who has been connected with the company since their organization, mainly employed selling the goods, is now in charge of the office and warehouse, at 242 Water street, New York, where is carried a stock to fill requisitions for near-by delivery. An average of a carload of finished work is being forwarded from Shendun every working day. They have their own tinning plant for tinning copper, and also machinery for hard rolling or planishing the copper sheets after being tinned.

THE WATER OVERFLOW PREVENTIVE COMPANY, 93 Grand street, New York, effect a novel insurance against damage by water overflow, by preventing the building from being locked until the water supply is shut off. The method consists in attaching to the stop-cock lever a catch which fits in a lock that is so located that the catch is held in it when the water is shut off. The lock is made to fit the main door key, and this key is used to release the catch so that the lever can open the stop cock and let the water on. The key is securely held in the lock and the building cannot be locked until the water is turned off, which releases the key so that the building may be locked. It prevents this duty being forgotten, which has often resulted in a flood that destroyed valuable merchandise.

THE DELAMATER IRON WORKS, 87 South Fifth avenue, New York, find with the increase of flats a steady demand for the improved Ericsson hot air pumping engines. They suggest that the pumping engine is entitled to a share of the credit of causing the increased valuation in New York City property, for without the water conveniences which they make possible no one would as soon occupy the top flat as one lower down.

KILLER & BEEBE of 129 Beekman street, New York, have recently renovated their premises and put them in first-class shape for promptly handling their business. The firm are now in shape, we understand, to accept the largest orders, and as they give employment to mechanics of the best grade, satisfactory work is guaranteed.

THE MASTER PLUMBERS' ASSOCIATION OF WASHINGTON, D. C., have elected the following delegates to attend the national convention held in Milwaukee next month: John Mitchell, president; Edward J. Hannan, James Ragan, James Lockhead and Donald Williamson.

The L. Wolff Mfg. Company

of Chicago have just issued an advance edition of their catalogue B, covering plumbing specialties. This work has been in preparation for a long time, but probably another year will be required to complete it. So determined are the company to secure the best results possible in making preparations for their catalogue, that they have their own photographing facilities and their own engraving department, stopping at no expense to get really artistic work. This edition of the catalogue—called merely an advance edition—would be creditable to any house if nothing further were attempted. It is a most gorgeous work, comprising some 250 pages, each 10 x 14 inches, embellished with the most exquisite engravings, many of them lithographed in colors, as well as unusually fine letterpress, on very heavy paper, bound in a substantial terra-cotta cloth cover, with titles stamped in gilt. The scheme of the catalogue is to cover all lines of the company's specialties, leaving some of their goods in the several lines to be treated in that part of the catalogue which is yet in preparation. On glancing through the advance catalogue it would seem that further additions would be unnecessary. The variety shown here should satisfy the most exacting taste and silence the most captious customer. Bathtubs are first considered, the place of honor being given to enameled iron baths. The L. Wolff Mfg. Company have cut loose from the Standard Mfg. Company, and now make their own goods in this line, having recently provided facilities for doing their own enameling. No less than 26 styles are shown. Next follow three styles of porcelain baths, then five kinds of copper baths, with seat and foot baths appropriately bringing up the rear. Needle and shower baths consume no less than 20 pages. The water-closet line, however, is immense, 76 pages being required to do the subject adequate justice. Lavatories and lavatory fittings take 40 pages. Among the designs for lavatories are a number of the most ornate character, the variety ranging from the most palatial article demanded by a fastidious sybarite to the plain every-day piece of furniture within the means of the most humble. Lithographic representations duplicate the exact patterns and colorings of decorated wash basins. Pantry and kitchen sinks and fittings absorb 26 pages of the book. Slop sinks and washtubs take 24 pages. Range boilers are supplied for vertical and horizontal use, either galvanized or of copper, or with copper coils inside for heating water with steam. Galvanized range boilers are made from 18 to 192 gallons capacity. Although but four pages are devoted to this subject, a great deal of interesting information is given. Urinals cover 16 pages, cuts being given of urinal stalls and all kinds of fittings. Limited time has prevented the company from showing all they desire to present with regard to urinal stalls, earthenware urinals, brass inlet connections, traps and automatic tanks, &c., but an illustrated supplement will soon be ready for distribution, dealing with this special subject. The advance catalogue is not for general distribution, but is only intended for plumbers of good standing in the trade and for jobbing houses whose location requires them to maintain a department of plumbing supplies and specialties.

House Warming.—IX.

From the foregoing it is obvious that in order to obtain the most economical character of combustion (irrespective of the manner of utilizing the resultant heat) it is important to supply exactly the proper quantity of oxygen. Any amount less than we find necessary as indicated by the formulæ will result in imperfect combustion; while an excess—though it does not act as against the complete chemical combination—will abstract from the fire and carry to the chimney a corresponding quantity of the heat generated and therefore become a source of wasteful loss.

And as we have seen that atmospheric oxygen—our only natural source of supply—is moved with four times its bulk, or three and one-half times it weight, of nitrogen $\left(\frac{14.01 \times 4}{15.96} = 3.51\right)$ the latter also must be heated to the same temperature as the uncombined oxygen, and will therefore carry off a certain additional number of heat units without useful effect. Beyond this fact, and that it is an inevitable diluent of the only available oxygen, nitrogen is perfectly neutral in its effects on the chemical reactions of combustion. The oxygen is, as it were, filtered out in its passage through the fire and the nitrogen is left "free"—chemically considered, although more or less intimately mixed, mechanically, with the other products of combustion. The latter, according to the chemical composition of the fuel and the degree of completeness of combustion, will be: Water, H_2O; carbonic oxide, CO; carbonic acid, CO_2; marsh gas, CH_3; olefiant gas, C_2H_4; sulphurous acid, H_2SO_3, and some other unimportant compounds in small quantities, dependent on the nature of the fuel.

In the destructive distillation of hydrocarbons in the production of illuminating and fuel gas, there occurs a chemical reaction resulting in the combination of certain quantities of nitrogen and hydrogen in the proportions of one equivalent of the former to three of the latter; and this—expressed by the formula NH_3—we see, by Table XXI, to be ammonia. This, however, need not be considered, as it has no important bearing on the subject in hand.

AIR NECESSARY FOR COMBUSTION.

To calculate the quantity of air necessary for perfect combustion of our fuel, we must have the chemical composition of the latter, as obtained by analysis.

Referring to the tables given in the earlier portion of our remarks, we find for bituminous coal (Chapter III, page 47, of February 11, 1893) the average composition of the samples analayzed, while it can only be considered as approximately representing this character of fuel, will serve to illustrate the method of calculation by which the required information may be obtained. We have, then:

Element.	Symbol.	Per cent.
Carbon	C	77.5
Hydrogen	H	5.5
Nitrogen	N	1.5
Oxygen	O	7.0
Sulphur	S	1.7
Ash	..	6.5

In order to facilitate calculations, the atomic weights of the ordinary elements generally used are: Carbon, 12; oxygen, 16; nitrogen, 14; sulphur, 32; water, 18; carbonic oxide, 28; marsh gas, 16; olefiant gas, 28. Of course, for exact results we must use the decimals given in the table.

Considering first the carbon, we have 77.5 per cent., or say 0.775 pound, in 1 pound of coal. The product of the complete combustion of this element is carbonic acid, CO_2, which indicates that our two equivalents of oxygen necessary must weigh, not $16 \times 2 = 32$ pounds, but by the rule of proportion—12, the atomic weight of carbon, is to 0.775, the given weight in pounds, as 16, the atomic weight of oxygen, × 2, is to the required weight in pounds of the latter, or $0.775 \times \frac{16 \times 2}{12} = 2.067$ pounds.

Expressed as a formula, it will read: Weight in pounds of the combustible × [(atomic weight of oxygen × number of equivalents) ÷ (atomic weight of combustible × its number of equivalents)].

With reference to hydrogen, we must remember the presence of free oxygen, which, as stated in Chapter II, February 4, affects the amount of available hydrogen. By the formula, hydrogen $= H - \frac{O}{8}$ we have 0.055 pound, $- \frac{0.07}{8}$ = 0.04625 pound, for which a supply of oxygen is required to burn it to water, H_2O; then $0.04625 \times [(16 \times 1) \div (1 \times 2)] = 0.37$ pound oxygen. For the 1.7 per cent. of sulphur, to burn it to sulphurous acid, H_2SO_3, we find 0.017 pound $\times [(16 \times 3) \div (32 \times 1)] = 0.0255$ pound oxygen required.

As these are the only elements of the analysis with which oxygen combines, the sum of the three quantities found constitutes the theoretical amount required, and this is $2.067 + 0.037 + 0.0255 = 2.1295$ pounds of oxygen. As air, $N_4 + O$, is composed of but one-fifth, by volume, of oxygen, we require to formulate a method by means of which the weight of air necessary to furnish this oxygen may be found.

The formula $N_4 + O = (14 \times 4) + 16 = 72$, atomic weight, which divided into 16—the atomic weight of the oxygen—gives 0.2222, or 22.22 per cent., as the proportionate weight of the oxygen.

Our formula then will read: Weight of air = weight of oxygen in pounds ÷ {atomic weight of oxygen ÷ [atomic weight of oxygen + (atomic weight of nitrogen × number equivalents)]}, and the equation becomes

$$2.1295 \div \frac{16}{16 + (14 \times 4)} = 9.584$$

pounds of air to afford theoretically perfect combustion of 1 pound of coal of above analysis.

To find the volume, in cubic feet, we must guard against the error of considering the air as a chemical combination, instead of a mechanical mixture, as the difference is very great. If the former, the volume would be $\frac{189.7 \times 2}{72} = 5.27$ cubic *feet* per pound, whereas we see by Table XXI it is 13.14. The reason for this need only be suggested to be perfectly plain. As there has been no chemical combination, with the resultant phenomenon of change of volume, we have simply to consider 4 equivalents, by volume, of nitrogen added to 1 of oxygen, which clearly gives 5 volumes.

The equation then will be $\frac{189.7 \times 5}{72} =$ 13.17; and the difference of $\frac{4}{100}$ cubic foot between the result and the volume as per table is due to the fact that the relative proportions of the two elements vary slightly under different conditions or in different localties, and the formula $N_4 + O$ is, therefore, only approximately correct, though very nearly so. The volume in table is derived from experiment, and is therefore to be preferred in exact calculations.

Our weight of air found, then, will be $9.584 \times 12.14 = 125.9$ cubic feet at 62° F. The volume at other temperatures may be found by multiplying by the relative volume (Col. 2 of Table X, February 25) for the desired temperature, and dividing by that of 62°. This is necessary from the fact that the volumes in table are calculated as relative to 32° as unity. If, for instance, the air supply is found by thermometer in room to be 92°, we multiply by 1.122 and divide by 1.061, thus: (125.9 cubic feet × 1.122) ÷ 1.061 = 133.14 cubic feet—an increase, by expansion, of 7.24 cubic feet.

It will be understood, of course, that it is impossible to attain theoretically perfect results in practical application of these laws. There are many causes which operate against the possibility of maintaining the necessary conditions, even though the most elaborate appliances be provided, and the best that can be done is to approximate as nearly as possible to the theoretical requirements. Certainly without some guide the entire subject becomes a matter of guess work, the results of which must be unsatisfactory and very wide of the possibilities as to both efficiency and economy.

In regard to the air supply, it must be remembered that we must consider the manner of its admission as well as the quantity; in other words, it must be so admitted to the fire that it will perform its work of oxidation of the combustible elements of the fuel with as little loss of uncombined oxygen as possible, and also with a view to preventing the valuable products of partial combustion from being carried to the chimney unconsumed, even in the presence of the necessary oxygen.

A Gigantic Ocean Liner.

Ireland, in spite of her "most distressful" condition, is going to be at the top in at least one line. She is building an ocean giant, which is to excel in size and speed even the latest Cunarders, "Campania" and "Lucania." The "Gigantic," now building at Belfast for the White Star Line, is to be 700 feet in length, or 20 feet longer than the "Great Eastern," the biggest vessel ever floated. In breadth, however, she will fall short of that monster by 15 feet; measuring 68 feet, as against the 83 feet of Brunel's failure. Coming to a question of horse-power, the "Gigantic" will be far ahead of anything yet placed on the seas. She is to be fitted with engines exerting a force of 45 000 horse-power, against 7650 of the "Great Eastern," and 15,000 more than that possessed by the "Campania." She is intended to run at the rate of 27 knots, or a little over 31 miles, an hour. The "Gigantic" will well suppprt her name.

Judging from the annual Parlimentary returns just issued relating to the gas undertakings of Greet Britain and Ireland, the companies have not yet been seriously affected by the adoption of the electric light in those countries. The number of gas companies in 1892 was 410 as compared with 405 in the previous year, and the total capital sunk in gas works has risen from $299,390,000 to $318,100,000 in the same period. About two-thirds of this total represents the capital belonging to public companies, and the remainder the value of the plants belonging to local authorities. Both classes exhibit an increase in business during the past year. The gross receipts of the companies increased during that period oy rather more than $5,000,000, and their output of gas by 3,000,000 cubic feet. Owing to increased expenses, however, net profits have fallen about 5 cents per 1000 cubic feet; the average dividend having been consequently reduced from 8.6 per cent. to 8.4 per cent. on capital invested. An addition of 14,700 lamps for the illumination of public roads is noted during the period covered by the report.

The Buffalo Steel Pressure Blower.

The Buffalo Forge Company of Buffalo, N. Y., have placed on the market the steel pressure blower here illustrated, which is designed especially for high-pressure duty, such as supplying air for cupolas, furnaces, forge fires, and for any work requiring the forcing of air for long distances. The main feature of this machine is the solid case, the peripheral portion of the shell being cast in one piece, to which the center plates are accurately fitted. The objectionable "putty" joint is thus dispensed with, and ready access to the interior of the blower without taking it entirely apart is afforded. In Fig. 2 is shown the form of blast wheel which is employed with this blower.

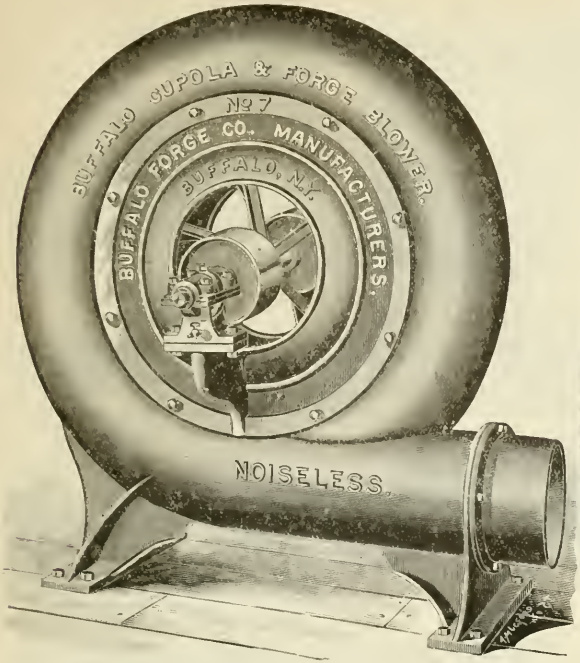


Fig. 1.—BUFFALO STEEL PRESSURE BLOWER.

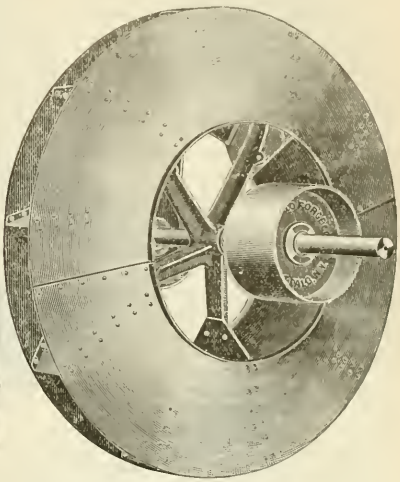


Fig. 2.—Blast Wheel.

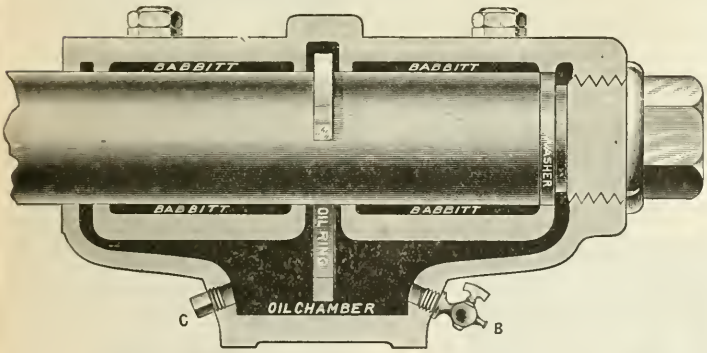


Fig. 3.—Journal Bearing Used on Buffalo Blower.

The journal bearing employed on this machine is illustrated in Figs. 3 and 4. It will be seen that the lower half of the bearing has an oiling chamber, through which the oil ring passes. This oil ring revolves when the shaft is in motion, and conveys the oil from the chamber to the shaft, from which it is distributed by means of chamfered edges the full length of the bearing. The surplus oil then passes to the recesses at the end of the bearing, where it is then returned by means of the channels to the oil chamber. By this method a positive feed is obtained, and the oil supply being regulated by the speed of the shaft, it is impossible for the bearing to heat while there is oil in the chamber. Another feature of this bearing is that a peculiar rattling of the ring occurs when the oil is nearly consumed. This gives warning before the bearing is actually suffering from lack of oil, for it will run for quite a time after this rattling begins without injury. The oil chamber is filled after removing the plug A. By the bib cock B the oil may be readily removed from the chamber, should it become thick by continuous use or dirt.

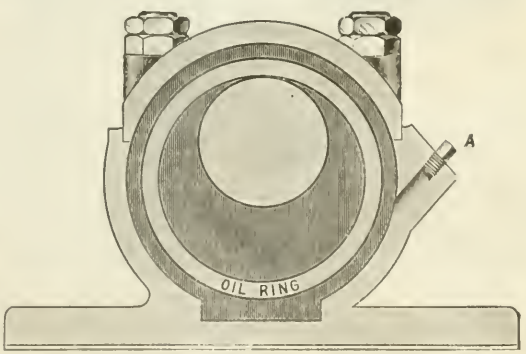


Fig. 4.—Cross Section of Journal Bearing.

Agricultural depression in Great Britain is felt more severely every year, not only among the farming population but among a large class of investors. The latest report of the British Commissioners of Inland Revenue points out that the gross annual revenue of lands assessed under a certain schedule relating almost wholly to the rural districts has suffered a decrease of about $60,000,000 during the ten years ending in 1890–91. Fifteen years ago the landlords' aggregate capital was computed at $10,000,000,000, and that of the tenants at $2,000,000,000. Accepting these calculations as correct, recent investigations show that the landlords' total capital is now a good deal less than $7,000,000,000 and that of the tenants is only $1,350,000,000.

A grand extension of the cable railway system in New York City is proposed by the Third Avenue Railroad Company. The attorney for the company says that the conversion of the horse-power system, together with extensions, will cost $7,000,000.

THE RETAIL STORE.

The National Convention of Retail Hardwaremen.

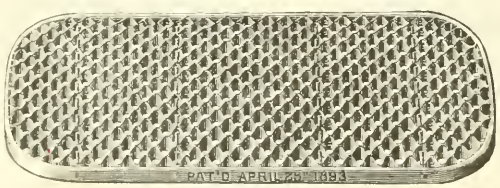
The Retail Hardware Dealers' Association of Pennsylvania, in view of the satisfactory working of their association, and the reasons that exist for similar organizations in other parts of the country, issue the following call to Hardware merchants to attend a national convention in Chicago in September:

The Retail Hardware Dealers' Association of Pennsylvania wishes to call the attention of the retail dealers of the United States to a call for a national convention, to be held in Chicago, Ill., about September 13, 1893. Those who are interested in the formation of a national association are requested to signify their willingness to attend by corresponding with S. S. Bryan, secretary, Titusville, Pa.

As we understand the matter, the principal object is the mutual benefit and protection of retailers against the encroachment of the jobber and manufacturer upon their legitimate trade. It is likely also that other desirable ends would be accomplished, and that an organization of the trade throughout the country might be of such a character as to be decidedly advantageous.

Acme Corrugated Steel Mat.

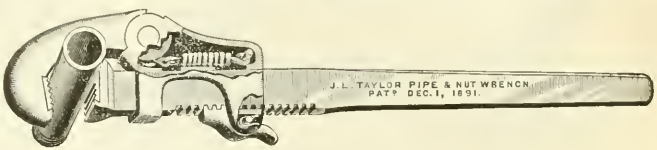
Cobin Mfg. Company, 107 Chambers street, New York, are putting the mat on the market as shown in the accompanying cut. The mat is made of corrugated steel strips held rigidly in a frame by means of rods, and also by projecting tips on each alternate strip, which engage in corresponding holes in the strips next to them. The manufacturers claim that the mats will keep their shape, as the tips make it impossible for the corrugated strips to move from the position in which they are originally placed. It is also claimed that the mats are clean, not accumulating deposits; that they are almost indestructible; that they are reversible; that they are safe, there being no danger of slipping; they will not flatten out, and that there are no points to catch or mutilate skirts or trousers. The mats are galvanized, and are recommended by the manufacturers for all places where mats are required. They are made regularly in eight sizes, from 16 x 24 to 36 x 72 inches. Extra sizes and unusual shapes are made to order.



Acme Corrugated Steel Mat.

The Taylor Pipe and Nut Wrench.

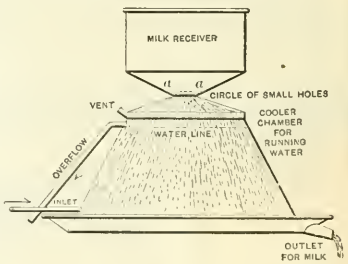
Hermann Boker & Co., 101 and 103 Duane street, New York, as sole agents for the manufacturers, are introducing the wrench illustrated herewith. The handle is made of forged steel, as are also the pivoted jaws; the sliding head of air-furnace refined malleable iron and the teeth plates of oil tempered tool steel. The pivoted head is held up to its work by a spiral spring in the sliding head, and the toothed thumb dog is held in place by a spiral spring on its pivot, as shown by illustration, portions of which are cut away. The teeth plates are detachably secured in dovetailed grooves, so that when desirable to renew the teeth plates, should they become worn or damaged, the old ones may be quickly driven out sideways with hammer and punch, and the new ones driven into position. A light blow of a hammer over each beveled corner locks them in position. The gripping principle is referred to as simple but effective, the wrench gripping its work independent of the spring. The point is made that no strain comes on either spring except that which is necessary to hold the parts in contact, and that the spring in the sliding head gives the self-adjusting feature to the wrench, enabling it to grip round, square, oval or any irregular shape with equal facility. It is stated that all parts of the wrench are interchangeable. The sliding jaw is held in any desired position by means of a multiple-toothed pawl or lock which engages with teeth formed upon the under side of the handle; the form of the teeth, together with the fact that several of them are always in use at the same time, gives additional strength. The pawl snaps into place by action of the spring when released, and when raised allows the sliding jaw to be instantly moved along to suit any pipe or object to be gripped. It is claimed that the wrench will grip a pipe and its connection with one setting; that it is quickly adjustable over a wide range by simply pressing the thumb dog, and that the wrench is so proportioned as to give the greatest strength with the least weight. They are finished all over, and are made in five sizes, to take from 0 to 2½-inch pipe.



The Taylor Pipe and Nut Wrench.

Improved Milk Aerator and Cooler.

The illustration presented herewith shows a milk aërator and cooler, for which an application for a patent has been made by H. Will Gazlay, Cortland, N. Y., who is manufacturing it, and claims that those in use are giving excellent results. It spreads the milk over a large surface for cooling, at the same time exposing it to the contact and influence of the air. The cooler chamber is circular, and the bottom forms a gutter around it with the use of but one seam. The receiver and cover to the cooler chamber are made solid together, so that there are but two parts. At the top of the cooler chamber is a vent, and just below the vent is an overflow pipe, while at the bottom is the inlet pipe, which is to be connected with running water, which may be cooled with ice if necessary. The water flows into the cooling chamber and rises and runs out of the overflow pipe. At a point in the bottom of the milk receiver, just above where it joins the cover, is a series of fine holes. When milk is poured into the receiver it runs out of these holes and spreads over the large flaring surface cooled by the running water, which cools the milk, while the air, it is said, has opportunity to carry off all odors, rendering the milk sweet and cool when it reaches the gutter, around which it flows to the outlet at the front. The ease with which it can be kept perfectly clean is referred to as a prominent feature.



Improved Milk Aerator and Cooler.

Good Luck Ice-Cream Freezer.

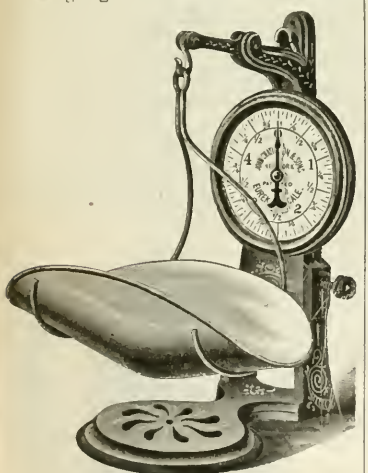
The accompanying cut illustrates a freezer put upon the market by Charles W. Packer, 20 North Fourth street, Philadelphia, Pa. The freezer is being made in response to a demand for a low priced freezer with covered gearing. It is remarked that in other respects it resembles the Standard Freezer manufactured by the same maker, and that it embodies all the

Good Luck Ice-Cream Freezer.

latest improvements, including the automatic double-acting vibratory scraper, which, it is stated, closely fits the can and thoroughly scrapes it during the process of freezing.

Eureka Tea and Spice Scale.

John Chatillon & Sons, 85–89 Cliff street, New York, are offering this scale, and recommend it for quick and accurate weighing. It is a modified form of their



Eureka Tea and Spice Scale.

butter scale of this pattern, a scoop being substituted for the marble plate. The thumb screw at the side is for keeping the scale in balance, and may also be used to equalize the tare of plate or package. The scale has a capacity of 5 pounds by ¼ ounces, and is made with brass scoop and brass bails, all nickeled; with brass scoop and brass bails, and with tinned scoop and iron bails.

Indurated Fiber Water Bucket

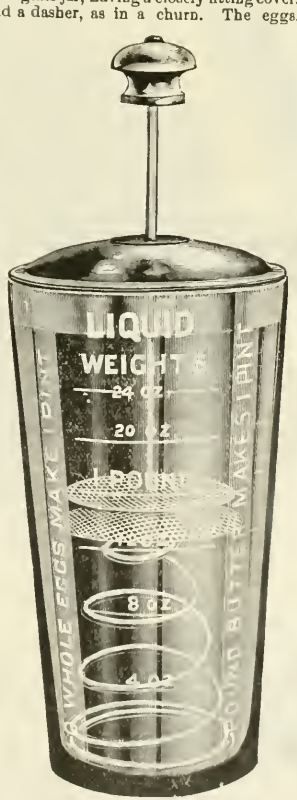
Cordley & Hayes, 172 Duane street, New York, are offering this article, as illustrated herewith. The inside diameter of the bucket is 12 inches, and it is 12 inches deep inside, having a capacity of 5 gallons. The faucet is nickel plated, the best, it is stated, the market can give, and the bucket is provided with a cover. The bucket is referred to as a substitute for a water cooler, cheaper, though fully

Indurated Fiber Water Bucket.

as good in every particular and very sensible. Covers are made with flush handle, as shown in the cut, also with elevated knob.

Lightning Dasher and Egg Beater.

Lightning Dasher Egg Beater Company, Orange and Erie streets, Toledo, Ohio, are introducing the above article as illustrated herewith. It consists of a graduated glass jar, having a closely fitting cover, and a dasher, as in a churn. The eggs,



Lightning Dasher and Egg Beater.

cream or other substance to be beaten is put into the jar, the lid pressed into place and the dasher pushed down by the hand of the operator, the coiled spring returning it again. This action, it is explained, forces the contents of the jar through the perforation of the double dasher, and that it will satisfactorily whip the most refractory eggs or cream in one minute. Attention is called to the fact that the beater has a tight fitting cover which prevents spattering, also of dirt or flies getting into the substance being beaten. The graduated jar is for use as a measure, the sides having marks by which weights or measures of liquids, flour, sugar, &c. may be determined. The manufacturers recommend it as an egg beater, cream whipper, lemonade and eggnog mixer, and as an ice cream freezer.

Waste in the Store and How to Avoid It.

SECOND ARTICLE.

By H. C. Wiseman.

The constant study of a subject, the main import of which is the caption above, will prevent many a man and many a firm from going to the wall. The writer, personally, has in mind a business acquired on a capital of $150,000, carried on for 11 years in a seemingly successful manner, the sales of which were enormous and based on a margin of profit that ordinarily would be more than safe—would be enriching. And yet that business literally leaked itself away. At the end of those years its stock was worth 40 cents. It sold finally under the hammer and did not realize 25 cents on the dollar on the original investment. It was full of leaks from cellar to garret, from office boy to president. They were never stopped, they grew, and those men to-day attribute every dollar of their loss to careless, criminal waste in the business. How to avoid it—be always on the lookout for it and know the remedy. Start at watching for small waste, and the habit will come of finding the large.

MATCHES, BROOMS, GAS, ETC.

In the store never set out a box of matches, put out a dozen or so. Set out the box and every man will take a handful. We've tried it and we now make one box go as far as a dozen formerly went. Buy a good broom, name a fair life for it, and when the old one is worn out serve the new one yourself. Tell your clerks: "There are a dozen brooms, use them," and with the most of them three will be used where one ought to answer.

Get every man in the house in the habit of turning down gas as soon as he is through with it. Two dollars a month saved for gas is a fair profit on $240 worth of goods sold in 12 months, or 10 per cent. on a $20 sale. Keep a nail box and use it—you throw them on the floor, why not in the box? Besides what we use again, we sell enough at 2 cents a pound to pay the broom account in a good sized retail store.

THE MATTER OF TYING.

Keep a twine reel and use that. Do not stop to untie knots—you cannot afford to lose the time—but cut off the knots, make a quick tie, give the reel a whirl, it is wound up and ready. Do not try to ball scrap twine,—the reel is better.

IRON SCRAPS, PAPER, ETC.

Save your iron scraps, it will surprise you to see the results of your hands alone

from bundles of iron coming in. And there is your paper account. I think I am safe in saying that with all the goods that come in pasteboard boxes, it is possible to save one half that account. The pasteboard boxes are the most convenient things in the world for sending out cut and wire and horse nails. Save the large pieces of pasteboard for every day special signs, and make a contract with some factory or foundry for all your good boxes, barrels and nail kegs. You will be surprised to see how much P. and D. you can credit to that account. While you are saving—save time, too. Buy a thousand or two cheap coin envelopes for brass headed tacks, screws, cupboard catches, brads, bed spring staples, &c., they take lots of time to wrap up, and that time is money.

SCALES.

ze on scales; have good
Do not economi. e that do not require
ones, and have thos w a pound. Your
down weight to sho what he buys, and
customer only expects eless clerks you
with bad scales and can 90 pounds for
cannot possibly sell over here is noth-
what you bought as 100. uccessfully
ing that will rob a man so
as his scales.

DROWN A DOLLA[R] g for small
The habit of not chargi inal. You
odds and ends is almost crin. ds simply
cannot afford to give away goo or two,
because it is a screw, a screw-eye wire,
a handful of nails or 6 inches o[f] , and
They are all worth a penny or tw[o] ales
it takes but a few of these good-will ad-
to drown a dollar beyond recall. Frie[nd]
ship is one thing and business is another
if goods are marked right no man respects
you any more for cutting the price on
them, either asked or unasked. If you
do it, your clerks will. If you do not they
will not; and your example more than
all else will prevent their sacrificing you
in their little personal friendships. Other
leaks are the exposed samples of goods.
Sell them off, keep them fresh. Watch
the parts of goods. Keys and strikes for
locks, roses for knobs, nuts for bolts,
hoops for buckets, &c. If short, fill
them or fit them up; keep them as near
their original value as possible.

READY FOR SALE.

Cultivate the habit in the store of every one always having something to do, if only using the dust brush. Have goods ready to go out. Grass seed packages made up, nails out in 5, 10 and 20 pound lots. Your season's rubber hose fitted up with nozzles, bands and connections, and ready for sale. There are hours in a day saved in such work, and the biggest leak in any house is the time wasted by employees. These are but a few of the wastes and losses, and their remedies, that if closely watched, will certainly bring the right side of a merchant's balance sheet to the front at the end of the year.

The Spring-Back Window Cleaner.

Wm. Vogel & Bros., 37–47 South Ninth street, Brooklyn, N. Y., as selling agents for H. Clayton & Co., are introducing the above article, illustrated in Fig. 1. The cleaner is made of galvanized iron and rubber, with a spring or flexible back, an end view of which is given in Fig. 2. When the edge of the rubber becomes worn and rough, it is laid on a flat board and cut off close to the metallic strip with a sharp knife. The manufacturers claim that this operation can be repeated several times, and that the cleaner will not rust, rot, warp or crack. The cleaners are made in four sizes: 8, 10, 12 and 14 inches.

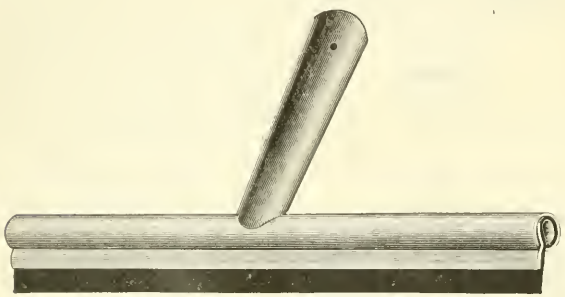


Fig. 1.—Spring-Back Window Cleaner.

Fig. 2.—End View of Window Cleaner.

WHITLEY & SONS, 193 Fulton street, Brooklyn, will have a front on two streets, New York & Brooklyn Bridge Com- who own the property they occupy, ing extensive improvements in it. to their regular line of stove, fur- in business, they have made a of chimneys and have a large eir services in correcting the ce the chimney the source and discomfort.

Bro as th pany, are mak In additio nace and special study demand for th defects that ma of much trouble

The Christy Improved Table Knife.

The Christy Knife Company, Fremont, Ohio, have added still another form of knife to their line, as illustrated herewith, and which they are offering under the name of the Christy Table Knife.

They refer to the new production as being made entirely of steel, both the blade and handle, the latter so secured to blade as to avoid any liability of its becoming loose.

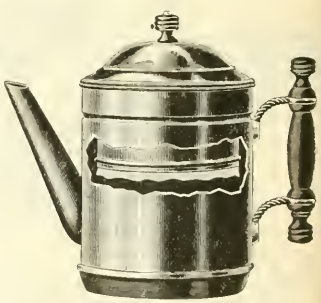
The Christy Improved Table Knife.

The knives are ground on one side only, making it more convenient to keep them sharp, and are heavily nickel plated, requiring no scouring to keep them clean and bright.

These knives, it is stated, are intended for use where it is desired to save the wear and tear of the more expensive silver-plated goods.

Puritan Coffee Pot.

The Bronson Supply Company, Cleveland, Ohio, and 72 Beekman street, New York, are bringing out a new coffee pot, as here shown, which will be known as the Puritan. The article is well made of heavy planished tin, or can be furnished nickeled. The enameled wooden handle is attached to the body of the pot by means of twisted wire securely fastened with stamped bosses to the sides of the vessel. The bottom is struck up in a die, and has a deflected edge, the bottom being joined to the body by a double-seaming machine, and soldered inside. One of the leading features of the coffee pot is the method now employed in making the filter. This consists of a metal rim having straight sides, with a bead at bottom in which is placed a circular wire spring for holding the filtering cloth. In many coffee pots the filtering facilities for various reasons have proved troublesome. As now arranged a piece of filtering cloth can be cut and put in place as often as desired by the most inexpert, and as the hot water poured on the pulverized coffee is compelled to go through the whole mass, the full strength is attained, there being no opportunity for it to escape at the sides. A bead in the coffee pot keeps the filter from going below a prescribed point. The general appearance of the utensil in make and finish is excellent. They are made in 2, 3, 4 and 5 pint sizes.

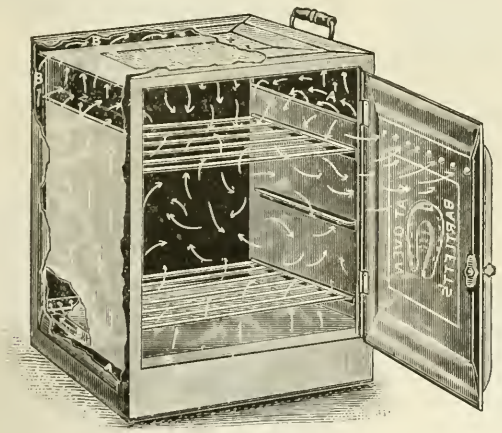


Puritan Coffee Pot, with Section Cut Away, Showing Filter.

STOVE TRADE NOTES.

The Bartlett Portable Gasoline Oven.

A portable oven intended for use in connection with gas, gasoline and other stoves has recently been brought to the attention of the trade by Russell, Bartlett & Kunz, Commercial and Market streets, St. Louis, Mo. The oven is constructed with two separate and distinct sets of flues. The first current of heat, we are informed, is admitted at the bottom of the oven, passes up the flue on either side of the oven marked A in the illustration and enters the baking chamber near the top of the inside lining, passing out through the openings in the top of the door. The heat currents are clearly indicated in the illustration, which represents an oven with the door open and portions of the side and top broken away. The second current of heat, we are told, is produced by a secret flue, marked B at the bottom of the oven, and connecting with the flue B at the back



The Bartlett Portable Gasoline Oven.

and top of the oven. It then passes down through the perforated plate C into the baking chamber and passes out through the same openings as those provided for the first set of flues. By this arrangement the manufacturers claim all articles baked are given a double current of heat over and across the top and also insured a thorough and efficient baking on the top and bottom. The oven is also provided with handles by means of which it can be readily moved about. In the directions which the manufacturers give for using this oven the operator is cautioned to have the bottom plate forming the secret flue to rest on the bottom and against the back of the oven. The oven, it is claimed, should be placed over the burner so that all the blaze will be admitted into the opening at the bottom. The oven should be well heated before placing articles within, the time for heating varying from six to ten minutes.

Diamond Extension Stove Back.

The Adams Company, Dubuque, Iowa, are introducing to the trade the extension stove back illustrated in the accompanying engravings. The construction is such that

Diamond Extension Stove Back.—Fig. 1. Stove Back Closed.

no bolts are required, the extended part being fitted in dovetails and driven together in oil. When the oil burns off, the makers say the back becomes nearly rigid. The flange that fits along the oven plate is on a straight line and is said to make an ash tight joint. The dovetail referred to is above the fire, where it is less liable to become heated and will not, the makers state, warp or become loose. Fig. 1 of the engravings shows the Diamond stove back closed, while Fig. 2 represents it in extended position. It is said that one size adjusts in width from 4½ to 7 inches and in length from 15 to 20 inches. The manufacturers refer to the ease with which this stove back is fitted and state that a small hammer is all that is necessary to adjust it.

Fig. 2.—Stove Back Extended.

Women's Ideas on Gas Stoves.

BY O. B. SERVER.

Very pertinent facts and worthy of careful observation were gleaned from chats with the sellers of gas stoves at various places in the East during a stroll among them. It appears that what has been sometimes called by the trade "Hot Plates," in speaking of the one or more burners arranged on a cast or wrought frame, which can be set on anything of convenient hight and to which the oven is an independent portable affair, has now secured a new name through the inquiries of the ladies. "Table Stove," and not gas range, as the larger and more complete affairs are designated by them, is what is now daily inquired for and examined. Another interesting hint to the makers of table stoves was that those sold best and were most popular which had the burners farthest apart, so that the oven did not encroach on the space of the next burner and interfere with a tea kettle or other cooking utensil. Stoves which had been previously very popular and sold freely were hard to move since the appearance of stoves having a very appreciable and marked increase of space between the burners. These same all-influential critics seemed to favor a stove smoothly cast in plain iron in preference to those that were coated with a dull nickel with very little polished surface, but if heavily nickeled, clean and white, with a generous space of polished surface, there was no objection to nickel plating.

THE JACKSON MFG. COMPANY is the name of a concern recently organized at Hammond, Ind., with a capital stock of $150,000. The directors include Charles A. Van Anden, W. H. Gostlin, George H. Helberg, James McCoskrie and M. M. Towle. The officers are Charles A. Van Anden, president; W. H. Gostlin, vice-president; M. M. Towle, treasurer; James McCoskrie, secretary, and Francis Jackson, general manager. We understand it is the intention of the company to produce a superior grade of stoves which, while proving entirely satisfactory in operation, will be very economical in the consumption of fuel.

Heating and Cooking by Electricity.

Among the latest candidates for public favor in the line of appliances for heating and cooking purposes is an electrical device at present in extensive use in Ottawa, Canada, and which was designed by T. Ahearn of the firm of Ahearn & Soper of the place named. The device is being introduced into the United States by the Railway Equipment Company, Pullman Building, Chicago, Ill., who have completed satisfactory arrangements for the

According to the statements of Mr. Ahearn, this stove with 6 ampères of current is equal in heat giving power to an ordinary coal stove. It is stated that the stove is wound with wire in order to permit of the use of a constant current throughout the day, so as to require no attention on the part of the conductor. Another type of heater which has recently been brought out is represented in Fig. 2 of the illustrations. This, it will be observed, is oval in shape, and four of them will take the same amount of current that is necessary for the cylindrical heater shown in the

which would be apt to lead to the rapid deterioration of the wire. The winding of the inner or central tube is also calculated to concentrate the heat at that point, while leaving the outer casing comparatively cool.

The application of electricity to cooking purposes in connection with the Ahearn appliances is shown in Figs. 4 and 5 of the illustrations. The former represents a plan view of an electric bake oven, while Fig. 5 represents a vertical section through it. The plan view shows the position of three electric heaters with which, it is claimed,

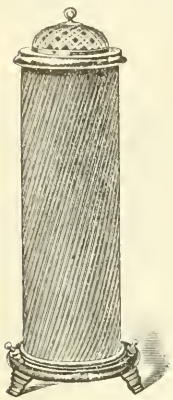


Fig. 1.—Cylindrical Car Heater.

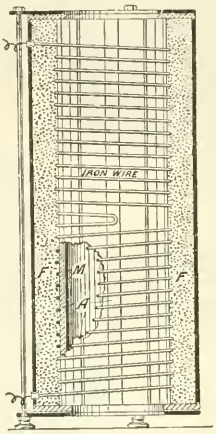


Fig. 3.—Sectional View, Showing Construction of the Ahearn Electric Heater.

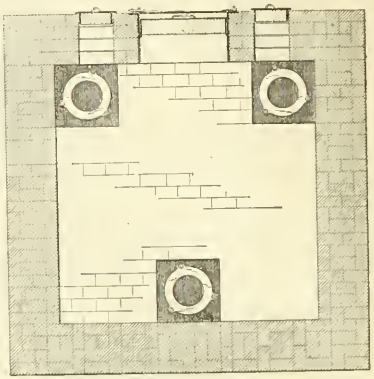


Fig. 4.—Plan View of Electric Bake Oven, Showing Position of Heaters.

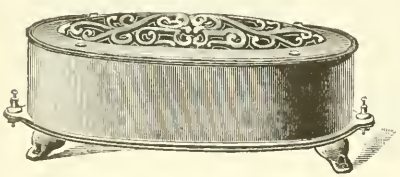


Fig. 2.—Oval-Shaped Car Heater.

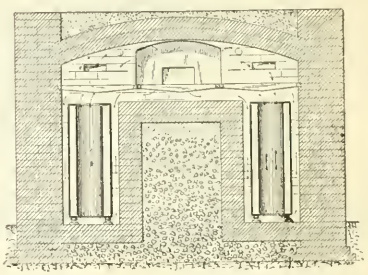


Fig. 5.—Vertical Section through Bake Oven.

HEATING AND COOKING BY ELECTRICITY.

purpose with the firm above mentioned. One form of the heater intended for use in car service is shown in Fig. 1 of the cuts, which represents a stove, as it may be called, cylindrical in shape and measuring 20 inches in hight by 11 inches outside and 7 inches inside diameters. It is practically two iron tubes, one being placed within the other. The inner tube is wound with iron wire, and the space between the inner and outer tubes filled with whiting, powdered fire-clay or sand, as the case may be. The stove, as will be noticed from the engraving, is placed a short distance from the floor, allowing the cold air to be drawn under it and into the central opening or tube, through which it rises, gradually increasing in temperature and creating a thorough circulation of the air.

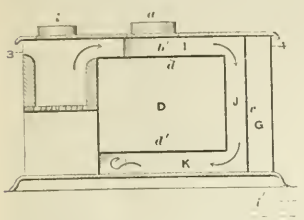
previous figure. A better idea of the manner in which the inner cylinder of the heater is wound may be gathered from an inspection of Fig. 3 The winding of the iron wire is said to be done in such a way as to counteract self-induction and constant flashing of the switch. The direction of the winding is reversed at the center of the coil, as shown in the engraving.

Another point to be noted in this connection, is that the winding wire does not cover the entire surface of the inner tube but terminates a short distance from the top. The inventor gives as a reason for this, that, as the hottest portion of the heater is at the top there would be at that point, if the winding was continued clear up, too great a concentration of the heat,

a baking temperature of 400° F. may be maintained. The size of each of the heaters used in connection with the bake oven is 29 inches high and with inside and outside diameters of 7 and 11 inches respectively. Two of the heaters take 20 ampères and the third 19 ampères at 50 volts. This bake oven was constructed as a portion of the recent exhibit at the grounds of the Central Canada Exhibition of electric heating apparatus. It is claimed that only two heaters of the dimensions given are necessary for use in the oven under ordinary circumstances, but the third was put in this exhibition oven in order to compensate for the frequent opening and shutting of doors rendered necessary by the large amount of food which was baked for sale to curious visitors.

Combination Cook Stove and Heater.

A rather novel form of stove construction by which the device can be used for cooking purposes, while, at the same time, the hot air may be employed for heating an apartment other than that in which the stove or range is located, has recently been brought to the attention of the trade by Franklin L. Sheppard of the house of Isaac A. Sheppard & Co., Philadelphia, Pa. The illustrations which are presented herewith will help to render clear the general construction employed. Fig. 1 is a vertical section through the fire pot and oven, while Fig. 2 is a plan view taken on the line 3 4 of Fig. 1. One of the objects of this form of construction is to utilize the waste heat in connection with cooking



Combination Cook Stove and Heater.—Fig. 1.—Vertical Longitudinal Section.

operations. Above the oven of the stove are two flues represented by 1 and 1 and separated by the plate marked *b*. These flues connect respectively with the descending passage J and the ascending flue J at the end of the oven. These two flues, in turn, are also separated by a partition plate, but communicate underneath the oven with two other flues, one of which is represented by K. These flues are also separated a portion of their distance by a partition, but communicate with each other at the ends nearest the fire box, so that the products of combustion follow the course indicated by the arrows and es-

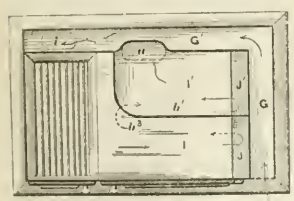


Fig 2.—Plan View Taken on Line 3 4 of Fig. 1.

cape at the pipe outlet marked *a* in the engravings. The construction is such that the greater portion of the heat strikes the plate marked *c*, which with one of the end plates of the oven, inclose the ascending and descending flues J and J' already referred to. This plate, *c*, becomes very hot, and in order to utilize the heat to advantage, and also the heat radiated from the back plate of the stove, a hot-air flue, G, is formed as shown. The air is admitted to the flue through a perforated plate at the front of the stove, clearly indicated in Fig. 2 of the illustrations, and after passing through the flues G and G' is discharged through the opening *i* into a pipe which carries it to the room to be heated. By this means, it is claimed, a constant current of air highly heated in its passage is carried to the room above that in which the stove is located, and a thorough circulation created. In some instances the cold air may by taken from the outside of the room in which the stove is placed, or from an adjoining apartment, so that the fumes of cooking would not be fed to the room to be heated. The flue for admitting the air is indicated by the dotted lines *i'* of Fig. 1. This device, we understand, is being employed by the company in connection with their line of Fidelity ranges.

Indiana Stove Works.

Among the first to favor us with a catalogue of stoves, ranges and heaters for the season 1893-94 is the Indiana Stove Works, with foundry, warehouse and sample rooms located at Seventeenth avenue, Indiana and Illinois streets, Evansville, Ind. In presenting the volume to the trade the company state that they have little comment to make. Their Darling line of stoves and ranges has met with very gratifying success, and as the best material and most skilled workmen are employed in producing them, it is confidently expected that their popularity will show a steady increase. The opening pages of the catalogue are devoted to miscellaneous matters, including telegraphic code, statement of terms, cost of repairs, reference to breakages and freight overcharges on stoves and castings, directions for setting up and operating stoves and an alphabetical index. The first construction to which attention is invited is the Grand Darling, a wood range which is made in two series, one having four and the other six boiler holes. The ornamentation is neat and effective and the constructive features embodied are of the latest type. These goods are made in a number of styles and in sufficient variety to meet the wants of the trade. The Queen Darling is a neat wood cook, first class in every respect and possessing, among other features, detachable enameled reservoir, patent door kicker, drop hearth slide, cemented oven plate, patent damper, which can be easily taken out and replaced without dismounting the stove, and cast door handles. The Darling A is shown in Series A and B and is offered the trade in numerous styles and sizes. The New Olive is a four-hole cook for burning wood, and is fitted with the latest improvements. Under the name Darling the company also manufacture a steel range, intended for hard coal, soft coal or wood. It is built up of heavy steel plate, with oven doors, hinges, latches, &c., of malleable iron. The grates employed are double acting, revolving from their center, the oscillating motion sifting the ashes and crushing the clinkers that come in contact with it and dumping them into the ash pan beneath. The fire box being oval in form, protects the fire lining so that the arch, it is stated, would have to be broken before the lining would warp or crack. In connection with the illustrations of this range are given weights, code words, list prices and directions for operating. Among the cast iron ranges the prominent construction is the Darling, with six holes, and adapted for burning coal. This is made in four sizes, and the usual modifications. The coal and wood cook stoves number several varieties of the Darling family, and are of modern construction. The heating stoves fill the latter portion of the catalogue, and are represented by the Darling Oak, a neat, substantial oak, made in three sizes; the Rival Oak, a medium-priced heater, made in five sizes; the Burr Oak, a low-priced heater; the Round Darling, a heavy cannon stove, shown with and without Russia iron drum; the Sloss, another cannon; the Home Darling, a very pretty cottage parlor, which the company have recently brought out; the Cottage Darling, another recent addition to the company's assortment, and adapted for burning coal or wood; the Daisy, the Longwood, the Eclipse and the New Darling, the latter being an attractive Todd. A list of hollow ware and sundries completes the catalogue.

School for Molders' Apprentices.

About three years ago Valentine Geiselhart, foreman of the foundry of James McKinney & Son of Albany, N. Y., started a trade school in that city for molders' apprentices. His motive was solely a philanthropic one, for he had taken a great interest in the boys and was anxious to have them become the best of molders. His ambition in the line of a trade school was a comprehensive one, though he decided to start in a modest and economical way. A number of the boys in various local iron-molding shops became interested, and there was every promise of a large school being established. A room was hired and the school was organized. But the molders' labor organization did not like this. They looked upon it, not from a correct and unprejudiced standpoint, but as a rival organization. It was not to be a labor organization in any sense of the word; but this explanation was not accepted by the union. They frowned upon the project, and practically vetoed it. This was throwing cold water on Mr. Geiselhart's efforts, and he felt it keenly. Through influence a large number of the apprentices were withdrawn from his meetings, and the result was that the apprentices who remained were unable to hire quarters and establish such a school as Mr. Geiselhart had ultimately hoped would be produced.

Undaunted, however, the friend of the boys continued in his efforts. The room was given up and the meetings discontinued for a time. But Mr. Geiselhart so arranged it that the boys who desired instruction might meet at his own home. A few of the apprentices accepted his kind invitation, and since that time have gathered there Monday nights. Foreman Geiselhart continues the school at his own expense and the boys have made excellent and rapid progress. He takes for his topics, especially, pieces of difficult work which are being done in the molding shop, invites the apprentices to ask any questions they wish regarding them and explains away the difficulties. The consequence is that the apprentices under Mr. Geiselhart are becoming very skillful. In fact, many of them are equal to the best molders, if not better, in many particulars. They learn readily, and, profiting by their lessons, grasp ideas which they never would obtain in any other way. All this is done by their kind instructor gratuitously and gladly. After the school he entertains them with refreshments and gives them free access to all his books and facilities for instruction. When there is occasionally a holiday the boys go on a trip with their teacher to large plants in the vicinity, where they may observe works that will interest and instruct them. In

this way they have visited the large iron and steel works in Troy and other places. A number of boys have joined the class recently, and the school, though not very large, is in a flourishing condition. The scholars will make the finest kind of molders, and Mr. Geiselhart deserves great credit for his work.

The Fuller-Warren Company,

with works and general offices at Milwaukee, Wis., and Chicago offices and salesrooms at 48 and 50 Lake street, favor us with a copy of a very tastefully prepared catalogue which has just been issued from the press. The volume is composed of 160 pages of letterpress, bound in book form, with stiff board covers, and carrying side titles in silver and black upon a ground work of deep straw color. The printing is in two colors, and the edges of the pages are finished in bright red. Each page is embellished with an ornamental corner piece, printed in chocolate, while the body of the page is in black. The opening pages of the volume carry bird's eye views of the company's plants in Milwaukee and Troy, N. Y., and a sectional view of a dwelling equipped with one of the company's ranges and heated by one of their boilers. The line of goods shown in the catalogue cover a wide variety, all of which are profusely illustrated and fully described. The ranges are represented by the Fuller-Warren Company's Stewart, intended for burning hard or soft coal or wood; the P. P. Stewart, a six-hole range, with sheet flue and single oven, being an entirely new construction fitted with the company's oval fire box; the Matchless, a very pretty stove embellished with nickel and cast ornamentation; the Signal Stewart, a four-hole range having large sheet flues, patent oval fire box, with draw-center or duplex grate; the Royal Diamond, a new wood-burning range embodying all the modern improvements, and the National Diamond, another new range for burning wood, and made in the usual styles and sizes. Several pages in the catalogue are devoted to the company's wrought steel oven range, which has met with a very gratifying sale since its introduction to the trade. It is referred to as being of satisfactory construction and operation and as having a system of oven ventilation which gives results in the roasting of meats, &c., "fully equal to the best given by radiant heat, while at all times the air in the oven is kept fresh, pure and wholesome." This range is made with single and double oven and in portable form, as well as adapted for brick work. Among the cook stoves may be mentioned the Stewart, Signal Diamond, Hearthside, National Diamond, Popular Diamond and the P. P. Stewart. Many of these are new patterns and embody the modern improvements. The P. P. Stewart base burner for 1893, occupying the leading place among the heaters, is of handsome appearance, and contains, the company state, all the successful features found in other first-class base burners, with many original and distinctive ideas, which make it entirely satisfactory in operation. It is offered in three sizes, having fire pots measuring 13, 14 and 15 inches respectively. The Splendid Stewart is a new base burner for this season, constructed for the purpose of meeting the demand for a leading stove of square shape. It is rich in its ornamentation and combines a judicious use of nickel plate in combination with cast decoration. There are also shown a large number of round sheet-iron heaters, oak stoves, globe, cannon and laundry stoves, farmers' boilers, fire place heaters, furnaces and hot-water boilers. The catalogue throughout gives evidence of careful arrangement and attention to details in which the dealer is interested.

ODD PLATES.

From the Buckwalter Stove Company of Royersford, Pa., it is learned that some changes are being made to the Eclipse Duplex furnace which will greatly improve its appearance and efficiency. When complete it will make another full line of Duplex furnaces.

Thomas R. Cook, Jr, is now representing J. P. Schaffer of Pittsburgh, Pa., whose business of hot-air and hot-water heating requires additional expert attention. A long service with the Abram Cox Stove Company of Philadelphia, both on the road and in the foundry, have given him valuable experience in making, selling and setting stoves and furnaces.

The William G. Fischer Mfg. Company, Kokomo, Ind., are mailing postal cards to their customers, requesting that all orders for repairs be sent direct to the company. They say that they are located in Kokomo, Ind., and are there to stay. They are sole owners and manufacturers of the Fischer wrought-steel ranges and cooking apparatus, and request dealers interested in goods of this kind to send for catalogue and prices.

From V. Clad & Sons, 117 and 119 South Eleventh street, Philadelphia, we receive an engraving of "The Waldorf." The kitchen of this $5,000,000 hotel has been equipped complete to the smallest detail by them. There are over 70 feet of Clad's steel plate French ranges and broilers, covered with fancy Gothic hood, all specially made with aluminum trimmings, besides the vegetable range, gas terrapin range, bread toasters, griddle and waffle ranges, copper stock boilers, urns, carving tables, &c. The equipment of such a kitchen is looked on with pride by the house.

The Brand Stove Company, Milwaukee, Wis., are sending out a neat little catalogue relating to their Famous gas stoves and ranges, which are made in a variety of styles and sizes. The ranges are constructed entirely of cast iron, while the piping is nickel plated, giving to the ranges an attractive appearance. The burners are operated by brass nickel-plated valves, by which the flow of gas into the air chamber is controlled. The air supply is regulated by means of a brass plate furnished with each burner, thus enabling the user to maintain the proper balance between the air and gas pressure. The flue arrangement is such that an even distribution of temperature in the oven is secured. The range is lined with asbestos throughout, and its construction is first class in every particular. The Famous oil ranges and stoves are also considered, their special features and advantages being set forth in a manner calculated to interest the dealer. A reduced price-list of Famous oil ranges and stoves is a feature of the little pamphlet.

Head's Iron Foundry of Utica, N. Y., has placed upon the market for the season of 1893 a steel furnace which is known to the trade as the Standard. It has been brought out to meet the demand for a low-down, low-price heater of large capacity, intended for using coal, gas or wood. The cast-iron portion is made heavy, strong and durable, while the material used in the radiator is said to be first quality heater drum cold-rolled steel, of unusual thickness. The course of the draft is toward the front and completely around the radiator to the smoke outlet at the bottom of the radiator on the opposite side. The division plate is adjustable and may be placed either to the right or left of the feed door, while the collars on the radiator may be placed either for the smoke outlet or clean out, according to the position of the division plate. The furnace being of low elevation, is especially desirable for cellars of small hight, while insuring rapid transmission of the heated air to the rooms above. The company are also directing the attention of the trade to their Standard air blast furnace intended for burning soft coal. This heater is constructed in a first-class manner, has large heating capacity and has been thoroughly teated. In order to thoroughly consume the dense smoke and soot arising from the use of some qualities of soft coal, the manufacturers have added to their regular Standard soft coal burning furnace an apparatus which is designed to properly mix the requisite amount of air with the gases arising from the fuel in order to promote combustion. The makers state that in this heater soft coal burns with a bright red flame and leaves no unpleasant odors or dirt. Explosions of gas is said to be obviated and a perfect control of the fire obtained.

The Fuller-Warren Company, Milwaukee and Chicago, have issued from the press a price-list of their top return flue warm-air furnace, combination warm-air and hot-water heaters and hot water boilers. It is a work of over 70 pages, profusely illustrated, and gives, in addition to a general description of the goods named, tables of sizes, prices and information of interest to the furnaceman. A feature of the work is bird's eye views of the establishments in Milwaukee and Troy and a telegraph code by means of which goods may be speedily ordered by wire. The company state that in order to fully meet the increased demand for new improvements and conveniences they have completed several new patterns in both furnaces and hot-water heaters, which are illustrated and described in the catalogue. In addition they have arranged the triangular bar grates for many sizes and styles of their furnaces and hot-water heaters and boilers, but the grates will be furnished only when specified on order, as a majority of the trade prefers the draw-center shaking grate, which in the past has given entire satisfaction. The company have also provided larger casing rings for several furnaces, which increases the heating capacity without increasing the selling price.

Col. Augustus S. Bement of E. Bement & Sons, Lansing, Mich., manufacturers of stoves and agricultural implements, and uncle of Mayor Arthur O. Bement of that city, died of heart disease while on his way home from the works on the 12th inst. He was a brother of the late E. Bement, founder of the extensive institution, and was 65 years old.

The case of William M. Brinkerhoff and Dexter A. Smith of Auburn, N. Y., against the Fuller-Warren Stove Company of Troy, N. Y., has been referred to A. M. Mills of Syracuse, N. Y. The suit was brought to recover about $20,-

000 royalties alleged to be due under a contract between the parties to the suit, respecting the use of the plaintiffs' patented ventilating attachment for stoves and ranges. The real question in the case is said to rest upon the definition of the word "practicable," as it is read in connection with the other words in the contract, the defendants agreeing to use the ventilating apparatus upon all stoves and ranges "so far as practicable."

Rathbone, Sard & Co., Albany, N. Y., say that this, the year of the World's Fair, will be also distinguished as the year when they made the greatest display of new and improved patterns in stoves. In 1891 and 1892 their pattern shops turned out almost entire new lines of both cooking and heating goods, but the additions this year are even greater. They will in the near future print a new catalogue, and this month their salesmen will start out on their fall canvass with photographs of their new goods.

From the March-Brownback Stove Company of Pottstown, Pa., is received a catalogue covering their heater, range and grate departments, and forming a special edition designed for the use of builders, architects and dealers. Their new Crown hot-air furnace comes first, with cuts, description, dimensions and heating capacity, for the convenience of the purchaser. The Crown steam heater is shown by a broken view and a cut of the patent return water heater, followed by a detailed description of its advantages and a long list of those using the heater with satisfaction. Hot-water heating for dwellings is then explained, and cuts show the Scollay patent hot-water boiler complete and by a sectional view, and another sectional view shows a dwelling warmed by hot-water circulation. The range department is devoted to the New Globe, adapted for either horizontal or vertical circulating boilers, with all the modern conveniences and some special constructive features. The top oven plate is made in two parts, greatly increasing its durability, and the long center is cut and supported to prevent sagging in the middle. The Boston ring cover is used, which, it is claimed, will not crack or bulge. The ranges are furnished with either duplex or Prismatic grates, and the fire bricks are held by self-locking brick clamps. These ranges are made to meet all the requirements for flats and dwellings. The grate department shows the Art Franklin, set in tile or fancy brick work. It has all the beauty of an open grate, and is made to give heat to a room above, or additional heat by circulating the air in the room. A sectional view shows the manner of setting it to heat a room above. The last page of the cover proclaims the company as the makers of Welcome Globe ranges, a circular of which is inclosed, and another circular shows their Quick Heat portable caldron.

The Yeager-Hunter Spring City Stove Works, Spring City, Pa., have introduced something of a novelty in the decoration of their stoves. The oven door carries a heavy French plate panel, the effect of which is very striking, and permits all parts of the oven to be clearly brought to view when the door is closed.

The Favorite Stove & Range Company, Piqua, Ohio, refer in another part of this issue to the extensive buildings and large additions of machinery made to their works the past year as increasing their capacity to such an extent as to give them ample facilities for promptly and satisfactorily meeting the demands of their trade. We understand that the company are contemplating many new patterns for the fall business, and are looking forward to a gratifying demand. Their works cover a large area, as may be inferred from the statement that the depth of the buildings is 1270 feet.

The Magee Furnace Company, with New York office at 242 Water street, have among their samples a specimen range of a new variety, recently brought out and something similar, although not so elaborate, as those now on exhibition at the Chicago Exposition. It is called the Magee Grand, and, including the various kinds, can be furnished in from 15 to 20 styles and sizes. The range at the New York office is resplendent in nickel-plated ornamentation, which pleases the eye, although not necessary where economy is an object. What they call attention to is not any radical or particularly novel features, but the excellent material and workmanship, closely fitted joints and combination of conveniences so much appreciated by competent housekeepers. At the back are provided two shelves, on which dishes may be placed, although it is furnished with but one shelf when desired. At one end is a hot water reservoir, for use where range boilers are not employed, made of copper, and tinned. The cover to this, which is flush with the top of the range, is of galvanized iron. The oven door is opened by means of a foot lever, while one of the holes is supplied with a set of rings, permitting of 3, 5, 7 and 9 inch holes being used as desired. Another advantage is a close-fitting cast-iron ash pan in front, under the well-known Dockash grate, which will not permit cinders passing between the pan and range. A broiler door above is also one of the conveniences, while on the oven door is a circular thermometer, with a black dial about 2½ inches in diameter, graduated to indicate a moderate, medium, or hot oven. The damper connecting with the stove pipe works in connection with a check draft that also serves as a medium of getting rid of offensive odors. There is a damper to regulate the supply of heat to be thrown around the water boiler or reservoir, which may be cut off entirely when not needed or increased heat is wanted for concentration on the oven.

The damage reported in the recent fire in the japanning room of Rathbone, Said & Co., at Albany, N. Y., was overestimated, as has been found by further investigation. The company have repaired the damage and are now running as if nothing had happened.

The Round Oak Stove Works of Dowagiac, Mich., are busy in all departments in turning out their leading specialties, for which there is a gratifying demand. We understand that the foundry is melting about 40 tons of iron a day.

S. W. Graves & Co. of 624 and 626 Gay street, Knoxville, Tenn., have issued an attractive pamphlet of 16 pages, in which are illustrated a few examples of the company's line of wood mantels, grates, andirons, fenders, fire sets, &c., adapted for any of the rooms or halls of modern houses. The mantels are also adapted for hotels and flats where good taste and workmanship are wanted at moderate prices. The mantels are made in large quantities and carried in stock in oak, ash, birch, cherry, maple, walnut, sycamore and magnolia. The designs shown are neat and attractive and are sufficiently varied to meet the wants of the trade.

We understand that the plan of consolidating the Wallace Foundry Company, of which Wallace & Williams are proprietors, and the Girard Stove Works of Girard, Ohio, and forming a stock company with a capital stock of $30,000, has been approved by the local board of trade. The committee which was appointed at the recent meeting of the citizens to investigate the business of the two plants has made a very favorable report, and it seems to be the unanimous opinion of the committee that the investment will prove safe and profitable. It is stated that nearly one-third of the stock has already been subscribed, and it is thought that the balance will be placed within a few days.

In our issue for last week we called attention to a new stove which has recently been constructed for use by the National Guard of the State of Pennsylvania during their encampments. A test of the stove has since been made by a military commission composed of high rank officers of the National Guard and with results which, we are informed, were highly satisfactory. The designers of the stoves, Messrs. Schraeder & Schimpf of Pottsville, will apply for a patent covering the essential features.

Page Brothers & Co., formerly Williams, Page & Co., of 227 to 233 Cambridge street, Boston, Mass., have recently added to their interesting line of oil heaters, known under the name Ladies' Delight, a new size, which is provided with japanned iron legs. The burners employed are constructed on the central draft principle, the parts being so arranged that no heat is transmitted to the oil. As an additional safeguard the company place over the top of the oil tank a wooden shelf with metallic covering, which prevents the tank from becoming heated by the reflection or radiation from the burners. There are also provided seamless brass burner tubes, brass reservoir and other features, which render it light, durable and ornamental. The manufacturers state that they guarantee the stoves to be absolutely safe and odorless, that the flame will always remain as originally set and will not draw up and smoke. The oil cooking range has a special feature in the shape of a double chimney, which prevents the radiation of heat at the sides by conveying it to a hot-air chamber at the top, thus increasing the capacity of the stove, the comfort of the user and effecting a saving of fuel. The stoves are made in several sizes and provided with one or more burners, according to requirements.

The Portsmouth Stove & Range Company, Portsmouth, Ohio, are doing a good business and making heavy shipments of Model ranges to points in Northeastern New York. The company have just completed the purchase of a fine line of patterns of stoves and ranges intended for burning coal and wood. We understand that they formerly were the property of the Witman Stove Company of Ironton and were designed to equip a large foundry which was to be operated in Virginia. In addition to these President Knaus has purchased another dynamo for the nickel-plating department, as the rush of business has been such as to render increased capacity in that department desirable.

TRADE REPORT.

The Iron Market.

A very conservative spirit pervades the entire Iron and Steel trade, the principal occupation of many manufacturers and dealers being to stimulate the collection of outstanding accounts and at the same time delay payments to others. Sharp dunning on the one hand and clever dodging on the other are popular arts just now.

It is undeniable, however, that the worst fright is over. Prices are down to a point below which they cannot be driven in ordinary transactions; but while the present stringency in money continues it is just as difficult to attempt an advance. So far as the past week is concerned nothing has occurred to cause further depression, neither is there anything in sight likely to cause any immediate improvement.

Pig Iron.—There have been some inquiries for round lots in New York, both for Anthracite and for Charcoal Pig, a consumer of the latter asking for a considerable quantity. While the supply of Foundry grades from the Lehigh Valley is taken care of quite well, as much cannot be said of Gray Forge, which is feeling the decline in the consumption of the puddling mills quite severely. There are indications of weakness, too, among some of the Alabama furnaces, while in isolated cases Virginia furnaces are holding out for an advance of 25¢ on the lowest prices made. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 @ $14.50 for No. 1; $12.75 @ $13.50 for No. 2, and $13 @ $13.50 for No. 1 Soft.

Last week's report of the Philadelphia market would exactly define the situation to-day, except that sellers think their position is strengthened by an anticipated advance in freights from the South, which is expected to go into effect June 1. Apart from this, business moves along on the same lines as before, good Irons being scarce and in demand at full prices, others not specially abundant. It has been supposed that most of the Iron held for advances has been pretty well cleaned up, but as every week seems to produce a new lot from some source or other, it cannot be that supplies are completely exhausted. For the present, however, business is confined chiefly to covering immediate requirements, and usually at prices about as follows for Philadelphia and equivalent deliveries, with 25¢ @ 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X...	$16.00	@	$16.50
American Scotch, No. 2X...	15.00	@	15.50

The condition of trade in the West during the past week was rather discouraging to sellers. Transactions have been light, and few inquiries are now coming forward. It is a fact worth notice, however, that consumption keeps up remarkably well. Shipments are heavy on old contracts and consumers in very few instances are asking to have deliveries deferred. Prices of Northern Iron have not been affected by the financial situation, as makers are in no hurry to force Iron on the market. Some Southern companies, however, are making strong efforts to push sales, and are offering concessions beyond anything previously known here. It is a good time for buyers who are able to pay prompt cash, as they receive special consideration. The molders' strike in the local foundries is now about over, and the net result is in favor of the employers. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal.....	$16.50	@	$17.00
Local Coke Foundry, No. 1	13.75	@	14.25
Local Coke Foundry, No. 2.....	12.85	@	13.25
Local Coke Foundry, No. 3	12.35	@	12.75

The tone of the Southern Pig Iron market is easy, with the general disposition on the part of the buyers not to anticipate their wants, so that no large sales have been made, and few run many months into the future, although the furnaces are willing to sell for the whole year on the basis of current prices, and we learn of one sale where the deliveries run for 12 months, or four months into next year. There has been a pretty satisfactory volume of business in the aggregate of small lots for immediate and short forward delivery, seldom more than three months, and of nearly all varieties of Southern Iron, but chiefly No. 2 Foundry and Gray Forge, with a fair quantity of No. 1 Soft. Prices of these grades have been more generally $8.75 for No. 2 Foundry and $7.75 for Gray Forge, f.o.b. Birmingham, prompt delivery and sharp cash. Quotations are as follows:

Foundry.

Southern Coke, No. 1.	$13.25	@	$13.50
Southern Coke, No. 2.....	11.75	@	12.00
Southern Coke, No. 3.....	11.00	@	11.25
Ohio Soft Stone Coal, No. 1....	16.00	@	16.25
Ohio Soft Stone Coal, No. 2 ...	15.00	@	15.25
Mahoning and Shenango Valley	14.75	@	15.00
Hanging Rock Charcoal, No. 1..	19.00	@	19.25
Hanging Rock Charcoal, No. 2..	18.00	@	18.50
Tennessee and Alabama Charcoal, No. 1	15.50	@	15.75
Tennessee and Alabama Charcoal, No. 2.....	14.50	@	14.75

The projected steamship line from Tacoma to Honolulu will commence running in a few weeks.

Metal Market.

Pig Tin.—The weight of heavy supplies here, together with unfavorable advices from Europe, has caused a further sharp decline in prices. On Monday, when the pressure was greatest, Straits was offered at as low as 19 60¢ net cash on the spot, while sales were made of May and June delivery at the same price, showing a decline for the week of over ¾¢ ₱ lb and about 1¼¢ from the extreme highest point reached when the McKinley "bull" fever was highest. Toward the close of the week there was a decided reaction and better general feeling, with circumstantial evidence that the "bull" interest have regained control, temporarily at least. As a whole, the statistical position would indicate that the proposed duty has been well discounted by speculators and that the near future of the market depends in a great measure upon the staying qualities of the largest holders here of Tin afloat for this country.

Copper.—There was quite free offering from first hands early in the week of Lake Superior Ingot at 11¢, Electrolytic at 10⅝¢ @ 10¾¢, and Common Casting at 10⅛¢ @ 10¼¢. It is understood also that sales of Casting Copper have been made at prices below the popular quotations.

Pig Lead.—Sales have been made of about 300 tons Common Domestic at 3.80¢ for near future delivery and rumor had it that as low as 3¾¢ was touched in at least one instance. At the close the market was 3¾¢ bid, 3.85¢ asked.

Spelter.—Prices for Western have suffered a further decline and the market is at present in a depressed condition, suffering from heavy production and indifferent buying on the part of most consumers.

Antimony. — Dealings have been moderate and the market is rather easy, without, however, any radical change in prices. Current quotations are 10¢ for Hallett's, 10¼¢ @ 10¾¢ for L.X., and 10½¢ @ 10¾¢ for Cookson's.

Tin Plate.—There has been no improvement in the demand for Plates for either prompt or future delivery, and the movement at present is largely deliveries on old contracts. Arrivals have been quite heavy, affording good supply and assortment, but there is no sign of burdensome holdings, and prices remain fairly steady except for Wasters, which are offered lower.

Coal.

The Anthracite Coal trade is quiet, and there is nothing unusual to report concerning Bituminous. The small steam sizes of Anthracite are scarce and in good demand. Lehigh is selling a shade above the company schedule and may be quoted as follows: Chestnut, $4.25; Pea; $2 40 @ $3.25; Buckwheat, $1.75 @ $2.35. Lehigh Broken and Egg are $4 and Stove $4.25. There is much conjecture respecting a proposed advance June 1, but, in the present state of the market, doubts are expressed whether it could be realized. Production for the week, 732,000 tons, which is a trifle less than for the corresponding week last year, but since January 1 production is 1,185,000 tons larger. The compsnies feel the need of restriction.

At a meeting of the Coal operators of West Virginia 50 companies were represented. A State organization was effected, to be known as the West Virginia Coal Exchange. Officers were elected, of whom John Cooper of Coopers is president.

The Ohio miners' strike was settled at Columbus, Ohio, the workmen agreeing to return to work upon the terms of last year. The miners agreed to waive their demands for an adjustment in the machine mines and Jackson County district.

Governor Pattison of Pennsylvania, in common with the Governors of other States, has appointed delegates to the great anti-Coal combine convention to be held in Chicago, June 5 and 6.

The official mine inspectors of Pennsylvania report that the Bituminous Coal production last year was 46,018,000 tons.

It is stated that the "Campania" in her eastern voyage, the quickest on record, used Pocohontas Coal.

The Reading last week shipped 370,000 tons of Coal, of which 45,000 went to New York, and the Pennsylvania transported 366,700 tons.

Chicago Report.

Scrap.—The local market is stagnant and Old Material is very abundant. Dealers have been buying lately at the following rates :

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12.00	....
Machinery Cast	9.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	6.50	....
Burnt Iron and Grate Bars	4.00	....
Sheet Iron and Hoops	3.00	....
Plow Steel and Breaking Stock	8.00	....
No. 2, such as Shovels, Hoes, &c	4.50	....
Old Boilers—whole (Iron)	7.00	....
" (Iron)—cut in single Sheets and Rings	10 00	....
Old Gas-Pipe and Boiler Tubes	7 50	....
Cast Borings	4 00	....
Turnings	5.50	....
Horseshoes	12 00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9 ¢
Heavy Brass	....	8 ¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	2¾¢

Anthracite. — A continued movement in stocking up is reported among the dealers, but consumers have not yet begun to buy. We continue to quote carload lots of 12 net tons as follows:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.35	$5.60
Milwaukee, Wis	5.35	5 60
Kansas City, Mo	8 55	8 80
Council Bluffs, Iowa	8.55	8 80
Lincoln, Neb	8.70	8 95
Sioux City, Iowa	8.55	8 80
Aberdeen, S. Dak	8.60	8 85
Dubuque, Iowa	6.65	6 90
Madison, Wis	6.85	7.10
St. Paul, Minn	7.85	8.10
Burlington, Iowa	6.85	7.10
Des Moines, Iowa	8.30	8 55
Davenport, Iowa	6.65	6.90
St Joseph, Mo	8.55	8 80
Leavenworth, Kan	8.55	8 80
Omaha, Neb	8.55	8 80

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY	
Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

In the advertisement in another column of the S. P. Oil Company, 1430 South Penn Square, Philadelphia, Pa., is given an illustration of the Self-Pouring Oil Can and its method of operation is shown.

The Capital Sheet Metal Company of Columbus, Ohio, have been chartered, with a capital of $100,000, and will engage in the manufacture of Sheet-Metal products.

At the January, 1893, session of the Connecticut Legislature, the Peck, Stow & Wilcox Company of Southington, Conn., were granted the authority under suitable restrictions to reduce their capital stock from time to time to any amount not less than $1,000,000, it now being $1,500,000. The law thus amending the company's charter provides that the act shall not be valid unless accepted by the majority vote of the stock represented at a meeting of their stockholders duly named and held for the purpose of acting on the same: said meeting to be held within six months from and after the passage of the act.

Sidney Shepard & Co., Buffalo, N. Y., desire us to state that the unfortunate fire which, on the night of the 8th inst., destroyed the works of the Shepard Hardware Company of that city in no wise affected their plant or business, the works of the former company being situated entirely separate from those of the latter company

The Star Mfg. Company, Canton, Ohio, have been organized, with John A. Brobst as president and Frank H. Wagner as secretary and treasurer, the directors being John A. Brobst, Frank H. Wagner, F. B. Smith, Louis Wagner and C. C. Bow. The company will manufacture Hardware specialties, but for the present will confine their attention to the manufacture of the Crystal Valve Oil Can. In the near future they expect to erect a glass works in connection with their plant, as they will require considerable glass in the manufacture of this Oil Can. The company hope to commence operations about May 15.

The Hartman Mfg. Company, makers of Wire specialties, including Fence Materials, Tree and Flower Guards, Wire Mats, &c., whose works are at Beaver Falls, Pa., have been compelled, through lack of room at their former New York offices, 102 Chambers street, to move into more commodious quarters, and may now be found at 277 Broadway, at the corner of Chambers street.

CONDITION OF THE

Hardware Trade.

The condition of business is about as at our last report, with a good deal of unevenness, some manufacturers reporting an excellent demand and being behind their orders, while others refer frankly to the falling off in trade. Reports from Chicago, St. Louis and other Hardware centers refer to the fact that business is on the whole in a very satisfactory condition, and goods moving with at least fair freedom, while others call attention to the continued dullness, which in large measure is attributed to the prevalence of bad weather. The uncertainty in regard to money matters is undoubtedly an important factor in the situation, as merchants and manufacturers see the wisdom of pursuing a very conservative course, assuming only the obligations which they are sure to be able to meet and scrutinizing credits very carefully. This, of course, curtails the volume of business and is doubtless a prudent course to pursue. There have been during the past few weeks comparatively few changes in the prices of Hardware, but the market is not characterized by quite so firm a tone as a few weeks ago, as some of the staple lines which have recently been held quite firmly and at somewhat higher prices than have recently been prevailing are now showing a tendency to weaken. There is also more of a disposition on the part of manufacturers of some kinds of Shelf Hardware to shade prices with a view to inducing orders.

Advices from Chicago.— The dullness noted last week continues, but jobbers are taking the situation more philosophically and are not endeavoring to force trade. Bleak weather has again prevailed throughout this section, checking the demand for summer goods. Wire Cloth seems to have reached its climax at $1.75, with the supply now apparently ample to meet the demand. Poultry Netting is also in fair stock, and prices are stationary. Heavy Hardware is in reasonably fair demand, but trade in that line is by no means active. The rough weather has given the carriage trade a setback, which affects the demand for a wide range of goods.

Notes on Prices.

Cut Nails.—There is a moderate demand for Cut Nails and prices show but little change since our last report. The market is not characterized by a strong tone, but there has been no further open yielding in price, the quotation in the East being on the basis of $1.10 for carload lots at mill. This price, however, is sometimes slightly shaded. Small lots from store in New York are held at $1.35 to $1.40.

Advices from Chicago.—The trade in Steel Cut Nails shows no new developments and manufacturers are quoting

$1.30 to $1.35 Chicago for factory lots and are booking some orders, but not of any magnitude. The season drags along very discouragingly and the distribution from second hands is considerably below the average. Jobbers are selling small lots from stock at $1.35 to $1.40.

Wire Nails.—The quotation for Wire Nails remains $1.50 for carload lots at mill, but the market is not strong and intimations are made that this figure has been slightly shaded. Manufacturers complain that orders are coming in slowly, inasmuch as their large customers are still well supplied and those who are likely to want Nails in the near future prefer to wait for the developments of the market. While the manufacturers are congratulating themselves that the production of Wire Nails durthe past year, as shown in the statistics which were published in our last issue, exceeded that of Cut Nails, they would prefer to have the present demand more vigorous and well sustained.

Advices from Chicago.—Wire Nails are very quiet. So little business is now being done that it is hard to tell what prices are ruling in the market. Manufacturers' quotations are ruling generally at $1.55 Chicago, although a few of them would shade this price if there were any orders in sight which could possibly be secured. The heavy buyers seem to be well stocked, and are turning a deaf ear to inducements. Small lots from stock are selling from $1.70 to $1.75 to country trade and $1.65 to city buyers.

Barb Wire.—There is little to say in regard to Barb Wire. The demand is sluggish and prices are steady. We quote $2.45 to $2.50 for Four Point Galvanized in carload lots at mill. Small lots delivered in New York are quoted at $2.70 for Galvanized and $2.30 for Painted.

Advices from Chicago.—Manufacturers report no improvement in their trade. It is one dead level of moderate business which comes in with aggravating slowness. Quotations are unchanged at $2.20 for factory lots of Painted and $2.60 for Galvanized. Small lots from stock are selling at $2.30 to $2.70, respectively.

Chains. — The manufacturers of Wagon and Fancy Chains have for some time been conferring with reference to a revision of the lists in order to make them represent more closely the present cost of the goods. The changes made are principally in the lists of the following goods: Stage Traces, with clip; Breast Chain, Running or Back Cart Chain, South Jersey Traces, Breech Chain, Tug Chain, Heel or New York Traces, Well Chain, and Rein Chain.

The Abell Coffee Pot.—The Leach Roaster & Baker Company, Paxton, Ill., are manufacturing this article. These Pots are made in two sizes, No. 1, listed at $1, and No. 2, at $1.25. The discount to the trade from these prices is 50 per cent.

Combined Scissors and Tracing Wheel.—This article is put on the market by Pauls Bros., 88 Chambers street, New York, who are selling it to the trade at the following prices:

7	6½	6	5½	5	4½	4	inch.
$5	$4.60	$4.20	$3.90	$3.60	$3.40	$3.20	per doz.

Tinners' Tools.—The following discounts apply to some of the goods of the Niagara Stamping & Tool Company, Buffalo, N. Y., which are shown in their tinners' catalogue, new edition:

Niagara Hollow Punches.....20 and 2 %
" Solid " .....55 %
" Shears and Snips.....20 and 10 %

Indurated Fiber Water Bucket — Cordley & Hayes, 172 Duane street, New York, who are putting this article on the market, are selling it to the trade at $24 per dozen, subject to a discount of 25 per cent.

Cordage.—The Cordage market has developed no new features of importance during the past week, and quotations remain as before. The tone of the market is, perhaps, a shade stronger for the time being at least, inasmuch as most of the manufacturers connected with the National Cordage Company are not in the market. There, seems however, to be no difficulty in obtaining all the Rope needed from outside concerns.

Iron Rivets.—The Iron Rivet market continues in substantially the same irregular and demoralized condition which has characterized it for some time. The manufacturers, however, have been conferring with a view to reaching some understanding in regard to prices, but thus far there has been no change in the situation.

Sifters, Fly Traps, &c.—The principal manufacturers of Sifters, Fly Traps and Corn Poppers have formed the Union Wire Goods Company, having their principal office at Cincinnati, their object being to regulate the prices of these goods and to sell the product of the principal makers. The arrangement is made, we are advised, in the interest of jobbers as well as manufacturers and with a view to establishing prices to the retail trade as well as to the jobbers, for whom a satisfactory margin is thus secured if prices are maintained. The makers of the various brands of the Sifters, Fly Traps and Corn Poppers will take orders as usual, but the billing and collection of the goods is done through the central office of the Union Wire Goods Company, which is in the Masonic Temple, Cincinnati. In the arrangement which has been established the Genuine Hunter Sifter, made by the Fred. J. Meyers Mfg. Company, is quoted at $1.75 per dozen, other Sifters being quoted at $1.50 per dozen. The Harper, Paragon or Champion Fly Traps are quoted at $1.75 per dozen, and the Balloon, Globe or Acme at $1.50 per dozen. The following are the prices on Corn Poppers:

	Per dozen.
Square 1-quart	$1.00
Round 1-quart	1.00
1½-quart	1.25
2-quart	1.50
4-quart	4.00
Double Reversible	1.75

On all of the above goods gross prices have been determined upon, allowing the jobber a fair margin of profit.

Poultry Netting.—There is a good demand for Poultry Netting and prices are well maintained, but while the market has a good tone there has been no general advance. We are advised by the Gilbert & Bennett Mfg. Company that reports have been circulated extensively that Poultry Netting manufacturers are behind their orders and asking higher prices, and stating that so far as they are concerned such reports are without foundation. They have filled their orders promptly and have sufficient stock to meet any ordinary demand for regular sizes.

National Time Register.—The National Time Register Company, Columbus, Ohio, are manufacturing this article. The price of one Register suitable to register 50 persons is $50. Where two are purchased by the same firm or company, a discount of 10 per cent. is given, and on three or more purchased by the same concern a discount of 20 per cent. is allowed.

Glass.—There has been little, if any, change in the condition of the Glass market during the past week. Factories report a perceptible improvement in demand, but local dealers are doing comparatively little business. It is understood that at the last meeting of the National Window Glass Company, held at Chicago, the matter of adopting a new long list was discussed, but that probably no action will be taken until toward the end of the season. There seems to be no reason why an amicable agreement on scale matters should not be reached with the operators for the next fire, which goes in blast usually about September 1. It is reported that the Executive Committee of the National Window Glass Company, held another meeting at Philadelphia last week, because this is looked upon as the weakest spot in the country at present in living up to fixed quotations, and as about the only point at which any great shading of prices is being done. The imported Glass market shows lack of activity, and consequently a disposition in prices to weaken. While it cannot be said that Glass is regularly sold at less than printed quotations, there is reason to suppose that large cash buyers are favored somewhat. It is reported that orders for American Plate Glass are coming in satisfactorily and that quotations are sustained. A Pittsburgh paper states that the National Plate Glass Company have purchased the plant of the Charleroi Plate Glass Company, for which they paid $1,750,000, and that this is the fourth plant secured by this

company, the others being the works at Crystal City, Ellwood and Kokomo. Prices are quoted unchanged, as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags	₱ lb	4 ¢
No. 2 White Rags	₱ lb	3 ¢
Mixed Rags	₱ lb	1¼ @ 1¾¢
Blues and 3ds	₱ lb	1⅝ @ 2 ¢
Hard Sized White Shavings	₱ lb	2½ @ 3 ¢
No. 1 White Book Shavings	₱ lb	2¼ @ 2⅝¢
No. 2 White Book Shavings	₱ lb	1½ @ 1⅝¢
Light Book Shavings	₱ lb	⅞ @ 1 ¢
No. 1 Mixed Shavings	₱ lb	1¼¢
No. 2 Mixed Shavings	₱ lb	¾ @ 1⅛¢
No. 1 Printed Books	₱ lb	1⅝ @ 1⅞¢
Ordinary Mixed Books	₱ lb	¾ @ ⅞¢
Newspapers	₱ lb	½¢
No. 1 Manila Paper	₱ lb	1½ @ 1¾¢
No. 2 Manila Paper	₱ lb	⅞ @ 1 ¢
Bogus Paper	₱ lb	⅝ @ ¾¢
Common Paper	₱ lb	¾ @ 1 ¢
Straw Chips	₱ lb	½ @ ⅝¢
Binders' Clippings	₱ lb	½ @ ⅝¢
Jute Butts	₱ lb	1½¢
No. 1 Jute Bagging	₱ lb	1¼ @ 1⅝¢

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	₱ lb	9½¢
Light and Tinned Copper	₱ lb	8½¢
Heavy Brass	₱ lb	7¢
Light Brass	₱ lb	6¢
Lead	₱ lb	3½¢
Tea Lead	₱ lb	3½¢
Zinc	₱ lb	2¾¢
No. 1 Pewter	₱ lb	14¢
No. 2 Pewter	₱ lb	7¢
Wrought Scrap Iron	₱ gross ton,	$13.00
Heavy Cast Scrap	₱ gross ton,	9.00
Stove Plate Scrap	₱ gross ton,	6.00
Burnt Iron	₱ gross ton,	4.00
Mixed Bagging	₱ lb	1 ¢
No. 2 Bagging	₱ lb	⅞¢
Hemp Twine	₱ lb	2½¢
Manila Rope	₱ lb	2¼¢
Jute Rope	₱ lb	1⅞ @ 2 ¢
Mixed Rope	₱ lb	¾ @ ⅞¢

Trade Notes.

L. Schwartz & Co., 89 Seneca street, Buffalo, N. Y., are putting out a new catalogue of Wood Mantels, presenting new and original designs. They state that their producing capacity has been increased 50 per cent. over last year and that they are making a special feature of turning out goods according to architects' drawings which are sent in from all parts of the United States.

Duthie & Dagget Tool Company, Indianapolis, Ind., will at once commence the erection of an entirely new plant, 40 x 200 feet, two stories high, of brick, which will be exclusively devoted to the production of all kinds of Cut Gearing, Fine Machine Tools, and their specialty, the new Sensation Tapping and Threading Machine.

S. E. Hingston, 39 and 41 West Broadway, New York, makes a specialty of Show Cases, for which a large market is found outside of the United States. A feature of the construction, which is patented, permits the show case to be taken entirely apart and shipped in a "knocked down" condition, space rather than weight being the greater consideration in export shipments.

A. C. Beckwith, the metal Pattern maker, is now at 62 Mechanic street, Newark, N. J., turning out metal patterns for malleable, gray iron and brass foundries. Among his patrons are many from distant States, secured by the quality of his work.

Wm. Dixon & Co., 84, 86 and 88 Mechanic street, Newark, N. J., make a specialty of Brushes of every description for metal workers' use for cleaning and polishing work, either by machinery or by hand.

The Electrical Piano & Motor Company have just got in operation at their new quarters at 84, 86 and 88 Mechanic street, Newark, N. J. At present they are busy with the Feldkamp Electro-magnetic Ceiling Fan. This fan can be suspended from a hook in the ceiling, and the same wiring and power required for an electric light runs it. The Feldkamp Electric Motor is another of their specialties, made from ¼ of a horse-power up to 75 horse-power, for which claims are made for simplicity, economy and efficiency.

The Newark Wire & Brass Works are a new house at 261 and 263 Market street, Newark, N. J., making artistic Brass Railings and Grills for banks and offices and Wire Work of all description. Since starting they have fitted up the German National Bank, the office of C. Feigenspan and the *Deutche Zeitung* office. An attractive piece of their work is a beautiful display in their own windows. In one is a handsome window tree, made of brass, in graceful design, and hung with an assortment of brass wire Bird Cages. The other has some fine specimens of brass Grill work, grouped around a central design, resting on a brass easel. That these show-windows attract attention is realized in the fact that they have been the means of securing some substantial orders.

The Safety Electrical Company, at 88 Mechanic street, Newark, N. J., manufacture Electrical Supplies, Motors and Generators, for which they claim special features in safety, durability and full power.

The Kiechler Mfg. Company, Cincinnati, Ohio, have secured the contract to furnish all the necessary Galvanized Iron cans used in the artificial ice plant at the World's Fair, the number up to date amounting to upwards of 1100, which number is being constantly increased. The product of the company will be on exhibition in practical operation as well as in the form of a special exhibit.

C. E. Leveridge, 78 Mechanic street, Newark, N. J., makes a specialty of Mill Supplies. He carries a large line of Sterling Emery Wheel Company's wheels in stock, the consumption of these goods being very great in Newark. A line of polishing and grinding machinery made by this company and by the Appleton Mfg. Company, Philadelphia, are handled by him. To meet the needs of his trade he sells belting of four different kinds.

Clarence M. Kemp, Baltimore, Md., advises us that he has from time to time added to his line of Pipe Vises until he is now putting on the market an assortment equal, he claims, to any other manufacturer. Mr. Kemp is intending to add to this line gradually and hopes to offer such a variety and to quote such prices as will insure him a large trade in this department of his business.

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See Standard Lists on Following Pages

CHICAGO, MAY 18, 1893.

Tin—

Straits pigs..... 22¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland and Melyn Grade	IC, 10 x 14	@ $5.75
	IC, 12 x 12	@ 6.75
	IC, 14 x 20	@ 6.75
	IC, 20 x 28	@ 13.10
	IX, 10 x 14	@ 8.75
	IX, 12 x 12	@ 8.75
	IX, 14 x 20	@ 8.75
	IX, 20 x 28	@ 17.50
	DC, 12½ x 17	@ 6.50
	DX, 12½ x 17	@ 8.50
Allaway Grade,	IC, 10 x 14	@ 6.50
"	IC, 12 x 12	@ 6.50
"	IC, 14 x 20	@ 6.50
"	IC, 20 x 28	@ 13.00
"	IX, 14 x 20	@ 8.00
"	IX, 20 x 28	@ 16.00

Coke Plates—Bright.

	Per box.
Coke—IC, 10x14, 14x20	@ $6.00
IC, 14x20, 90 ℔	@ 5.75
IC, 14x20, 100 ℔	@ 5.85
10 x 20	@ 9.00
20 x 28	@ 12.00
IX, 10x14, 14 x 20	@ 7.50
Grade. IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—	
IC. 14 x 20	@ $6.62½
20 x 28	@ 11.25
IX. 20 x 28	@ 14.25
Worcester Brand and equal.—	
IC, 14 x 20..	6.12½@
IC, 20 x 28..	12.25 @
IX, 14 x 20..	7.62½@
20 x 28..	15.25 @

American Tin Plates.

Charcoal Plates.—Bright.

Irondale, A. A.— IC, 14 x 20	$7.00
" " IX, 14 x 20	9.00
" " IC, 20 x 28	11.00
" " IC, 20 x 28	14.00
" " IX, 20 x 28	18.00
" " IXX, 20 x 28	22 00
Florence.—	
IC, 10 x 14, 12 x 12, 14 x 20..	6.75
IX, 10 x 14, 12 x 12, 14 x 20..	8.75
Palma.—	
IC, 10 x 14, 12 x 12, 14 x 20..	7.50
IX, 10 x 14, 12 x 12, 14 x 20..	9.50
Each extra cross $2.00 and 20 x 28 double these prices.	
Brilliant, Theatre Packed, IC, 14 x 20	8.25
Royal, extra, IC, 14 x 20	7.25
Merion, IC, 14 x 20	7.00
Almond, IC, 14 x 20	6.50
Mint, IC, 14 x 20	6.25

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (205 ℔), 20 x 28	@ $12.00
Palm (205 ℔), 20 x 28	@ 12.25
Crescent, IC, 20 x 28	@ 12.50
Crescent, IX, 20 x 28	@ 15.75
Empire, IC, 20 x 28	@ 12 75
" IX, 20 x 28	@ 16.00
Hickory, IC, 20 x 28	@ 15.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20x28	@ $14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.00
" IX, 20 x 28	@ 18.25
Merchant's Roofing (extra coated), IC, 20 x 28	@ $17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@ $21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@ $19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	$23.60
Irondale A:	
IC, 14 x 20	$6.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Westmoreland:	
IC, 14 x 20	$6.25
IC, 20 x 28	12.50
Juno:	
IC, 14 x 20	$5.75
IC, 20 x 28	11.50
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20	$9.50
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20	11.00
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28	19.00
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28	22.00
Neville, Stamped, IC, 14 x 20	6.25
" " IX, 14 x 20	7.50
" " IC, 20 x 28	12.50
" " IX, 20 x 28	15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.50
" IC, 20 x 28	13.00
Knoxall, IC, 14 x 20	6.25
" IC, 20 x 28	12.50
Globe, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
Miami, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
" IX, 20 x 28	15.00
" (Redipped), IC, 20 x 28	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50

	Per box of 56 sheets.
X, 14 x 56	29.50
XX, 14 x 56	32.50
X, 14 x 60	31.50
XX, 14 x 60	35.50

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 16	℔ 2 7-10¢	3 3-10¢
17 to 20	℔ 2 8 10¢	3 4-10¢
21 to 24	℔ 2 9-10¢	3½¢
25 and 26	℔ 3¢	3 6-10¢
27	℔ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished.... ℔ A, 10½¢; B, 9¼¢; dis. 5%
Craig Polished Sheet Steel..... ℔ 8½¢

Galvanized.

List on following page.
Juniata or first quality..... dis. 70&2½%

Copper—

Ingot.

Lake..... 12½¢ @ 13¢
Casting Brands..... 11½¢ @ 12¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 26¢.
Seamless Brass and Copper Tubes.
Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ ℔ additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 20¢ ℔ 100 ℔.
Above 5-16 inch to 3 inch Inclu...35¢
Plain, above 3 inch.....45¢
Plain, 5-16 inch.....47¢
Plain, ¼ inch.....60¢
Plain, 3-16 inch.....$1.00
Plain, ⅛ inch.....$1.50
Fancy Tubing, Brass, to No. 20 Incl.....43¢ ℔
Bronze Tubing, 3¢ ℔ ℔ more than Brass.....

33 @ 40%

Roll and Sheet Brass

List on following pages. 35 @ 40¢.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 ℔ casks.....6¼¢
Less than Casks, ℔ ℔.....6¾¢

Lead—

Soft Pig Lead.....4¼¢
Bar.....4.60@6.50
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....25¢
Sheet.....6¢, dis. 10%

Solder—

½@½.....13¼¢@13½¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....13¢@14¢
Hallett's.....12¢@13¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain	60&10%
1¼ and under, Galv	52½&10%
1½ and over, Plain	70&10%
1½ and over, Galv	60&10%

Boiler Tubes, list Oct. 24, 1892.....65@67½%
Casing, list Nov. 16, 1892.....62½%
Inserted Joints Casing, list Nov. 16, 1892.....47½%
Steel Boiler Tubes.....27½%
Cold Drawn Seamless Steel Tubing...50%

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted	55%
Austin's Corrugated	60%
Gordon & Gilbert's Corrugated	55%
Ritchie's (Galv. Iron only) Cor'd	55%
Ritchie's Spiral Lock Seam, Galv'd	50%
Austin's Spiral Ribbed Pipe	55%
Plain Adjustable Elbows	55%
James A. Miller Bros. (Galv'd Iron only) Corrugated	55%

Furnace Fittings—

Discount from Excelsior Steel Furnace Co.'s list.....50%

Steel Roofing—

Perfection	$3.75 square
Climax	3.50 square
The Lloyd Spanish Tiling	4.50 square

Metallic Shingles—

Cushman's.....$1.25 square
Merchant & Co.'s Spanish Tiles:
Copper, 14 oz.....$36.00 square
Steel, painted.....$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	℔ ℔, 2 ¢
" Brown	℔ ℔, 1¾¢
" " Purple	℔ ℔, 2¾¢
" Ground in oil, B. Red	℔ ℔, 6¾¢
" Ground in oil, Red	℔ ℔, 6¾¢
" Ground in oil, Brown	℔ ℔, 5¾¢
" Ground in oil, Purple	℔ ℔, 6 ¢
Linseed Oil, Boiled, in bbls	53¢
Linseed Oil, Raw, in bbls	50¢
Mineral Paints	2@4¢
Orange Mineral	10¢
Pure White Lead in Oil	6¾@7¼¢
Dry White Lead in bbls	6¾@6¾¢
Red Lead, American	7@7½¢
Red Venetian, English, dry	$1.65@$1.70
Red Venetian in oil; asst'd cans, kegs	8½¢ ; 7¾¢
Spar Varnish, in bbls, ℔ gal	75¢
Spirits Turpentine, in bbls., ℔ gal	35¼¢
Asphaltum, Trinidad Refined, ℔ ton	$15
Tarred Felt, 1 Ply, ℔ 100 ℔	$1.65
Tarred Felt, 2 Ply, ℔ roll 108 sq. feet	$1.50
Tarred Felt, 3 Ply, ℔ roll of 108 sq. feet	$2.00
Roofing Pitch, ℔ bbl. of 300 ℔	$3.20

NEW YORK, MAY 19, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots, ℔ ℔, $0.75
No. 1 (guaranteed to be 98 % pure and over), in ton lots ..... ℔ ℔ .90
Lots less than 1 ton, 10¢ ℔ ℔ additional.

Antimony—

Cookson..... ℔ ℔, 11½¢
Hallett's..... ℔ ℔, 10¾@11¢

Brass—

Planished ..... net
Roll and Sheet..... 35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per ℔.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above 3 inch	45
Plain, 5-16 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu	43

35@40%

Copper and Bronze Tubing—

3¢ ℔ ℔ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¼ to 3½ inches inclusive....17¢ ℔ ℔
Over 3½ to 5 inches inclusive....18¢ ℔ ℔

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ ℔
Over 3½ to 5 inches inclusive....19¢ ℔ ℔

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $2.50 per doz.....10&10%

Conductors—

Corrugated. *Round or Square*—

Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—

Galvanized.....50%

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.....15@25%

Ingot.

Lake.....12¢
Ansonia Grade Arizona.....11¾¢
Ansonia Grade Casting.....11¢
Planished.....net
Sheet and Bolt.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering*, in Current Hardware Prices.

Damper Clips Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

Lap or Slip Joint.....flat, net

Elbows—

Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four-Piece.				
4½	5	5½	6	7 Inch,
$0.78	.87	.90	.99	1.20 per doz..20%

Elbows and Shoes—

Flat Crimp,

Tin.....35%
Galvanized.....35%

Corrugated.

Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—

Black.

	Common American.	R. G. Cleaned American.
Nos. 10 to 16	℔ ℔, 2¾@....	3¾¢
Nos. 17 to 20	℔ ℔, 3 @....	3¾¢
Nos. 21 to 24	℔ ℔, 3¼@....	3¾¢
Nos. 25 and 26	℔ ℔, 3¾@....	3¾¢
No. 27	℔ ℔, 3¾@....	3¾¢
No. 28	℔ ℔, 3¾@....	4¢
American B. H	℔ ℔, 4¢@4½¢	

Russia, Planished, &c.

Genuine Russia, according to assortment..... ℔ ℔, 12@13¢
Patent Planished.... ℔ B, A, 10¢; B, 9¢, 5%
Craig Polished Sheet..... ℔ ℔, 8¼¢

Galvanized.

	B. B.
Nos. 10 to 16	℔ ℔, 4 2-10¢
Nos. 17 to 22	℔ ℔, 4¼¢
Nos. 23 to 24	℔ ℔, 4¾¢
Nos. 25 to 26	℔ ℔, 5¢
No. 27	℔ ℔, 5¼¢
No. 28	℔ ℔, 5½¢
Nos. 20 and 30	℔ ℔, 6¾¢

Filter Joints—

Lee's.....33⅓%

Lead—

American Pig.....4¾¢
Bar.....4¾¢

New York Prices.

Pipe.....6½¢, 20%
Tin Lined Pipe.....15¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ ℔.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ ℔, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ℔, .05¾¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10¢
Fencing, Painted Sheets	20¢
Netting, Painted Sheets	20¢
Door Mats, Galvanized	25¢
Window Guards, Paneled	15¢
Tree Guards, Paneled	15¢

Mitres Eave-Trough—See *Eave-Trough Mitres.*

Paints Oils &c.—

Lead, Amn. White, Dry or In oil:

Kegs, lots less than 500 ℔	7 @ 7¼
Kegs, lots 500 ℔ to 5 tons	6¼@6¾
Kegs, lots 5 tons to 12 tons	6⅜@6⅝
Kegs, lots 12 tons and over	6¼@6¾
Lead, White, in oil, 25 ℔ tin pails, add to keg price	...@ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price	...@ 1
Lead, Red, bbls. and ½ bbls	6 @ 7
Lead, Red, kegs	6¼@7¼
Ochre, American	⅛@1¾
Red, Venetian, American	℔ 100 ℔...1.00@1.10

Linseed Oil:

City, raw	@ .50
City, boiled	@ .53
Western, raw	@ .50

Spirits Turpentine:

In regular bbls	31¼@.31½
In machine bbls	31½@.32

Putty:

In barrels and ½ bbls	.01¾@.01¾
In tins	.01¾@.01¾
In tin cans	.01½@.02½
In bladders	.01¾@.02¼

Roofing Material, &c.:

Asphaltum, Trinidad Refined, ℔ ton	$30.00@$35.00
Asphaltum, Rock, ℔ ton	$11.00
Coal Tar Felt, 1 Ply, ℔ ℔	2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.12½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl	$2.24

Pipe, Drain 50%

Pipe and Fittings, Cast Iron Soil—

Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive .....60@60&10%
Other sizes.....65@55&10%
Cast Iron Fittings, Tarred, sizes 2 to 6 inches ..... 60@60&10%
Other sizes.....65@55&10%

Pipe, Spiral—

Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

For discounts see Current Hardware Prices.

Rivets and Burrs—

For discounts see Current Hardware Prices.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, May 27, 1893.

DAVID WILLIAMS, - PUBLISHER

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CINCINNATI.....Rooms 22-24 Pickering Building.
ST. LOUIS.....Bank of Commerce Building
CLEVELAND.....312 The Cuyahoga

BRITISH AGENCY: The Ironmonger, 42 Cannon street, London, England.

The Convention Season.

Next week is the beginning of the convention season, so far as *The Metal Worker* is concerned, for this year the three trade gatherings in which we are especially interested occur within short intervals in and near Chicago. The stove manufacturers convene May 31 at Chicago, and their deliberations will hardly be well ended before the Master Steam and Hot-Water Fitters' Association come together at Chicago on June 6. A week later, June 13, the National Association of Master Plumbers meet at Milwaukee, so that for three weeks conventions will be the chief subjects of attention in that part of the world. The gatherings this year are likely to be particularly large; but whether they will be particularly profitable from a purely association standpoint is not so clear. The double attraction of the trade gathering and the Chicago fair will undoubtedly bring out a large representation, and the meetings, nominally at least, will be well attended. We think the Plumbers' Association, from a business point of view, has, perhaps, shown more wisdom than the other two bodies; for in meeting at Milwaukee they will have the advantage of a quiet city without the distraction of the World's Fair, and at the same time their members, at the close of the convention, will be in the neighborhood of the show and can easily arrange to spend a few days in Chicago to devote exclusively to sight-seeing. Nevertheless, in spite of the counter attraction of the World's Fair, it is probable that the other two conventions will be well attended and all important business be given the consideration it deserves.

A Worthy Example.

As an incentive for a workman to continue his apprenticeship, after his time has been served, a far-sighted employer, whose business covers several of the trades to which *The Metal Worker* is devoted, has adopted with profit the following plan: A prize in cash is offered, in one or another of the departments, for a method of accomplishing some result with less time, tools and material than are now necessary. One problem, which the employer has solved and tested with the aid of a trusted workman, is now the subject of competition for a ten-dollar prize. To offer a prize for information already obtained, and which could be given without cost, is a novel idea. But the knowledge gained by a workman from the most thorough explanation is insignificant compared with that acquired in the search inspired by such a competition. The natural consequences of the plan is that each competing workman becomes more valuable with each competition. That too many men are economical in the use of common sense is true, and the method of calling it into more active daily use, adopted in the case in hand, has its merit, and the employer confidently asserts that the outlay for cash prizes has been a most profitable investment.

An Ideal Town.

An item of news of considerable interest comes from France. It appears that the problem of providing a suitable central attraction for the great exhibition to be held in Paris in the year 1900 is a matter which has been for some time exercising the minds of the commissioners for that undertaking. Sundry suggestions have been made, including another Eiffel tower, to be double the hight of the original structure, a mammoth telescope and other propositions of a more or less impracticable nature. But all have, for good and sufficient reasons, been rejected. A French scientific journal has, however, come to the rescue with an idea which is said to have been received with great favor. It is, according to the source from which our information is drawn, "to build a town in the exposition grounds to accommodate from 3000 to 5000 inhabitants, and to practically illustrate there the most advanced ideas of construction, heating, ventilating, lighting, water supply, drainage, &c. There are to be real houses, streets, squares, &c., intended for actual use. Electricity is, of course, to play an important part in this ideal town. Light and power for the buildings are to be supplied electrically. There are to be electric elevated and surface street railroads. The sidewalks are to be roofed over with glass as a protection against rain. Model dwellings for workmen, a model school house and a model infirmary are to form part of the town." These details sufficiently indicate the line which it is proposed to follow. Should the conception materialize, such an ideal town would unquestionably form a most important and valuable object lesson, the effect of which could not fail to be good. The expense of the undertaking would necessarily be very great, and this consideration may stand in the way of its realization. It is, however, proposed to meet the outlay, in a measure, by the sale of the whole outfit at the close of the exhibition. We are not informed, by the way, whether it is proposed to stock the town with model citizens and establish therein a model municipality. There is a fair opportunity for instruction of another kind in this field.

Effectiveness of Heating Apparatus.

That there is a wide difference in the effectiveness both of hot-water heating and steam-heating apparatus is a fact known to all well-informed men engaged in the heating trade, but in many instances this difference is accounted for by referring it to anything but the proper cause—namely, defects in the system of piping between the steam boiler or water heater and the radiators. The boiler may be good, the radiators may be the best in the market, yet the result is unsatisfactory. In most such cases it will be found that not enough study and care have been given to arrangement of pipes and radiator connections, to their proper sizes with reference to the surface they are to supply, to their pitch, to the supply in steam-heating pipes of proper relief pipes, to avoidance of traps in pipes, to provision for expansion under the action of heat, and so on to the end of the chapter. These remarks apply to both large and small installments. Some of these defects are not always chargeable to the contractor who puts in the apparatus. Many buildings, large and small, can be found wherein, when first erected, the heating apparatus worked excellently, but in a year or two began to snap and pound vigorously, while its lack of vigor in heating some parts of the building became uncomfortably apparent to complaining occupants. What has happened during the interval between satisfactory testing and the failure to heat successfully is that the building has settled unequally, thus neutralizing, and in many cases often reversing, the inclination given by the fitter to the pipes and canting radiators so that their outflow connections are higher than their inlets. Examine the boiler: you will find there nothing to prevent efficiency. Radiators and valves, water-feeding and draft-regulating appliances may be all in first rate working order. The fault is that the piping has been disarranged because the building has settled, and settled unequally. The "skin builder," not the fitter, is to be blamed in such a case.

Boilers Unjustly Blamed.

It is the usual thing in domestic heating apparatus when defective heating occurs to blame the boiler or the hot-water heater: yet the opinion is here hazarded that among the heating boilers of reputation and which have become widely used careful tests of their efficiency would discover very little difference in the value of their heating surface, foot for foot, when all were put in with equal care and skill as regards the piping. Certainly there would be found no greater difference than is often met with between two boilers of the same design and make, in different buildings in which they have been placed by the same contractor and fitters, and where nothing in the draft of the chimney nor in the construction of the buildings can be assumed to account for the difference. Those who make this kind of heating apparatus, if called to testify could, almost any of them, relate experiences of such inequalities in working. Mr. A, a steam fitter, has put in, say, three boilers of the same kind. The first carried 800 feet of radiating surface. It worked so well that next time, with the same sized boiler, he put in 1000 feet, and "by George! you never saw a boiler work better; it was nothing but play. But on the other job there were only 750 feet of radiating surface and I was afraid the next smaller size would be a little too small, so I put in the same sized boiler again and it won't heat those radiators, do what I may." Every extensive manufacturer of boilers knows this Mr. A, and others just like him. Each of them knows the fault is not in the boiler, and each knows the true cause of the trouble is to be sought in the rule-of thumb way in which Mr. A does his work. On job No. 1 he had fairly good luck and got the whole thing about right. On job No. 2 he did still better. On job No. 3 he blindly stumbled into some mistake. When this is corrected there will be no more trouble with the job. The manufacturer sends some one to set Mr. A right; and as Mr. A is a good customer, having a shop, at which he may be daily found, in almost every county in the United States, the manufacturer considers it advisable to help him out whenever he gets into a hole, so long as he continues to use that line of goods.

Vacation.

BY L. O. AFER.

A few suggestions to the young folks on this approaching season might help some to enjoy it more advantageously than they ever dreamed of. No matter where you live it does not take so much money to go to Washington, Chicago, Niagara, Luray, Manch Chunk, Lake George, Saratoga or the seashore.

The thing of it is to get the money. Well, I know some young folks—clerks, apprentices, and wage-workers—who simply put away so much every week for a vacation fund and in that way $40 or $50 comes easier than would be imagined. No, it is not a waste, for it pays for some of the best education you will ever get and of a kind that will be worth to you far more than it cost; for in the fun you get and the vitality gained you have only a small portion of the return which will keep coming from it as long as you live. A 300 to 500 mile trip takes you a long way from home, and if you have never seen the sea or the mountains you have a treat in store for you. Such a trip brings you among people who are surprisingly different from the folks you know and you will learn many valuable things from them.

If you are a mechanic you will naturally visit the boys in the towns you stop, and in these days of cheap excursions, of unlimited privileges, you can stop off where you please and see the rolling mills, stove foundries, tin-plate mills, or whatever interests you most. It is a good lesson in geography to hunt up a trip or several trips, and a good fellow to help you and one who will be glad to do it, when he has time, is the traveling man that you buy goods from—ask him. If you have never traveled and have no companion for the trip, that does not make any difference; in fact, it is all the more reason for you to begin alone. It will make you think ahead a little and improve your manners, too, for strangers are entitled to a courteous address, and we are all apt to get a little remiss in the treatment of our friends. When you start off remember that the railroad men can and will answer all of your necessary questions and are reliable, and if they have time and you show your genial side they can give you a lot of information about the points of interest you will pass.

Another source of information that will never be denied you if properly addressed is the traveling man, whether he sells lace or lumber, stoves or diamonds. He knows all about the hotels and boarding houses and their prices. By the way, when you start make it a point to keep account of every penny you spend, as it will be almost as good as a diary of the trip, which you might find a task on your time. Go to bed early and get up early while you are off, for then you will see more and can stand more, and you will come home better, continuing to improve after you have been home some time.

Two young fellows went from Philadelphia to Niagara, stopping at Watkins Glen and returning through Manch Chunk and the Lehigh Valley, for $35 each, and were gone eight days. Another young chap went from New York up the Hudson to Saratoga, through Lake George and up Lake Champlain to Burlington, Vt., and across the mountains, down the Connecticut Valley, back to New York, in ten days, for $50.

Many regular traveling men on the road do not spend over $5 a day on an average. When you come home after such a tour of education just put what you have learned into practical everyday use and everybody will be glad you had that vacation.

Mercantile Credits.

It cannot be denied, says *The Iron Age*, that business men are now passing through a crucial period. While the entire situation may in truth be pronounced tranquil, there is evident disturbance and some degree of apprehension. This appears from the frequency of failures among those who are dependent on credit and bank accommodation. Naturally institutions "banking on wind" are among the first to go, sharing the fate of that class of stocks which have been watered to an extreme, and of those speculators and business men whose operations have been unduly extended, because of their inability to borrow money any longer on doubtful collateral. So long as confidence remained they could go on, but when for any reason distrust is excited more margin is called for and then their collaterals are thrown out altogether. Thus, we notice at the present time that there is no lack of loanable funds at a fair rate of interest where the security is undoubted, but collaterals are scrutinized and the financial standing of individuals and firms is the subject of inquiry. Those who rely on note brokers for accommodation are especially exposed.

This undesirable condition was brought about primarily, it will be remembered, by distrust respecting the ability of the general Government to maintain specie payments in the face of an extraordinary foreign demand for gold and declining receipts. The Sherman Silver law was recognized as the chief impediment in attempting to uphold the standard of value. Then followed the collapse of industrial stocks and the enforced assignment of prominent individuals or firms who were in some way involved as borrowers. We have later, in quick succession, the failures of "strings of weak banks," mostly in Illinois and Indiana, which have been doing business on corrupt principles, and which Senator Sherman hastens to say, contrary to report, he unhesitatingly condemned.

Among New York bankers the troubles here referred to are viewed with unconcern, as they cannot in any proper sense be taken as an index of general business. Banks in the association are in excellent condition, as shown by the last weekly statement. There was a further contraction in loans, equal to $5,000,000, and the result of all the changes was a gain of about the same amount in reserve, which now stands at nearly $18,000,000 in excess of legal requirements, against less than $16,000,000 in the corresponding week a year ago. The contraction here observed does not, a bank official explains, signify a contraction of credits, but is the result of liquidation mainly connected with stock operations. Money, as before remarked, is in good supply. Another good feature is the improved condition of the Government Treasury, there having been last week a gain in the gold balance of upward of $2,000,000. The Treasury situation excites no further apprehension.

The latest cause of concern is the sweeping disaster that has overtaken banks in Australia, wiping out large amounts of British capital and increasing the demand for gold.

ROOFING AND CORNICE.

Laying Steel Roofing.—I.*

BY L. S. BONBRAKE.

Steel sheets as a material for roofing have been in active demand since the idea originated to use them, some seven or eight years ago. Previous to that iron sheets were in use. While steel has not had the same time test as ordinary charcoal iron, which has been used for roofing over half a century, yet so far as used it has proven more satisfactory from the fact of its greater tenacity, being smooth and soft to work. In the early days of its existence it was received with doubt and considerable misgiving, and was but little known except in the immediate neighborhood of the pioneer cities of its manufacture—Cleveland and Cincinnati, Ohio. Garry of the former and Scott of the latter place can be mentioned as fathering this industry, which has reached such a wonderful degree of magnitude as to surprise every one familiar with the iron business.

Starting in small degree, the steel-roofing industry is now the mainstay for over one-half the rolling mills in the land, and factories have increased from a few in Ohio until they are now found in every State, reaching from the Atlantic Ocean to beyond the Mississippi River; and, starting as a shed covering, steel now protects the interior of the most handsome places in the great centers of civilization.

The day to question the durability of steel as a material for roofing is past. Its advantages are numerous and so clear that many sturdy advocates for other materials have discarded old prejudices and taken it up. The business is near its zenith and can be continued for time indefinite if quality of material is given proper attention by the manufacturer of roofing, rather than increased sales by a low price. If prices are cut let quality be known, as it must necessarily result in detriment to quality, and one roof of poor quality in a neighborhood not only injures the firm making it, but injures all manufacturers to an extent ten good roofs will not overcome.

Steel, without metallic coating, of whatever sort, and rolled in lengths about four times that of ordinary terne-coated sheets,* can be converted into roofing much cheaper than the latter, even when of heavier gauge, and the double-lock cross seams now in use prevent trouble at that point.

PAINTING ROOFS.

It is a fact indisputable that upon the proper care in painting ordinary metallic roofs is based all hope of durability. Too much care cannot be taken in this matter, as upon it almost entirely hangs the longevity of terne or steel roofing. It is not the frequency of painting so much as the quality of and manner in which the paint is applied that gives the desired protection. Painting too often will make a coat or coats too thick to allow of contraction or expansion to conform with that of the sheets, and results in cracks and open streaks, which form a recess in which soot, dirt and dampness work havoc with the roof material.

We find a good rule, and one largely followed by experienced workmen, is to paint the roof immediately after it is laid complete. If a roof is laid and painted in the fall, the following spring it should be given another coat, or the second coat should go on not later than six months after the first. In one year from the second, the third coat will have given it three in 18 months, after which painting every four or five years will give sufficient protection to warrant its lasting fully or over half a century. While graphite is being used, and highly recommended, and has proven an excellent "filler" or body, yet iron oxide is more commonly used than any other material (yellow ocher excepted, in some localities). A successful manner of mixing, when the oxide of iron has not already been ground to a paste, is to pour ½ gallon of pure boiled linseed oil over 10 pounds of the dry metallic oxide some little time before wanted for use. When thoroughly soaked to a paste use 7 pounds to 1 gallon of oil. If the weather is damp or unfavorable use a small quantity of pure turpentine dryer to help "tack" the paint and prevent creeping.

A matter of vital importance too often overlooked when repainting a roof is having the roof clean. In many instances where the roof has not given full satisfaction, its failure to last as it should has been traced to neglect in getting the surface properly prepared to receive the paint. Soot, dirt, scales and blisters have been painted over with a reckless disregard of time wasted and labor lost that is to be deplored. All of these are detrimental to the durability of the roof, and should be removed by scraping and sweeping before paint is allowed to be used. Don't use a broom or whitewash brush to paint with. If worth painting at all, do the work well. Use a good 4 or 5 inch hair brush and see that the seams and uneven places are thoroughly coated as well as the smoother surface of the metal.

THE ROOF FOUNDATION.

The question is often asked: "What is the better surface on which to lay a metal roof—sheeting or lath?" Actual tests under the same favorable surroundings have proven beyond question that under any circumstances close sheeting is preferable to open sheeting or lath.

It is especially noticeable when a roof is laid over an engine, or a room in which steam is escaping, and numerous instances are cited where the body of the roof has given

Laying Steel Roofing.—Fig. 1.—Roof Fastener.

out entirely between the lath, while that part immediately on the lath remained intact.

To prevent dissatisfaction and provide for the durability of the roof under trying conditions, as mentioned, tight sheeting covered with felt or rosin-sized paper should make the foundation for the metal. This manner of treatment has proven entirely satisfactory and durable.

A metal roof should not be laid over old shingles, which is often done in the Eastern States, the result being invariably poor. It is impracticable, unworkmanlike, and withal disastrous, and in many instances the cause of fire, for the shingles become as dry as punk under the metal and are readily ignited. Moreover, for firewood, they are well worth the time taken to remove them. Aside from its rough appearance a roof laid over old shingles is very uncertain in its anchor fastening and invariably insecure, as the workmen are liable to drive nails in the extreme edge of lath instead of center, and may, in fact, miss it altogether.

ROOF FASTENERS.

At times annoyance is experienced to some extent by the rattling of steel roofing, caused by the sheets being anchored loosely and not bound down snug and tight to the sheeting or lath, or by suction in rain and wind storms, causing vibration, lifting the sheets at their centers, and again dashing them against the sheeting. When a roof of this sort is found, and the noise is objectionable, it can be remedied by using a fastener, as shown in A, Fig. 1, and adjusting one or two to every sheet on the roof.

The fastener is made by using a heavy 1-inch wood screw and 1-inch cone-shaped metallic cap, with 1¼-inch rubber or lead washer. A hole should be punched through the center of each sheet of such size as will admit the screw by forcing it. The washer is placed around the hole and the metallic cap screwed down tight upon it, as shown by B, Fig. 1. When further security is desired the fastener may be used in the center of the cross seams, between the standing seams, but when so secured it is recommended not to force the cap down too tight. While there is but slight danger of leaks at points of fastening, additional protection can be had by covering the whole fastener with a good roof cement, shaping the cement to a point, as a cone.

* Copyrighted 1893, by L. S. Bonbrake.

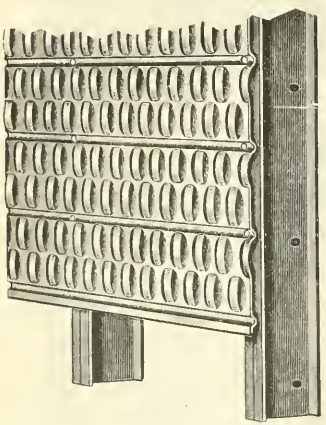
When cement is used upon a roof it is advisable to moisten with paint the surface to be cemented, and after the cement has been applied it should be smoothed over with paint mixed as thick as can be used with the brush. When trouble is experienced with cross seams connecting the steel roofing proper to tin or galvanized iron gutters, and the roof is of such pitch that cementing is deemed unsafe, the steel may be soldered to the gutter material. This may be accomplished by first filing, scraping or sandpapering the edges of the steel bright, after the hem or hook has been formed. When bright, they can be readily tinned by the use of strong muriate of zinc and ordinary solder; when tinned the two metals can be solidly united, after which the seam should be thoroughly cleaned and oiled to prevent corrosion caused by the use of the acid.

It will be found that this work, as explained, is not difficult or tedious, as it has been done with the result entirely satisfactory. In fact, small holes on any part of the roof may be tinned and soldered, but cement is preferable.

(To be continued.)

Columbia Steel Lathing.

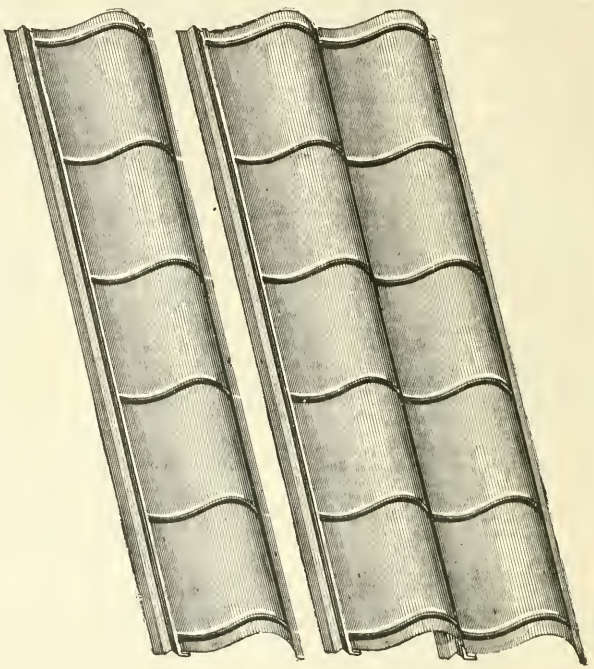
A form of fire-proof construction to which the attention of the building trades is being invited by M. H. Crittenden & Son of Minneapolis, Minn., is based upon the use of what is known as patent Columbia steel lathing nailed to metal studding composed of channel irons. The Columbia steel lath has heavy round ribs running the full length of the sheet, thus giving great strength and stiffness. These ribs are 3¾ inches apart, and between them are slots arranged with depressed lips forming an incline upon which the mortar easily slides through to the back, where it forms a lock or clinch around the strap between the depressed lips. The size of the sheets is 27½ x 48 inches. The partition is formed by the erection of sheet steel studs made of two pieces of channel or ⊔-irons placed back to back and securely riveted together. The Columbia metal lath is then nailed to this studding by the use of barbed wire nails which are driven through the lath and into the crevices between the two channels forming the studding. An idea of the appearance of the lathing when in position on the metal studding may be gathered from an inspection of the illustration presented herewith. The manufacturers state that the lath is securely held in place by reason of its rough surface and the hold which the two sides of the channel irons has upon any object forced between them. The first building in which this form of fireproof construction was employed was the Hampton Arms, an apartment house in Minneapolis, in which was placed over 70,000 square feet of curved corrugated steel floors, 32,000 square feet of patent steel ceilings lathed and 138,000 square feet of steel partitions covered with patent Columbia steel lathing.



Columbia Steel Lathing Attached to Metal Studding.

Sheet-Metal Roofing Tile.

Fred. F. Bischoff & Co., 24 and 26 West Lake street, Chicago, have brought out a new style of sheet-metal roofing tile, which is illustrated herewith. It is pressed in sections measuring 8 x 44½ inches, which are easy to lay. The construction of this tile is such that the fastening is covered with at least one inch seam lock, which, the manufacturers state, makes leakage or the rusting of nails an impossibility. Heat and cold will not affect it, as ample provision is made for the contraction or expansion of the metal. This tiling is made of the best quality of block steel, English or American tin plate, copper or galvanized iron, as required; and the firm are also prepared to furnish all necessary ridge cresting, hips and valleys. The tin and steel tile receive a heavy coat of paint, resembling the color of the original Spanish tile, making a very handsome roof. A strong argument put forth in favor of this tiling as compared with clay tiles is that the latter require double the amount of roof timber, which is an important item in the cost of building. The Texas, New York and Chinese buildings at the World's Fair, also the extensive and beautiful Fisheries Building, are covered with this tile. A fine illustrated catalogue, describing the tiling and rock-face siding, has just been completed by the firm and is now being distributed.



Sheet-Metal Roofing Tile.

FLASHINGS.

The Canton Steel Roofing Company, Canton, Ohio, have an exhibit at the World's Columbian Exposition located in the northwest corner of the Manufactures Building, Section H, where they will be pleased to meet their customers and friends. They explain, however, that on account of the fire from which they suffered and the small space assigned to them, their exhibit is not as elaborate as originally intended. The Canton Steel Roofing Company have just moved into their new plant, which replaces the works that were destroyed by fire last December.

E. T. Barnum, Detroit, Mich., has just issued a new 120-page spring catalogue, showing improved and artistic designs, covering almost every conceivable form of wire and iron work for building and decorating purposes, such as roof cresting, weather vanes, tower ornaments, iron and wire fences of every description, reservoir vases, lawn settees, chairs, statuary, wire arches and trellises, fountains, summer house, bank and office railings, grilles for interior and exterior decoration, window

guards, vault doors, balcony railings, iron stairs, columns, iron bedsteads, jail cells, stable fixtures, hitching posts, grave guards, sidewalk lights, wire signs, elevator inclosures, folding gates, &c. Mr. Barnum has been established for nearly 30 years, and is constantly adding new designs to his catalogue, which is gotten up with a view of meeting the special requirements of the trade. It will prove interesting and valuable to all who receive it, and may be obtained upon application.

BIDS will be received at the office of the Supervising Architect, at Washington, D. C., until June 9 for all labor and materials required for cut stone and brickwork, iron and wood floors, ceiling and roof construction, roof covering, skylight, &c., for the superstructure for the United States Post Office at Fort Worth, Texas, in accordance with drawings and specifications, copies of which may be had at the office of the Supervising Architect, Washington, or at the office of the Superintendent, Fort Worth, Texas.

THE VALIDITY of the new Chicago building ordinance is to be tested in the courts by the Cornice Makers' Union. This ordinance provides that bay windows and light shafts must be made of non combustible materials, and is claimed to have been passed in the interest of bricklayers and makers of fireproofing tiles. The cornice makers declare that if the ordinance in its present form is permitted to stand, several hundred men will be thrown out of work in the Chicago shops. They have employed counsel for testing the question by suit.

SEALED PROPOSALS will be received at the office of the Supervising Architect, at Washington, D. C., until June 20 for all the labor and materials required for cut stone and brick work, iron and wood floor, ceiling and roof construction and roof covering for the superstructure of the United States Post Office at York, Pa., in accordance with the drawings and specifications, copies of which may be had at the office of the Supervising Architect, at Washington, D. C., or at the office of the Superintendent, at York, Pa.

BOWERS, GALPIN & CO., Binghamton, N.Y., will not exhibit at the Chicago exposition, owing to an unfortunate mishap to their machinery, by which they were unable to get their display ready in time. They advise us that they successfully turned out a Trough 144 inches long, an achievement which they claim has never before been accomplished in seamless lengths.

A commercial writer, commenting upon the recent collapse of the industrials and the disfavor with which investors regard monopolies, says: "It is now better appreciated than at the time of their conception that these concerns were chiefly organized for speculative ends, and that the much-vaunted economies of combination were usually used as mere pretexts to aid in the marketing of enormous quantities of watered stocks."

The *Market Record* of Minneapolis indicates that the spring wheat crop may equal that of last year, and that the total crop may be expected to reach 440,000,000 bushels, with 135,000,000 bushels available for export. But at this date there are very scanty data for estimating the spring wheat crop.

Prize Competitions

$25.00.

Prize Competition No. 25.

SUBJECT:

Show-Window Display.

The subject of attractive show-window display is one requiring careful attention as an inexpensive and sure method of attracting and securing trade. This competition is designed to draw out suggestions as to the best methods of displaying goods, which may, if desirable, be illustrated by sketches and photographs. Prominent among the points which may be touched upon are the following:

1. The object of window display;
2. How this object may best be accomplished;
3. Kinds of goods especially suitable for window display;
4. The frequency with which displays should be changed;
5. Treatment of season goods;
6. To what extent goods in operation may be shown;
7. Suggestions for special and unique designs;
8. Arrangement of stands, shelving, &c., in windows;
9. Errors to be avoided in window display.

This competition will remain open until June 24, 1893.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which, in the judgment of the Committee of Award, are most suitable for publication and of the most general interest

We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than June 24, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96-102 Reade street,
New York.
Prize Competition No. 25.

The Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 23. Closing May 27.

Three or more Subjects for Prize Competition.

No. 24. Closing June 3.

Short Methods of Figuring Discounts.

No. 20. (Reopened.) Closing June 10.

A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

No. 25. Closing June 24.

Show-Window Display.

Another subject will be announced in our next issue.

OBITUARY.

N. B. HUSSEY.

Those who have attended the meetings of the National Association of Master Plumbers will be shocked to learn of the death of N. B. Hussey of Omaha, Neb., whose face was a familiar one at the conventions. Mr. Hussey, who died at Omaha on May 11, was born at Freedom, Maine, in November, 1836, at which place he resided until 12 years of age. He then removed with his parents to Springfield, Mass., where he remained eight years and laid the foundation of his education. Then going to Boston and completing his education, he returned to Springfield and engaged in the insurance business, which he followed during the next two years. He then took charge of the interests of the Connecticut River Railroad at Northampton, where he remained 12 years.

At the end of this time he engaged in the steam-heating and hardware business in Northampton and eight years after in the work of building waterworks systems for cities, putting in plants at Holyoke, Northampton and Florence. His health failing, he removed in 1882 to Minneapolis, Minn., and in 1886 to Omaha, forming here the Hussey & Day Company, of which he was president until the day of his death.

For the past five years he has been president of the Omaha Master Plumbers' Association and for the past three years president of the Builders' and Traders' Exchange of that city. He was also a member of the Executive Committee of the National Association of Builders, and was quite prominent in politics as a member of the Republican party. He had also been, when in Massachusetts, a member of the National Republican Committee. He was married in 1857 to Margaret Bliss of Northampton, Mass., who survives him and by whom he had five children, three of whom are living.

According to a London journal, the results of the official surveys recently made by order of the Government of Japan show that the coal fields in the island of Yezo are likely to prove of great commercial and industrial importance to that country. The workable coal beds are estimated to contain at least 150,000,000,000 tons, or about two-thirds as much as those of Great Britain. The coal hitherto obtained is of somewhat uneven quality, but is declared by the British consul to be "all marketable."

WORLD'S FAIR NOTES.

A Whaleback Passenger Boat.

Capt. Alexander McDougall's scheme, which was thought chimerical when announced, has been realized, and a great passenger whaleback now runs on Lake Michigan between the business center of Chicago and the World's Fair docks. It is named the "Christopher Columbus." It arrived at Chicago on the 18th inst., making a speedy trip from West Superior, where it was launched. The "Christopher Columbus" is the first passenger whaleback ever built. Besides this, it is the longest vessel seen in the port of Chicago. It was built for lake service in a lake shipyard, and is the perfection of a new idea in shipbuilding. A few years ago Captain McDougall evolved his whaleback idea and freight steamers were successfully launched. The new vessel looks almost as queer to modern eyes as the old high-decked vessels of Columbus' time. Three decks rise above the whaleback and tower in the air like the circles in an amphitheater. The vessel was begun September 6, 1892, and completed and launched December 3, 1892. The monster steel cylinder is 362 feet long, with a beam of 42 feet and a depth of 24 feet. Triple-expansion engines with three cylinders, 20, 24 and 70 inches in diameter, lie in the torpedo-like steel shell. With 2600 horse-power the whaleback rides the waves at the rate of 20 miles an hour. During the voyage to Chicago the vessel went at the rate of 18 miles an hour. Heavy seas were met on the trip. The whaleback did not cut through them, but rode over them. The bottom of the cylinder has nine water-tight compartments for a water ballast of 730 tons, which serves to keep the vessel in an upright position. Seven turrets support the decks. There are five decks altogether, including the main, the promenade, the turret and the hurricane. In the cylinder is another deck, where the restaurant and dining room are to be managed.

Along the promenade deck runs the grand saloon, 225 feet long by 60 feet wide, with a ladies' cabin aft. The saloon will likely make passengers forget that they are riding on the lake. The apartments are handsome and luxurious throughout. No one could wish for a prettier room. Cushions soft and easy cover the chairs, the decorations are artistic, and the view from the windows superb. In the center of the saloon rises a fountair which trickles down a crystal globe into an aquarium below. On the windows designs of ships, from Noah's ark to the whale back, are engraved. The captain's cabin, the wheelhouse and the officers' quarters are on the promenade deck. Everything is painted white down to the water line.

The arrangement of the decks above the cylinder is unique and gives the seasick passenger a sense of comfort and safety which is absent on other big passenger boats. One can stay far out of reach of the waves and breathe the fresh air freely. Passengers are not huddled together below deck in a stuffy atmosphere and within sound of the waves as they dash against the sides of the vessel. The waves of Lake Michigan will have free access to the deck of the cylinder, but they will hardly climb higher.

New and Old Tracks.

An important attraction was added to the exposition last week by the opening of the exhibit of the Pennsylvania Railroad Company, which is an independent feature located between the Hygeia Building and Cold Storage. A number of prominent railroad officials were present and an abundance of handsome bunting was unfurled, but there were no formal ceremonies.

The space assigned the Pennsylvania Company is 400 x 150 feet, and the exhibit is partly outdoors and partly housed in the main hall, 100 x 40 feet in size, of a model railroad station, 140 x 40 feet in size, built of staff and of classical and beautiful architecture. The exhibits relate only to the transportation lines comprising the Pennsylvania Railroad system, and its design is not only to perpetuate the early history of the lines merged into or associated in interest with the Pennsylvania Company, but also to place permanently on record the results that have attended the efforts of the management's advanced methods.

One of the outdoor exhibits is a section of a four-track standard railroad, 100 feet in length, laid with standard 100-pound rails, or 3333 pounds to the rail, with frogs, switches, stone ballast, ditches, signals, and overhead foot bridge. The rails are 100 feet in length. The track is ballasted with crushed stone and drained on each side by drains made of concrete. The signal tower is equipped with a special Westinghouse electro-pneumatic machine, which controls the two switches and six signals governing the track.

On this splendid track and in strange contrast with it, is exhibited the old locomotive "John Bull," with pilot and tender complete, which was first put in service on the Camden & Amboy railroad November 12, 1831, and which is the oldest complete locomotive in America. It was still able to haul to the exposition the two Camden & Amboy passenger coaches of the style of 1831, leaving New York April 17 and arriving in Chicago April 22. On the track are exhibited also the two special gun cars on which the two huge Krupp guns of 10 inch and 16½ inch bore were transported. The guns weighed 140,000 and 285,000 pounds respectively and the gun cars 113,300 and 175,000 pounds, making totals of 253,300 and 460,000 pounds. Reproductions of the guns are mounted on the gun cars.

Still more interesting, if possible, is a collection of old railroad material sent in a special car from the Smithsonian Institute in charge of J. Elfreth Watkins. It consists of a number of specimens of articles in use as far back as 1830 or 1831. Old signals, wooden engine and car wheels, strap rails, and primitive switches and crossings are exhibited, but the most interesting article is a section of track laid in 1831 on the Camden & Amboy Railroad. The rails are about the size of those used in mines for small hand cars. The ties are blocks of granite about 2 feet wide, laid three to each rail. The stone sleepers are provided each with two holes, or, when they come at the joint of two rails, with four holes. In these holes were driven locust wood plugs and the rails were fastened down by spikes driven into the locust plugs. When they fastened a rail in that way in 1831 it was expected to stay. The rails themselves were held together by single fish plates at each joint, to which they were riveted with hot rivets. This was to make the track very rigid, the possibility of rails wearing out never occurring to railroad men in 1831, since at that time none had ever given out.

These valuable relics of some of the first railroad work done in this country will be returned to the Smithsonian Institute at the close of the exposition.

The indoor exhibit consists of: 1, panels, relief maps and charts; 2, models; 3, canal boats and appliances; 4, special machinery; 5, monuments; 6, safety appliances, precautions and uniforms; 7, floating equipment; 8, switches and frogs; 9, tracks and signals; 10, bridges; 11, relics, numbered from 36 to 762, in cases; 12, relics, numbered from 373 to 463, in frames; and 13, views on the Pennsylvania lines, numbered from 2529 to 2590.

Another Disagreement Over Awards.

The agricultural machinery exhibitors at the exposition wrestled with the question of awards at the Grand Pacific last Friday night. H. C. Staver of Chicago, president of the Chicago Vehicle and Implement Club, presided. John Boyd Thacher, chairman of the Executive Committee on Awards, explained the methods of judging. There would be no graded prizes. Every meritorious exhibit would receive a medal and accompanying diploma. There was no fund for field trials of agricultural implements. The judging would have to be done on the floor.

Mr. Manning of Syracuse, N. Y., said that the plow exhibits were not ready for field trials, and judging on the floor was an absurdity.

Colonel Dodge of Dixon, Ill., as a representative of the Western Plow Association, protested against any awards whatever, declaring that no man could be secured competent to pass upon plows.

Mr. Robie of Indiana declared there was not a man on earth competent to pass on engines and thrashing machines on the floor.

After Mr. Cox of Illinois suggested that exhibitors could withdraw from the judging, a discussion was had as to the advisability of all withdrawing. A vote showed 20 for withdrawal, 15 against, and 25 not voting.

Chief Buchanan of the agricultural department suggested that the various lines represented get together and agree upon what plan they should pursue. Unless all stood out of the judging he would be compelled to report to the judges those who desired to stand for the awards.

Hon. James Martin, M. P., and special commissioner from New South Wales on machinery and agricultural implements, then addressed the meeting by invitation, and complimented the American agricultural implement exhibit as a revelation.

A committee consisting of Messrs. Manning, Cox, Farie, Bevington and Francis was appointed to report at another meeting, to be held at the Grand Pacific next Friday night, a form of permanent organization for the agricultural implement exhibitors.

The Photographic Concession.

The representatives of trade papers and other illustrated periodicals have been seriously inconvenienced by the restrictions placed on them in securing photographs of exhibits. They have been obliged to apply to Official Photographer Arnold for all work in this line. A slight loophole was offered in the way of making special photographs by a rule permitting small hand cameras to be carried on the grounds at a tax of $2 each per day, to be paid to the official photographer. Complaints of high charges and slow service rolled into

headquarters, until finally the National Commission made the matter the subject of official inquiry. The Special Committee appointed last week to inquire into the concession of Mr. Arnold, the official photographer, made its report on Friday. Members of the committee said that no records of the concession had been found in the Director-General's office, and it was a puzzle to them when Arnold and his partner got the authority to levy a tax on persons carrying cameras in the grounds. The following resolutions were adopted:

That all publishers of illustrated papers or periodicals shall be permitted to send their photographers or artists upon the exposition grounds and in the exposition buildings to take pictures for publication in their respective papers or periodicals under the rules already adopted, provided that said pictures shall be used for no other purposes.

That when publishers elect to employ Mr. Arnold, the official photographer, to make negatives for them they shall be made at a reasonable price without unnecessary delay, and that said negatives shall be the property of said publishers after they have paid for them and shall be in their possession, provided, however, that neither of the said negatives nor any print therefrom shall be used for any purpose other than for publication in the periodical or paper for which it is made.

That the Director-General is hereby directed to enforce the rule adopted by the commission and found upon page 138 of the official minutes of the seventh session of the said commission, which is as follows: "Sketches, drawings, photographs and other reproductions of articles exhibited will be allowed only upon the joint assent of the exhibitor and the Director-General. But photographs may be taken upon the grounds and general views of portions of the interiors of the buildings may be made by the approval of the Director-Geueral."

The committee was not discharged, but instructed to learn all possible about the photographic concession and report at its earliest convenience. There is now some hope that the fine exhibits at the fair can be adequately shown in periodicals. The difficulty of securing prompt service and the high cost of the official photographs were serious impediments in the way of securing desired illustrations.

Increasing Attendance.

Fine weather last week served a twofold purpose. It greatly increased the attendance and decidedly hastened the work of getting the grounds and buildings in better order. Although there are plenty of exhibits in every department which are not yet in proper shape and may not be for two or three weeks, the exposition is now well worth viriting. It will be necessary for visitors to bear in mind that some of the States have exhibits of a most interesting character in their own special buildings. Many things are likely to be overlooked on this account, merely because they are not in the principal exposition buildings. The rate of admission for children was fixed the past week at 25 cents for those 6 to 12 years old, while those under 6 are admitted free.

A new market is said to be likely to open for the slate trade. The report comes from France of the discovery that slate makes an excellent electric insulating material, numerous experiments proving, according to a well-known French technical journal, that the substance can in many cases replace such expensive insulators as glass, porcelain, ebonite, vulcanite, &c.

An electric towing vessel has recently been put into operation on the river Seine, near Paris, with marked success. A magnetized pulley of novel design is used, for which great efficiency is claimed.

New Publications.

VENTILATION AND HEATING. By John S. Billings, A.M., M.D. Published by the *Engineering Record*. 1893. Price $6.

This book of 500 pages, with its 210 illustrations, must at once take rank as the most comprehensive American work upon the subject. Written, as it is, for the architect, engineer and non-professional man, the author has, upon the one hand, avoided a treatment too scientific, and on the other, has made his descriptions and explanations perfectly simple, without rendering them wearisome to the technical mind.

An introduction upon the utility of ventilation is followed by an exceedingly interesting chapter on the history and literature of the subject, with which is incorporated a list of the more important works relating to ventilation, dating from the earliest in 1714. The atmosphere, its composition, physics and humidity, the tension of vapors and the effusion of gases, are treated in chapter 3, followed by a long dissertation upon carbonic acid, accompanied by what must impress the ordinary reader as an excessive number of separate reports of air analyses. Neither the utility of ventilation nor the efficiency of the means employed can be clearly appreciated without an understanding of the physical and chemical aspect of respiration. The pages given to this division of the subject are most comprehensive and treat also of organic matter, bacteria, offensive and dangerous gases and dust in the air, as well as of sewer and soil air.

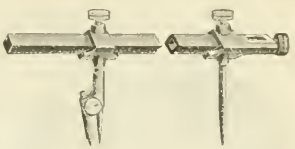
The relation existing, between moisture in the air and successful heating and ventilation is one not usually comprehended, although here clearly explained. The matter of actual quantity of air required for ventilation always stands open for discussion, and Dr. Billings will always be found urging increased air supply; for no one appreciates more fully than he how far is the large majority of the buildings of this country from a condition of healthful ventilation. His opinion of the commonly accepted basis of school house and similar ventilation, viz., "30 cubic feet per person per minute is definite and decided. He writes: "Thirty cubic feet of air per minute in rooms continuously occupied, will not secure good ventilation; nor is an architect or engineer justified in preparing plans upon the basis of such an amount of supply." Further on he shows the desirability of 45 to 60 cubic feet per minute.

A treatise upon the action of aspirating flues and chimneys, the laws governing the same, the influence of accellerating coils, fans and blowers, together with a description of the apparatus and methods of testing air velocities and volumes, and the determination of the presence of carbonic acid, combine to form chapters 8 and 9; while the succeeding chapter is given up to a very complete exposition of the methods of heating. Stoves, furnaces, fire places, steam and hot water systems are all presented with numerous illustrations.

That the source of air supply, its filtration and its proper tempering are of utmost importance, is clearly indicated by what follow, while the chapter upon foul air shafts and outlet cowls dispels some popular fallacies regarding the efficiency of many chimney and vent flue tops. Some interesting cuts of ancient methods of fan construction and mine ventilation are presented in the chapter on mine ventilation, in connection with a table of tests upon mine fans. The remainder of the book, 250 pages, is devoted to very complete descriptions, with excellent illustrations of actual examples, of systems in operation in various classes of buildings. The hospital, with its absolute requirements of the very best in the way of ventilation, is dealt with most exhaustively, while legislative halls, theaters, churches, schools and dwellings are discussed in as many chapters. A chapter on the ventilation of tunnels, railway cars, ships, prisons, stables, shops and sewers, closes the work. The remarks upon shop ventilation are certainly open to criticism, in that no reference is made to the present common method of shop heating and ventilation by the blower system. Throughout, the subject is treated in an extremely simple and straightforward manner, devoid of evidence of bias, and in just the comprehensive form desired by the inquiring mind, no matter what its previous knowledge. A very complete index adds greatly to the value of the work.

Draftsmen's Trammel.

The accompanying cut represents a tool recently put upon the market by Hurley Brothers, 223 State street, Hartford, Conn. The trammel is designed for the use of pattern makers, draftsmen, &c. The tool is 14 inches in length, well finished and nickeled, and



Draftsmen's Trammel.

is referred to as having a beam of square brass tubing, which is very light, and points made from best tool steel and hardened; it also has a pencil attachment. The makers remark that after placing the attachment in the same radius as the steel point it can be changed from one radius to the other without changing the relation of one to the other. Attention is called to the fact that the points can be set approximately when brought down with fine adjustment at the end. At an additional cost an extension of 14 inches with a clamp is furnished when desired.

It is estimated that the capital invested in American natural-gas fields amounts to over $100,000,000. The following notes collected by a statistician as to the development of the use of this fuel are of interest: In 1821 natural gas was first used for illumination in Fredonia, N. Y.; in 1838, for heating purposes, at Findlay, Ohio; in 1841, for salt making, in West Virginia; in 1860, for steam production, at Oil Creek, Pa.; in 1870, for domestic fuel, shore of Lake Erie; in 1873, for iron making, at Leechburg, Pa.; in 1883, for plate-glass making, at Creighton, Pa., and in 1883 it was first piped for general supply in Pittsburgh. Natural gas was discovered in large quantities at Findlay, Ohio, in 1884, and in 1886 the large fields of Central Indiana were first hit upon.

COPPERSMITHING.

Art of Coppersmithing.

XLII.*

DYERS' COPPERS.

Dyers' coppers, as compared with some others, are not a difficult job, which will be readily seen by referring to Fig. 466. A dyers' copper is made with a cylindrical body and a segment of a sphere for a bottom. The sides are usually made in two pieces, and the bottom in one. These coppers may be made with a broad or narrow brim, similar to that of a tallow copper; or they may be supplied with a lead apron to catch and convey the drip and slopping, which is always a contingent circumstance in the dyers' art. Let us make a dyers' copper to hold 150 gallons' American standard. Now, we have learned by experience that the easiest way to build this vessel is to make the bottom one-fourth the depth and the sides three-fourths, without the brim, although this, like all others, may be made any style or shape to suit the taste or convenience of the purchaser. But we will suppose the sides needed are three-fourths the depth and the bottom one fourth. An American gallon equals 231 cubic inches, and 231 × 150 = 34,650, or the number of inches in 150 gallons, and we have 0.7854, which represents a cylindrical inch; then $\frac{0.7854}{4} \times 3 = 0.58905$, or $\frac{3}{4}$ cylindric inch. The value of a segment of a sphere whose hight is one-fourth its diameter is 0.08181, and adding this to the value of $\frac{3}{4}$ cylindric inch we have 0 58905 + 0.08181 = 0 67086, the value of the figure which represents a dyers' copper. Then 34,650 ÷ 0.67086 = 51,649.964, and extracting the cube root of this last result we have

* Copyrighted, 1889, by John Fuller, Sr.

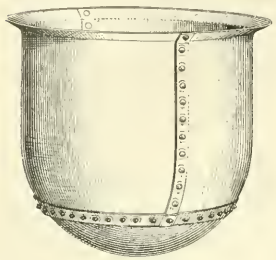


Fig. 466.—Dyers' Copper.

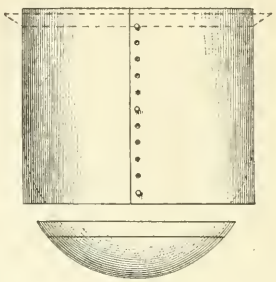


Fig. 468.—Preparing to Turn the Brim.

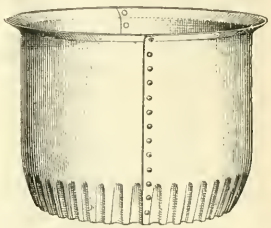


Fig. 469.—Drawing in the Sides to Fit Bottom.

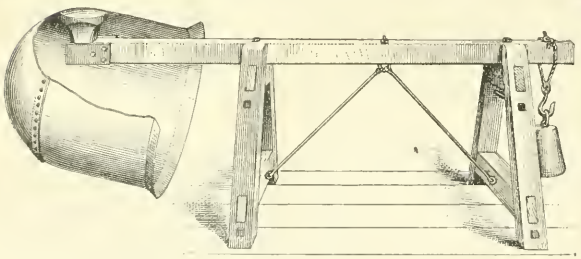


Fig. 470.—Planishing Dyers' Copper.

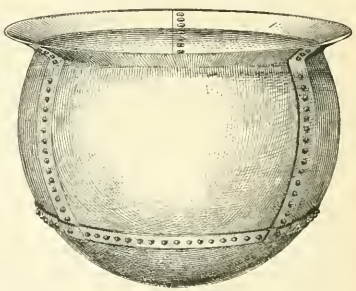


Fig. 471.—Sugar Tiech.

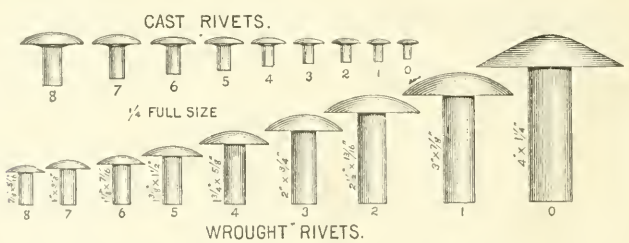


Fig. 467.—Size and Shape of Copper Rivets, One-quarter Size.

ART OF COPPERSMITHING.

37.3 as the diameter or $\sqrt[3]{\frac{34650}{0.67086}} = 3.73$; that is to say, $37\frac{3}{10}$ inches is the diameter of the sides, and $\frac{37.3}{4} \times 3 = 27.975$, or 28 inches is the depth near y, without seams, and $\frac{37.3 \times 3.1416}{2} = 58.5858$, the length of one side. Add to each side say $2\frac{1}{2}$ inches to the length before hollowing. We are now ready to hollow the bottom, mark and punch it, also to prepare the sides for putting together in the same way. In the building of this copper we may use cast or wrought rivets; let us use cast. I should here state that the sizes of cast rivets are designated the opposite way to that of wrought; that is, No. 0 is the largest size in wrought rivets, which run from 0 to 8, while 8 is the largest cast rivet, which run from 8 to 0. Fig. 467 shows the shape and sizes of both wrought and cast. (We usually call the wrought ones nails to distinguish them from cast rivets.) Take the bottom and wrinkle it regularly around the edge; then sink it in the hollowing tub, and work out the wrinkles carefully until the diameter is the size required; smooth up and planish. Now work and punch the sides and bend them to shape, and put three temporary rivets into each seam; then with a racer mark off the depth of the brim and run around it with a hammer, Fig. 468, to harden it at the turn, and then lay off the brim. Draw in the other end at the sides to fit the bottom, Fig. 469, and planish the sides on the horse shown in Fig. 470, and work in the seam rivets. Scrub and finish the seam, making the surface of the seam inside smooth. Mark and punch the holes for the bottom seam, after which set the sides into the bottom evenly all round, and mark the holes in the bottom by the sides, and punch the bottom. Put the sides back in the same place, and put into the bottom seam a few temporary rivets.

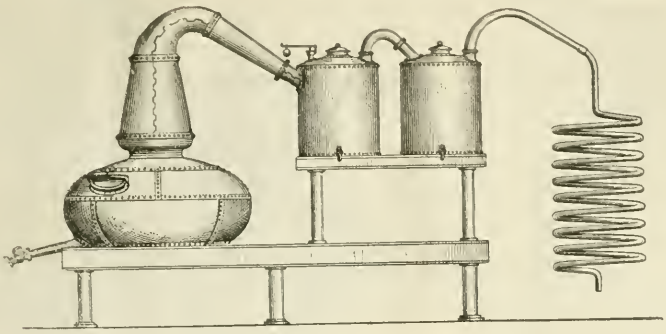


Fig. 472.—Fire Still with Head and Worm.

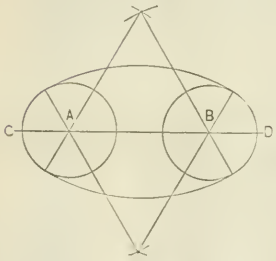


Fig. 473.—Method of Drawing Oblate Spheroid.

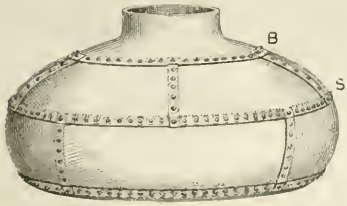


Fig. 475.—Elevation of Boiler.

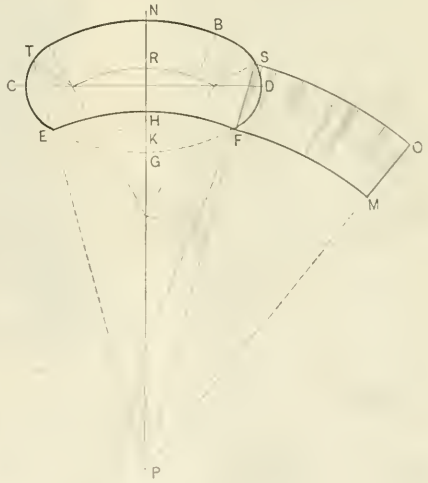


Fig. 474.—Pattern for Sides of Boiler.

ART OF COPPERSMITHING.

for seams, and we have 58.5858 + 2.5 = 60.0858, which we should call in practice 60 inches. Now, we must add 3 inches for the brim, and we have 27.975 + 3 = 30.975, or 31 inches nearly. Let the sides be 60 inches long and 31 inches deep. The bottom is obtained as follows:

$$\frac{1}{4} \ 37.3 \times 12.325 \times 4 = 42.88;$$

that is to say, the diameter of the copper multiplied by one-fourth the hight, together with 3 inches added for the bottom seam, multiplied by four, and the square root of this last result is $42\frac{7}{8}$ inches, or the diameter of the bottom

Now work them in all round the bottom seam, performing the work on the horse. When they are all in, scrub them up tight until the inside is smooth, after which head up the rivets outside and finish.

TIECHES.

Sugar tleches were made the same as a tallow copper, excepting that heavier material was used, and the brim usually made narrow, as shown in Fig. 471. They can now be made in one piece, but where this is not possible the same rules and directions given for tallow coppers may be used, and will be found

as useful for fleches and all other vessels of this shape, as for tallow coppers, due allowance always being made for seams, as suggested in the directions given.

STILLS.

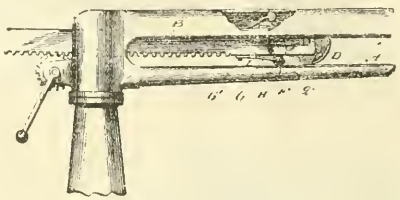
Copper stills are and have been in continual demand for many years and are likly to be, seeing that there are so many uses to which they may be put in the manufacture of the many commercial commodities which depend upon the process of distillation. Stills are made from 1000 to 5000 gallons capacity, according to the uses for which they are required. The largest, however, are used for the purpose of distilling spirits, such as gin, rum, and brandy. These large stills will occupy our attention. In Fig. 472 is shown a squat or fire still with head and worm. This apparatus is usually made in three sections—that is to say, the still boiler, the head, and then the worm, which together complete the still proper. But they are often supplemented with retorts of various designs, the most common of which is shown in Fig. 472. These retorts are used for rectifying purposes, and there are sometimes several interposed between the still and the worm, according to the degree of rectification required. As all large stills are made nearly the same pattern, we will make one as an example or guide for ascertaining the dimensions and pattern of those most in use and then consider their construction. Let our example be required to hold 500 gallons. It will be seen by reference to Fig. 472 that the outline or design of the body of the still boiler is that of an oblate spheroid—that is, down to the lag of the bottom, when the bottom is reversed or pressed upward to form the bottom crown in the same way as that of a brewing copper. Here, in the case of a still, as in a brewing copper, the quantity displaced by the crown of the bottom is quite an item in the capacity and must therefore be taken into account, although it was ignored in the case of large brewing coppers. Our body, then (that is, the boiler), is to hold 500 English gallons. Now, we find the solid contents of a spheroid by multiplying the square of the revolving axis by the fixed axis and this product by 0.5236. Here, then, we have the key to the solution of the various problems involved in the sizes or dimensions we should make the still boiler, and we will proceed to find the diameter and hight of a still boiler to hold 500 gallons (English measure), to be used as a rule to find any or all others. An English gallon contains 277.274 cubic inches, therefore $500 \times 277.274 = 138,637$. Again, in an oblate spheroid whose dimensions are fixed in the proportions shown in Fig. 473—namely, two and a half diameters of the focal circles A and B as the measure of the transverse axis of the ellipse which forms the outline for or boundaries of the spheroid, and whose axis is C D, or is 1—the value of its solidity is found by the rule given to be 0.29362. The spheroid, however, is made concave on the under side to form the lag and crown of the boiler bottom, therefore this value must be reduced by the value of the spherical segment E G F, Fig. 474, which vanishes, together with the segment E H F, which forms the bottom crown. Now, $\overline{EK}^2 \times 3 + \overline{GK}^2 \times GK \times 0.5236 = 0.02758$, the solid content of the segment H E F, and $\overline{EK}^2 \times 3 + \overline{HK}^2 \times HK \times 0.5236 = 0.02128$, the solid content of the segment E H F, or the segment which forms the crown of the boiler bottom; then subtracting the value of these two segments from the whole spheroid we have $0.29362 - (0.02758 + 0.02128) = 0.24376$, or the value of solid figures whose dimensions are similar to or like that of a still boiler. To proceed: The solid contents of 500 English gallons is shown above to be 138,637 cubic inches; then $138,637 \div 0.24376 = 568.743.805$ boiler inches, and extracting the cube root of this last result we have 82.85 inches as the diameter C D of a still boiler to hold 500 gallons. Now we want the depth, H N, Fig. 474, which we find by multiplying the transverse axis C D, or 82.85, the diameter of the boiler, by 0.3701; that is to say, C D by H N, or $82.85 \times 0.3701 = 30.6627$. We thus have the diameter of the boiler, 82.85, or 6 feet 9 inches, and the depth from the bottom crown to the head collar, 30.6627, or 2 feet 6⅝ inches. For the pattern proceed as follows: Through S F and T E, Fig. 474, draw the lines S P and T P, and with P F as radius describe the arc F M, and with P S as radius describe the arc S O, making the distance from F to S equal to 26.028; that is, 82.85 multiplied by one-fourth of the circumference of the focal circle. The length of each one of the sides from F to M may be any convenient length, according to the size of the sheet; but for the symmetry and beauty of the work, the sides should be all alike; that is to say, either three, or four, or any other suitable number, so long as they are all alike or can be got out of the sheets at hand without waste. Now take sides enough so that when they are put together they will measure 83 inches in diameter at the points C and D after the top and bottom have been tucked in to form the bulge or curve of the sides, and let the sides, when ready for the bottom, go into the raise of the bottom within about 2½ inches of the bottom lag. The first section of the crown from S to B, Fig. 475, may be made in the same number of pieces as the sides if it cannot be supplied in one piece with the bottom, but the crown pieces are usually supplied. Having then the sides, bottom and crown, the workman may proceed to put them together in a similar manner to that described for the building of large brewing coppers. I should here say, it is sometimes better to cover the trestles with boards of a suitable thickness (if at hand), which will add firmness to the trestles and make the stage more complete. The illustration, Fig. 472, fully explains itself as to the construction of the still head and worm, while the processes or methods used to make them have been explained in a former chapter and need not be repeated.

[THE END.]

At 1518 Chestnut street, Philadelphia, a company known as the Associated Art Workers have opened an establishment for the exhibition of a combination of skill in general decoration, furnishings, &c., as shown in the complete equipment and furnishing of the building as a residence. The handsome furniture and artistic decorations cover the latest styles and effects, and include many novelties. The bathroom attracts particular attention. The bath is constructed of enameled art tiles, cream-colored, and is fitted with polished brass fittings. A Mexican onyx open washstand with oval basin and a syphon closet with bird's-eye maple tank and fittings complete the furnishings of the room. The wainscoting, 5 feet 6 inches high, is of white tiles with a border of glazed art tiles, festoon design. The purpose of the company is to undertake contracts for the decoration and furnishing complete of any class of building, private or public, and in every style.

Groover Attachment for Smoothing Seams.

Fred. Kanzleiter, 523 N. Lafayette avenue, Terre Haute, Ind., is introducing an attachment to be used in connection with seaming machines, more commonly known in the trade as grooving machines. The object sought is to provide a simple and cheap attachment, which the maker says may be readily applied to any groover now in use, for smoothing down a seam after it is formed at one and the same operation, avoiding the necessity of afterward hammering it down. The device consists of a spring arm carrying a supplemental roller, the arm being held against lateral movements by simple means, the supplemental roller traveling in the path of the seaming roller, interfering in nowise with the successful operation of the other parts.



Groover Attachment for Smoothing Seams.

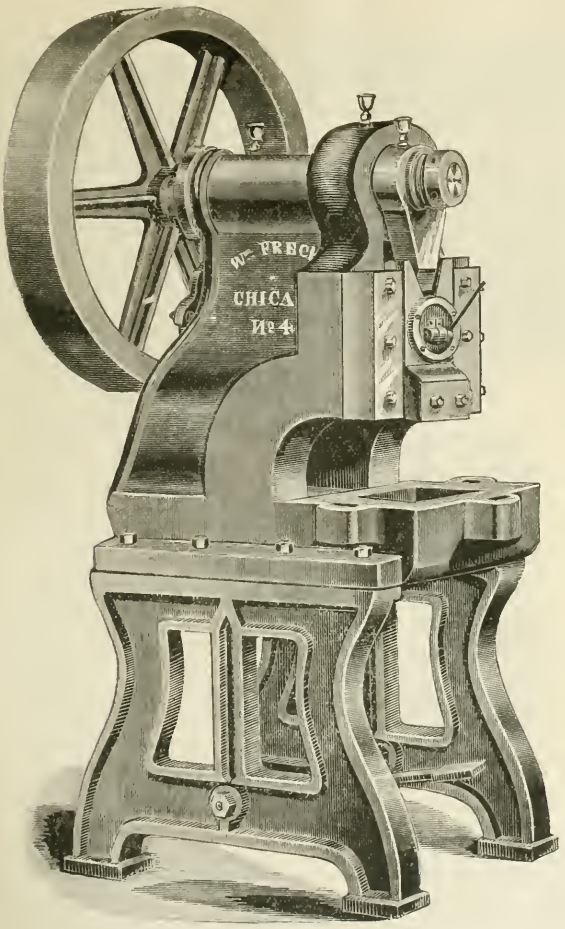
Three of the most powerful ships in the Russian navy will soon visit New York. Two are ironclads, which have a displacement of from about 8000 to 9000 tons, and each cost $3,000,000 or upward. They are the battle ships "Admiral Nachimoff," "Nicolai I.," and the armored cruiser "Pamyat Azova."

An interesting fact concerning the relative hardness of copper and zinc has been brought to light by means of Paul Jannetaz's new sclerometer. Most authors regard zinc as harder than copper. If, however, the metals are examined in a sufficiently pure state, it appears that copper is the harder of the two.

Assistant-Secretary Hamlin has decided that terne plates manufactured from imported or smoothed or cold-rolled black plates are entitled to drawback allowances.

The Frech Punching and Forming Press.

Among the more recent improvements in this class of machinery is the press built by the Frech Machine Company, 75 and 77 West Van Buren street, Chicago. As shown in the perspective cut—from photograph of the No. 4 machine the general features of design embody the two essential qualities of strength and convenience in operating. The depth of throat permits the handling of wide sheets, while the arched opening through the base of the housing allows the passage of sheets lengthwise to a width not exceeding 13 inches. The bottom plate of the housing is securely bolted to the supporting frame, which is made very heavy and affords a large amount of supplementary strength and rigidity to resist the springing tendency from working the machine at its maximum capacity. The housing is made solid from the top of the opening to the crank-shaft bearing, the latter being heavily ribbed at the crank end to resist the tensile strain of the working stroke. No bushings are provided for the journal bearings of the shaft, they being formed of the cast-iron surfaces, lapped perfectly true and smooth, and the shaft journals ground to fit. Owing to the close grain of the quality of iron used in the casting and the large amount of bearing surface, the accurate fitting of the journals remains intact for an indefinite time, as no appreciable lost motion is caused by several years' continuous use. The shafts are of hammered steel and of large diameter—the latter, of course, being proportionate to the stroke of the head—and the crank-pin is turned down from the solid metal. The size of the shaft used with the No. 4 machine is 6 inches diameter for 1¼-inch stroke, thus permitting the diameter of the crank-pin to be 4½ inches. In the actuating device there are no peculiar features, the engagement of the shaft and its automatic release at the end of the up-stroke being by means of the treadle operating the ordinary pin-clutch.



THE FRECH PUNCHING AND FORMING PRESS.

The most important feature of the machine, which has been made the subject of a recent patent, is in the method of adjusting the stroke of the head—or, more specifically, the device for maintaining the adjustment.

The Trimo Combination Wrench.

Trimont Mfg. Company, Amory street, Roxbury, Mass., are introducing the above tool, as herewith illustrated. It is made with a long sleeve nut and oval threads, the latter being a feature common to all Trimo wrenches. When used as a nut wrench the thumb nut is tightened, which does not interfere with adjusting the jaw to the size of nut, but obviates all play or looseness of the movable jaw upon the bar. When used as a pipe wrench the screw is loosened, thus giving the movable jaw perfect freedom to take hold and release. When releasing the pipe it is not necessary to unscrew the wrench, as it releases as soon as the pressure ceases. The pipe side of the movable jaw has a toothed piece held in place by a pin, which can be replaced when desired. The manufacturers claim that the wrench does not slip, lock, or crush the pipe, and that it performs the office of a nut wrench equally as well, combining simplicity and strength with quickness of adjustment. The wrench is interchangeable in all of its parts and designed to meet the wants of machinists, engineers, mechanics, &c. The wrenches are made 10, 12 and 15 inch, to take pipe from ⅛ to 2 inches.

The Trimo Combination Wrench

New methods of separating tin from scrap have been announced from numerous quarters lately, and several of these have been noticed in *The Metal Worker* from time to time. Here is a process for which a patent has been secured by J. and C. Batchelor of Penarth, Wales: These inventors find that tin can be cheaply and effectually separated from iron or steel tin-plate scrap by means of an electric current in a suitable bath, provided the solution be rich in tin and a low voltage be employed. To send a sufficiently large current of electricity through the bath, and, at the same time, keep the voltage low, the scrap tin is formed into anodes by compressing it in a mold and to such a density that it retains its form when removed, but is not so dense as to impede the action of the electricity in the solution employed. The anode slabs are preferably made from 3 to 6 inches thick, so that the voltage shall not rise—owing to the distance of the center of the scrap anode from the cathode—to much more than the counter electromotive force produced by the baring of the iron at the points nearest the cathode plates, thus preventing the iron becoming dissolved before that portion of the tin which is furthest from the cathode.

THE LETTER BOX.

Warping of Sheet-Iron Pans.

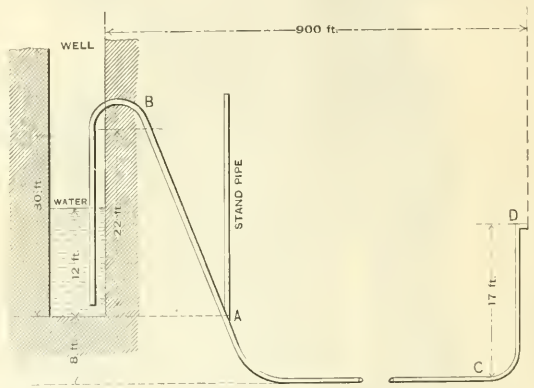
From F. J. H., *Rochester, N. Y.*—Some time since I had occasion to make a number of sheet-iron pans for a bakery. The pans were made of No. 24 smooth iron, 18 x 25 inches in size and $\frac{3}{4}$ inch deep when finished, with a $\frac{3}{16}$ rod in top. The baker claimed the pans were not properly made, as when they were put in the oven the heat caused them to turn up at the corners, so it was impossible to bake in them. He informed me that in England, where he came from, the pans would never act that way, but lie perfectly flat in the oven, the heat not causing them to warp. Will some of the readers of *The Metal Worker* who have had experience in the manufacture of such pans inform me how to remedy the difficulty?

Galvanizing Corrugated Iron.

From W. T. FLANDERS, *Nashua, N. H.*—In answer to the inquiry from "W. J.," Bay City, Mich., in *The Metal Worker* of May 13 as to how to prepare and galvanize corrugated iron, I will submit the following, which will be found practical for the purpose where the amount of work is limited. I would not, however, advise any one to engage in the business unless he had sufficient work to employ at least one skilled man, as galvanizing cannot be done cheaply except by one having a large amount of work. The kettle should be of refined iron (fire-box iron is best in my opinion, although many galvanizers use steel) and of sufficient length and depth to immerse the sheet completely and allow a few inches at the bottom for the dross to settle. The bath should be of pure spelter or scrap zinc. No tin is required or used in the business. Great care must be taken that the metal does not get overheated or burned, as such a condition would injure it and cause loss. Practice alone will enable one to determine the proper heat necessary for the different kinds of work, as a kettle heat to galvanize cast iron would not answer for sheet iron, and so it is in galvanizing different qualities of sheet iron—the heat of the metal must be gauged with reference to the work to be run through. The sheets should first be cleaned of scale by immersing them in a pickle composed of 5 parts water and 1 part sulphuric acid. Care must be taken that the sheets do not remain in the pickle long enough to become burned or over-pickled. Any particles of scale which the pickle does not readily eat away must be removed by scouring with sand or by picking out with a sharp steel. The shank of an old file ground sharp will answer. The sheets should then be rinsed in water, then dipped in a solution composed of 3 parts water and 2 parts muriatic acid, after which they should be dried. They are then ready for dipping. The last-mentioned solution is identical with muriate of zinc, used by tinsmiths in soldering, and causes the zinc to adhere to the iron. Care must be taken that the iron does not get burned in the drying. For example, the sheets should show a grayish color when dry; if they are burned they will be a dark brown and will not readily take the zinc. On the other hand, if the acid is too weak the iron will dry red, in which case the zinc will peel from the iron or refuse to adhere at all. The pickling or acid tanks should be made of pine, and so constructed that the acid will not come in contact with the iron fastenings.

Difficulty With Syphon.

From J. H. W., *Pine Bush, N. Y.*—I have a well 30 feet deep in which there is 12 feet of water, and the water is conveyed 900 feet through a pipe arranged as a syphon. As shown in the accompanying drawing from bottom of pipe to where it leaves the well is 22 feet, and from bottom of well to run of pipe is 8 feet. From the pipe C to outlet D is 17 feet. When the pipe was first put in, the water would hardly



Difficulty with Syphon.—Connecting Stand Pipe, Suggested by "J. H. W."

run out at C. Accordingly a T was placed in the pipe at the point A, which is level with bottom of well, and a stand pipe connected which extended 3 feet higher than point B, where the pipe turns to leave the well. After doing this a pump was connected with the stand pipe and the air exhausted from the main pipe. The water then commenced to run through the pipe and out at opening D.

Note.—From an inspection of the diagram submitted by our correspondent it would appear that the outlet D is only 3 feet below the surface of water in well. If such is the case, the flow of water at D must be very limited. There appears to be no particular reason for connecting the stand pipe at A, as the air would naturally collect at the highest point in pipe, which is at B. Then this would be the most favorable point for connecting the stand pipe. It is supposed this pipe is provided with a stop cock, so that when the air in the pipe is exhausted by means of the pump the stop cock can be closed, thus preventing any air from entering.

A Tin Plate Growl.

From G. S., *Laura, Ohio.*—In reference to an article in *The Metal Worker* of May 6, on the subject of Welsh tin plates, would like to say that I have been using these plates several years, but have not noticed the falling off as being so great until recently. That which I have received lately is irregular in thickness and very greasy. On counting the sheets, too, I find the boxes contain only 111 instead of 112, as formerly. I would like this to be published for the protection of brother tinners, and would ask that if anything of the kind comes to their notice they would write it up. I think this is a plan they have been trying in order to compete with American plates. I prefer the domestic tin and think it to be far superior to any Welsh tin I have used. I have used large quantities of Calland IC and IXX bright. Of the latter I have made coffee pots and buckets, thinking they would give good results. To my sorrow I have found them giving way in from six months to one year. There does not seem to be enough coating. I think if we could get plates coated as in former years we should avoid the pin hole trouble.

Size of Syrup Dippers and Skimmers.

From W. S. C., *Tallahassee, Fla.*—Will some reader of *The Metal Worker* inform me what size to cut syrup dippers and skimmers?

Leaking Gutter.

From H. & J., *Harlan, Ind.*—Is it possible to line a gutter with metal so that it will not break? We lined a gutter on a house, using a guaranteed terne plate. The seams were soldered on both sides and thoroughly soaked. When laying the gutter the tin was turned over the edge of cap and nailed; the shingles held it above at the other edge by a few nails driven, strung along. Two years afterward we were doing some work on a house next door

to the one on which the gutter was laid when the owner came to us and told us his gutter had two holes in it and leaked, which he would like to have us fix. When we got on the roof we found that the seams were not broken, but that the tin had pulled in two between the seams. What was the cause?

Note.—This is certainly a rather singular occurrence, for which we are unable to assign a specific cause. It would require a considerable strain to tear apart any sound sheet of tin in a gutter, a good deal more, we are inclined to think, than gutters are likely to be subjected to. We would like an expression of opinion from our readers on this case.

Gauge of Iron for a Cistern.

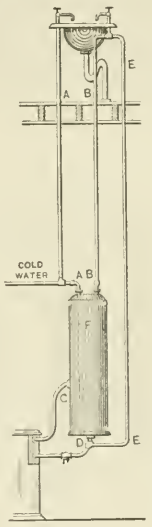
From W. and T., *Hamilton, Texas.*—Please inform us what number or gauge of galvanized iron would be the most suitable for making an overground cistern holding about 1000 gallons.

Answer.—This depends on what shape our correspondent intends to make the cistern or tank. If the body is to be cylindrical, with a flat bottom, a lighter gauge of iron will answer than if the tank is made square or with flat sides. For a round body about 5 feet in depth and 6 feet in diameter No. 18 (gauge) iron may be used. This gauge will be amply heavy if the tank is constructed according to the following directions: Make the body or cylindrical part of two courses, each 30 inches high. Rivet these together, spacing the rivets about 1½ inches apart. Make all laps about 1 inch wide. The bottom, after it is made the required size, can either be double seamed to the body, or if preferred it can be flanged up to fit outside the body and riveted to the same. Around the outside at the top of the cistern or tank place a ¼ x 2 inch iron band and also two bands ⅛ x 2 inches, one about one-third the hight of the body from the bottom and the other midway between the lower and the top band. Thoroughly soak all the seams when soldering the tank. If a somewhat heavier job is desired use No. 16 iron. If the cistern is to be made square with flat sides, or cube-shaped, much heavier iron must be used, the thickness depending on the number and character of the braces or bands put on it. Instead of using flat bands for bracing and strengthening the tank, use angle irons. The number and size of these angle irons will depend on the amount of pressure on the tank. A gallon of water weighs about 8 pounds, and the cistern in question when full would inclose a weight of 8000. From this calculation, and the fact that water presses with equal force in every direction from any given point, it is easy to see that a very severe strain would come on the sides of the tank near the bottom. The bottom should be securely riveted on and well soldered, and if No. 16, 12, or even No. 8 iron is used for the square tank, angle iron braces at frequent intervals should be placed on the sides. The angle iron for the braces should be 1½ or 2 inches or larger, according to their length.

Circulating Pipe on a Range Boiler.

From Young Mechanic.—Please inform me where to put a circulating pipe on a range boiler and how high to carry it up.

Note.—In order to cover all points of this inquiry a drawing is given of an ordinary circulating boiler, and its connections lettered so that the explanation may be made clear. A is the supply pipe, and connects with either of the openings in the top of the boiler, providing the tube shown by the dotted line connected with it extends down



Circulating Pipe on a Range Boiler.

below the point C and within 1 foot of the bottom of the boiler. There should be a ⅛-inch hole in the tube at F near the top to prevent syphonage. B is generally called the distributing pipe, though sometimes the circulating pipe. If the query refers to this pipe with the intention of avoiding the usual wait for hot water at a washstand in a third story or distant room until all the cold water in the pipe has run off, it should, after connecting with the faucet, instead of stopping there be run back to the boiler, as shown by E, and connect with the pipe D, which takes the cold water from the boiler to the water back. Then as the water cools at the distant stand it will drop down the pipe E and permit hot water to come up B and always be ready immediately when the faucet is opened. When a pipe like E is used it is called a circulating pipe, and must necessarily go to the highest point to which the hot water is carried, and this point is determined by the pressure or force on the supply pipe. The pipe C is far more generally known as the circulating pipe, and connects with the top opening in the water back and the opening in the side of the boiler. There is an advantage of some importance to be gained by having the pipe C one size larger than the pipe D, for when the water is expanded by the heat in the water back it finds its way to the boiler in a larger pipe much more readily. The bottom of the boiler should preferably be enough above the water back level to permit an easy turn and a slight decline in the pipe D. Circulation will go on if both of the water back pipes are of the same size and the boiler is so set that the pipe C enters only a few inches above the water back level, but that practice should be avoided. There should never be even a slight drop in the pipe C from the time it leaves the water back till it enters the boiler. The hight of the point at which C enters the boiler is fixed by the boiler makers, and is usually about one-third of the hight of the boiler from the bottom.

Accumulation in Chimney.

From C. J. G., *Plymouth, N. H.*—Will you please tell an old subscriber the best remedy for preventing creosote forming in a new chimney with which a wood furnace is connected in the cellar and a wood range in the kitchen? The chimney has been burned out twice a week on an average during the past winter. The fuel used is good quality, dry hard wood.

Answer.—To define the cause may suggest a remedy that it is possible to apply to the case. The solid matter is a part of the fuel which has not been burned and accumulates because the chimney is not large enough to carry off the smoke made by the fire, or it may be that the smoke is cooled too much before it reaches the chimney, and so deposits the soot. If these ideas are correct, they would suggest a larger smoke pipe as an easily applied remedy, or else the pipe might be covered and thus kept warm. Should these fail, another change would be a larger chimney, so that the smoke will not be retarded in passing out until it is cooled and the deposit made. Wood will burn well enough in a furnace to heat, or in a range to cook, with a draft of chimney less than is necessary to keep the chimney free. It may be possible that the chimney is low and subjected to depressing currents of air at its top.

Prof. George Forbes of the Niagara Falls Tunnel & Power Company says that the machinery which is to supply Buffalo with power from that source will be turning by the latter part of the summer or the early fall, so that many World's Fair tourists will have the opportunity of seeing it in operation. The initial tunnel will divert about 100,000 horse-power. This will certainly be increased to 450,000 horse-power, but it is improbable that the whole of this amount will be utilized for some time to come.

Nearly $2,000,000 worth of new buildings are under way and projected in Winnipeg, Manitoba, this year.

TIN PLATES.

The American Tin-Plate Situation.

We have received the following remarks on the situation of the American tin-plate industry from an observer in this city, who has had considerable opportunity of gaining an inside knowledge of the facts. Writing under recent date, he says :

Among the showers of verbal brickbats that have been hurled at one time or another at the American tin-plate industry the accusation that inferior or poor material was being put out from domestic works has never been included. The facts of the matter were too patent for even the most captious of critics to ignore. The assertion made in some quarters that no genuine American tin plates were being produced was long and persistently reiterated, and this ground was clung to even after proof upon proof to the contrary had been piled up high enought for the most purblind to see. When, however, the fallacy of the statement had become too glaring the extraordinary position was taken up by the same class of unbelievers that the tin plates now made in American factories are too good in quality, that the manufacturers must be losing money over them, and will, therefore, be obliged by degrees to lower the present standard, when the temporary reputation acquired for them will burst like a pricked bubble. This question was dealt with editorially, at some length, in *The Metal Worker* of April 22, under the caption, "Can Tin Plate Be Too Good?" I can only remark in this connection that, to my mind, in this very same excellence lies the whole secret of the success which, all objections to the contrary notwithstanding, has unquestionably attended the efforts of our domestic manufacturers to build up the new industry and to establish a reputation and a market for American tin plates. Putting aside for the present the question of loss to the makers, and the inference drawn from it, all of which is mere conjecture, and, I believe, based altogether on false premises, the broad fact stands out that out of the mouths of the opponents of the industry has come its best recommendation. The state of mind in which people must be who have to grumble because an article is too good must closely resemble that of the *blasé* character in the play, who sings:

Oh, don't the days seem lank and long
When all goes right and nothing goes wrong!
Oh, don't the days seem awfully flat
When there's nothing whatever to grumble at!

They must be very hard put to it to find fault. Had American tin-plate makers commenced by dabbling in the production of poor stuff, or devoted their energies at the atart to cheapening the cost of manufacture by the use of inferior materials and questionable methods, the American tin-plate industry would have been a failure. If not strangled at birth, it would have, at least, been now dragging on a precarious existence in face of a possible removal of the protective tariff which fostered it, and it would probably go down with all hands when such protection was removed. There would be no solid ground to fall back upon. Manufacturers would have no sound reasons to give in recommending their products to the notice of customers in competition with the imported article. But as it is, the best of the American producers are now able to put their plates on the market and leave them with confidence to the common-sense consideration of buyers, knowing that they will not suffer by comparison with any material offered by foreign competitors. The rivalry among domestic makers is now as to who can make the very best quality of plates and not who can make them cheapest. The consumer is ready and willing to pay a fair price for a good and reliable article; and our manufacturers and dealers have no difficulty in disposing of their American-made plates, even though their price may be, in some cases, a trifle ahead of that asked for Welsh material. The difficulty is, in fact, the other way. Dealers complain of not being able to get the supply they need to fill orders; and many of the best known makers, both in the East and West, are unable to keep abreast of the demand, although running their works night and day. This applies to the production of both bright and terne plates, but the pressure is more marked in the case of the latter, which have long ago taken a high and steady place in the estimation of the American roofer. This is fairly proved by the situation in American tin plate works at the present time. All establishments, so far as I know, are busy—many inconveniently so. Half a dozen concerns have additions to their works in hand or lately completed, increase of capacity being imperatively called for. Others are erecting rolling mills for making their own black sheets, or are adding to existing facilities in this respect, while three or four brand new concerns, promoted by substantial and experienced parties, are just about starting into the business. And this in the face of what it was believed would be a fatal blow to the whole industry, namely, the possible removal of protection. It goes to prove to the unbiased mind that the manufacture of American tin plates has a healthy vitality which it would be well-nigh impossible, at the stage which the industry has reached, to crush out. This healthy condition has been attained through the wise course taken by the pioneers at the start. Beginning at the top, and turning their attention and endeavors to the production of the very best material possible, they have placed American tin plates, as regards quality, in the front of the world's production. That "quantity" will eventually follow is as certain as anything can be in a land which possesses the "biggest" of everything, including world's fairs, land booms and financial collapses. It is merely a question of time—and not a long time, either—when the quantity of both tin and terne plates made in the United States will more than supply the home demand. Indeed, in the case of roofing plates, this is almost an accomplished fact; and I have the best of reasons for accepting as correct the forecast given me recently by a friend, a shrewd observer who is well up in the facts and statistics of the native and foreign tin-plate market, that within six months imported terne plates will be an unknown quantity, so rapidly is the native article displacing foreign roofing tin in the market.

SCRAP.

WE ARE FAVORED with a specimen of the handy little standing desk calendar which Gummey, Spering & Co. of Philadelphia are distributing to their friends, and which advertises the merits of their American roofing plates Pennsyl Old Method and Alderly. The calendar is of red leather, with a case containing transferable cards, each showing one month of the year from May, 1893, to April, 1894. The upper portion displays a neat ivoried tablet bearing the name of the firm and their registered trade-mark, the head of William Penn, besides the names of their brands of terne. Pennsyl Old Method is claimed to be the oldest old style plate in the market, and also the heaviest guaranteed roofing plate made, being, they say, treble coated.

A. A. THOMSON & Co., 213 Water street, New York, makers of the well-known Puritan brand of roofing plates, have decided that these plates shall in future be designated and stamped "Thomson's Puritan" to distinguish them from other plates of the same name in the market. The Puritan plates were first made abroad specially for A. A. Thomson & Co., in 1886, but are now being made by the firm at their own tin plate works in this country.

S. G. NEGUS, 40–42 College place, New York, the resident buyer in this market for the Harper & Reynolds Company, Los Angeles, Cal., having in the routine of business occasion to purchase roofing materials for that house, recently shipped them a carload of American terne roofing plates, which proving satisfactory he has sent forward another load.

N. & G. TAYLOR COMPANY, Philadelphia, Pa., and New York City, are continually diverting trade from foreign-made tin and terne roofing plates to analogous goods made by them. One of the comparatively recent acquisitions is that of a leading trunk line railroad in this country, who have settled down to regular orders in satisfactory quantities, specifying the same brand each time, which is taken to mean that they have found it suited to their needs and a proper article to reorder.

The first carload of tin from the Harney Peak Tin Company's mines in the Black Hills of South Dakota has been received by the Crooke Smelting Company of New York City.

STEAM AND HOT WATER.

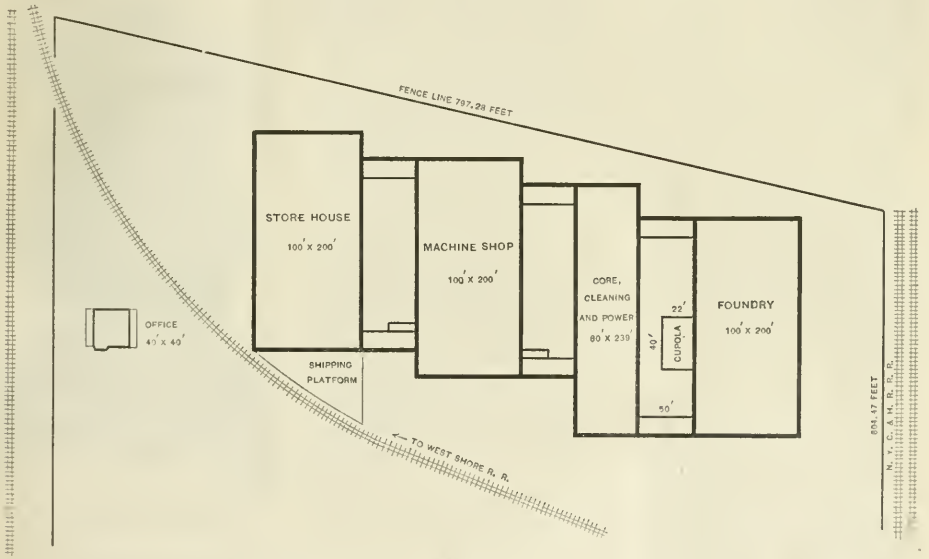
New Works for the Manufacture of the Florida Boilers.

In July last the Pierce, Butler & Pierce Mfg. Company decided to remove their works for the manufacture of the Florida heaters from Geneva to Syracuse, N. Y., and there to erect a plant with all the latest improved appliances for the manufacture of the Florida heaters. After looking over a number of places they decided to locate on the lands of the Central City Land Company in the eastern part of Syracuse, as this location possessed all the natural advantages for a works of this kind, having ample shipping facilities, being situated between the New York Central and Hudson River Railroad and the West Shore Railroad. Twelve acres of land were purchased, having a frontage of 697 feet on the N. Y. C. & H. R. R. R. and 688 feet on the West Shore Railroad. Plans were made for the buildings and on September 1 the contract was let for their erection. The first work done was the thorough underdrainage of the land. This was done by running a main drain through the center of the property with lateral branches for storm water and underdrainage. All trenches were excavated to the proper grade and tile of various sizes were laid to carry off the water. The joints of the tile are not cemented, and the trenches are filled up with broken stone for 2 feet above the tile, and at intervals of 50 feet the broken stone is filled in up to the grade line. Over 6000 feet of tile is laid to remove the storm water.

The land is very low at this place, and after a storm was always covered with water. After the drainage system was completed the soil became very dry and after a very heavy storm would dry out in a very short time. There is a continual discharge from the drainage system of over 60 gallons per minute, with a greatly increased discharge after a storm. A separate line of tile was laid to carry off all sewage. This tile is laid to a true and perfect grade. All joints are filled with oakum and Portland cement and are made water tight. The sewage is discharged into a filtering tank where all water is removed and then discharged into the main sewer.

All the buildings are brick on solid foundations and are built on the slow combustion principle. There are no solid side walls, all roofs and floors are supported on brick piers 2 feet wide, 8 feet center to center and the space between the piers is filled in with glass, which makes the buildings as light inside as it is possible to make them. The foundry building is 100 feet wide, with a row of posts in the center for supporting the roof and the electric traveling crane, 200 feet long and 22 feet high on the sides. There is a monitor on top, 20 feet wide and 10 feet high, with windows on each side. All windows are opened and closed from the floor by sash ventilating apparatus.

Attached to the foundry on the side in the center is a building, 22 x 40 feet, in which is located the cupola, fan and engine. Power is supplied to the fan and elevator by the engine, also to tumbling barrels and emery wheels in the cleaning room. The cupola has a capacity to melt 20 tons of iron per hour. One-half of the building next to the cupola has an electric traveling crane 50 feet wide running the entire length of the foundry. This crane has a capacity to lift 10 tons and carry it sideways and lengthways, all three motions at the same time. This is one of the most complete foundry buildings in this country. It is as light as day, and is arranged to have perfect ventilation. The foundry is connected at each end by a covered passage 14 feet wide to the core and cleaning building. The buildings are 50 feet apart, and the passages are made fire proof. In each passage are large wooden sinks supplied with hot and cold water for the use of the workmen. There is also connected to the passage water closets arranged with automatic flushing apparatus and all modern sanitary appliances. The core and cleaning building is 60 feet wide, 239 feet long and 20 feet high on the sides. It has the same monitor top as the foundry. This building is divided into three rooms by two brick fireproof walls. One end is used for cleaning the castings as they come from the foundry. The center room contains the ovens for baking the core used in making the sections of the Florida heaters. There are in this room four ovens, 7 feet 6 inches wide, 15 feet long; two ovens 15 feet wide and 15 feet long. At the rear of each oven is a furnace which furnishes heat to bake the cores. At the front end is a flue connected to a large main flue under the floor to carry off the products of combustion from the core ovens. This main flue is carried along underground in front of the core ovens to one end, where it connects to wrought iron pipe 24 inches in diameter and 50 feet high. In the other end are the boilers that supply steam to the engines and pumps. This



Plan of the New Works for the Manufacture of the Florida Boilers.

end of the building is divided into three rooms running lengthwise of the building. On one side is a blacksmith's shop for tool dressing, in the center room the boiler, on the other side is the engine room, where is placed the engine that furnishes the power for the electric crane and to the dynamos for lighting the buildings. In this room are placed the boiler feed, water supply and filter pumps and feed-water heater. There are two horizontal steel tubular boilers, each 16 feet long, 66 inches in diameter, fitted with the Backus smoke-consuming furnaces, Kilts' steam high and low water alarms, also automatic boiler feeders. The pumps are fitted with the Mason pump regulators to control the pressure on the boiler feed and water supply pump. Five 12-inch nickel plated gauges from the works of Schaffer & Budenburg show the vacuum, water and steam pressure. Power is furnished the electric crane and light for the building by two dynamos, one of 200 lights and one of 600 lights, furnished by the Fort Wayne Electric Company. There are two marble switchboards with switches to control all lights in each building, also ampère and volt meters, reostats, and a full and complete set of electrical instruments. The water supply for the building is taken from 16 driven wells, each 2 inches in diameter, connected into one 5-inch main pipe, which furnishes an abundant supply of pure water.

The machine shop is connected to the core and cleaning building the same as to the foundry, with a covered passage. This building is 100 feet wide, 200 feet long; first story 15 and second story 14 feet high. There are two rows of posts, 33 feet centers one way and 8 feet the other way, which support the second floor. On this line of posts is secured the shafting that furnishes the power to the tools. Power is furnished to this shop by an engine located at one end of the building. The second floor is used for a pattern shop, box making and light machine work. A 4000-pound elevator lifts all material to the second floor. The buildings are all heated by exhaust steam from the three engines. The exhaust from all the engines and pumps are connected into one main steam main, which equalizes the pressure on all the buildings. The main high-pressure steam main is also connected to the exhaust main. A Watson pressure regulator is used to supply what steam is necessary to keep the pressure on the main up to 1 pound. All condensation from the heating coils is carried into one main return pipe, which discharges into a receiving tank in the engine room, and from there pumped back into the boilers. Before the exhaust steam enters the main heating pipe it passes through a Hine eliminator, which removes all the cylinder oil from the steam. All heating coils are placed overhead and are made from 1¼-inch pipe. Over 28,000 feet of this size pipe is used in the coils. High-pressure steam mains are run from the boilers to the engine in foundry and machine shop.

The system of heating is so arranged that all the coils will fill with steam and produce a perfect circulation with one-half pound pressure on main supply pipe. A branch track is connected to the West Shore R. R., which runs in front of all the buildings, also the sand and coal building. Cars are unloaded or loaded direct from the buildings. Everything has been done to make this one of the most complete plants in the country. A narrow-gauge track runs through all the buildings and passages, with turn tables at all corners. On this track small cars are used to transfer all material used about the works. About 5000 feet of rails were used to build this track.

The store house is connected to the machine shop same as the other buildings, with a covered passage. This building is built after the same plan as the other buildings, 100 feet wide and 200 feet long, one story high. This building is used to store supplies and finished work as it is received from the machine shop. In front of this building is a shipping platform, where all material is received and finished goods shipped. The raw material is unloaded from the cars in front of the foundry. It is then taken into the foundry and the castings are made; from there into the cleaning building and next into the machine shop, where all machine work is done. They are then taken into the store house, packed and shipped.

Next to the store house and near the West Shore R R. is the office of the works. This is a two-story cottage design, 40 x 40 feet square. It contains office for the manager, bookkeepers and draftsmen, and is arranged with all modern appliances for doing the business of the works.

The works are now under the control of the American Boiler Company of Chicago, the Pierce, Butler & Pierce Mfg. Company having transferred the works to them. The plans for the buildings, sewerage, drainage, steam heating and steam power were prepared by E. P. Waggoner, engineer for the Pierce, Butler & Pierce Mfg. Company.

The following well-known firms furnished material for the buildings: Building contractor, W. J. Gillett, Syracuse, N. Y.; engine and boiler, Porter Mfg. Company, Syracuse, N. Y.; electric light, Fort Wayne Electric Company, Fort Wayne, Ind.; electric crane, Industrial Works, Bay City, Mich.; roofing, H. W. Johns Mfg. Company, New York; shafting and pulleys, Medart Patent Pulley Company, St. Louis, Mo.; elevators, Howser Elevator Company, Syracuse, N. Y.; belting, Curtis Mfg. Company, Syracuse, N. Y.; water filter, Bradley & Co., Syracuse, N. Y.; water tanks, Phœnix Foundry & Machine Company, Syracuse, N. Y.; sash ventilators, Hitchings & Co., New York.

Long Distance Steam Cooking.

One of the engineering successes of the World's Fair which is not visible to the public is the steam-pipe line from Machinery Hall to the Casino restaurant. When the scheme was first broached of doing all the cooking in the Casino by steam from Machinery Hall it was pronounced impracticable almost universally by engineers. Nevertheless the work was given in charge of second assistant mechanical engineer Arthur Venning and is now in successful operation.

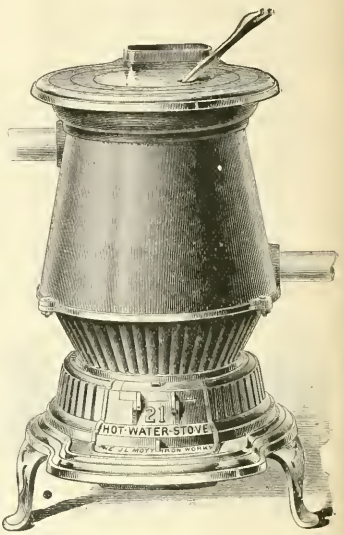
The pipe is six inches in diameter and runs from the boiler room at Machinery Hall across in front of the Colonnade, under the Agricultural Building, and ends at the kitchen of the Casino adjoining the Peristyle. It is 3000 feet long.

Steam was first turned on about two weeks ago, and since then the pipe has been in constant use. The pressure at the boiler room is 120 pounds and at the Casino end 100 pounds. When the pipe has been covered with magnesium to retain the heat the pressure will be much better at the Casino.

Great fears were entertained as to the successful operation of the pipe during the last week, as all the cooking at the Casino is done by the steam from it and a failure of the pipe line would have ruined the opening banquet, but Engineer Venning has had it patrolled night and day by two men watching for leaks, and so far it has proved a success in every particular.

Mott's New Hot-Water Stove.

The J. L Mott Iron Works, 84–90 Beekman street, New York, have added to their assortment of heating apparatus the one shown herewith, designed to heat water for range boilers and tanks suitable for small laundries, bathhouses, boarding houses, hotels, stables, &c., or where for any reason the range facilities are not equal to supplying a sufficient amount of hot water. The



Mott's New Hot-Water Stove.

stoves are made in two sizes, Nos. 20 and 21. No. 20 has a diameter of fire pot of 10 inches, depth of water cylinder 10¾ inches, and the manufacturers claim it will heat 40 to 50 gallons of water per hour. No. 21 has a fire pot 11 inches in diameter, with a water cylinder 14 inches deep, and a capacity of 50 to 65 gallons an hour. The cylinder is tapped for 1¼-inch iron pipe. The top of the heater is made with rings suitable to take in a 9, 10 or 12 inch clothes boiler, or may be put to various other uses, such as heating irons, &c.

T. C. Joy & Co., Titusville, Pa., issue a catalogue of radiators of their manufacture. The publication, of large size and oblong shape, contains 16 pages, and is bound in colored paper covers with embossed title in gilt letters. As usual with publications of this firm, the material is interesting and the presentation of the goods is effected in a novel way. The first two pages show full size cross sections of the Crescent and the Joy vertical flue radiators for steam or hot water. Another interesting page

presents sections one-half size of various radiator loops, printed in two colors, red lines indicating the unobstructed radiating surface, and black lines the obstructed radiating surface. Following are illustrations of the Crescent radiators for steam and hot water, a sectional view of the Crescent base and section for direct-indirect heating; then the Orient, the Joy vertical flue, the Crescent flue dining room, the New Crescent window and other radiators, including indirect radiators.

HEATING NOTES.

THE NEXT MEETING, or rather dinner, of the Caloric Club, will be at Chicago in the early part of June. The club members are manufacturers of steam and hot-water heating goods, and their monthly dinners afford an excellent opportunity for the discussion of interesting questions and establishing a mutual confidence that is always desirable.

ONE OF THE LARGEST BUILDINGS in the country to be heated by means of hot water will be the sanitarium to be erected in Milwaukee by the Sisters of St. Francis. Four of the No. 20 Bolton hot-water heaters will be required in connection with nearly 10,000 feet of radiation, the American Radiator Company's goods being used. The contract was taken by Cardes & Freis, 128 Clybourn street, Milwaukee, assisted by the United States Heater Company's agency, 100 Lake street, Chicago, John W. Mills, manager.

T. C. JOY & Co. of Titusville, Pa., have recently opened an office at 48 Centre street, New York, where samples of steam and hot-water radiators are displayed.

L. J. WING & Co , 126 Liberty street, New York, make a specialty of disk fans and ventilating apparatus, as well as electric motors to run them. They send drawings and instructions with their goods, which enable the average mechanic to set them up for use. Some of their recent shipments have been to the Paris Electric Light & Railroad Company, Paris, Texas; Bradley & Hubbard Mfg. Company, Meriden, Conn.; Stevens Mfg. Company, Fall River, Mass.; Reuter & Mallory, Baltimore, Md., besides a number in New York, among them the Murray Hill Turkish Baths, office of New York *Press* and the New York Electric Equipment Company.

W. M. MACKAY, manager of the school and public building heating and ventilating department of the American Boiler Company, at 92 Centre street, New York, will continue his custom of attending the conventions of the Steam and Hot Water Fitters' Association, and will be in Chicago to attend the meeting in June.

PRESIDENT JOHN SIMMONS of the John Simmons Company is doing Chicago on a pleasure trip, and in his absence the office at 110 Centre street, New York, is being rearranged to give greater facility in transacting a growing business in plumbers' and steam fitters' supplies.

THE WESTON ENGINE COMPANY, Painted Post, N. Y., issue an illustrated catalogue of the Bronson water-tube boilers of their manufacture. Sectional and general views of the magazine and base burner are presented and then illustrations of the boiler proper, separate; also the portable form of boiler. Later on is given a sectional view of the Bronson improved boiler for steam or hot water. In addition to the illustrations are tables of sizes and other interesting particulars, besides descriptive text. Special circulars issued by the company give information about the Bronson boilers, one circular in particular being printed in very pleasing style with red and black ink.

THE GURNEY HOT WATER HEATER COMPANY of Boston, Mass., will be represented in Chicago this year by Wallace Finch as manager of their Western office at 59 Wabash avenue, who will operate the territory of Illinois, Wisconsin, Nebraska, South Dakota and Minnesota.

C. F. BACHLER of 49 North Seventh street, Philadelphia, the general agent of the Monitor Steam Generator Mfg. Company of Landisville, Pa., expresses satisfaction at the outlook for sales of the Monitor hot-water boiler during this season. Toward the latter part of last season their limited capacity would not allow of their keeping up with their orders, but increased factory room and facilities will enable them to keep abreast with the demand this season. Mr. Bachler is at present supplying boilers for the Maennerchor Hall, Fifth street, and the large Harmonie Hall, at Eleventh and Spring Garden streets, Philadelphia. He is also supplying the boilers for the new Washington Hotel, at Seventh and Germantown avenue, Philadelphia.

THE AMERICAN RADIATOR COMPANY, 111 Lake street, Chicago, have sent out a handsomely engraved card to the hot-water and steam fitting trades, inviting them to make the above office their headquarters while in Chicago visiting the World's Columbian Exposition. Every facility will be furnished for correspondence, and the officers of the company will hold themselves in readiness to give general information. Another reminder to the trade is in the similitude of a mail bag, which, when opened, contains an invitation of the same purport. A third is still more unique, representing a shawl strap inclosing a roll of clothing, folded in the interior of which is another hearty invitation.

THE BUFFALO, N. Y., FORGE COMPANY have issued a catalogue of 286 pages descriptive of their hot-blast steam heating apparatus and the fans, blowers, steam engines, drills, forges, &c., made by them. Their hot-blast system of heating and ventilating is described by reference to buildings of diversified characters, drawings and perspective views being freely used to show the general arrangement in each case. These examples include public, private and office buildings, depots, theaters, hospitals, public schools, factories, &c.

GEO B COBB & Co., in addition to their New York house at 42 Duane street, have established a house at 35 North Seventh street, Philadelphia, and have some contracts for installing the steam heating plants in the houses that are built in rows in Philadelphia.

W. H. OAKES, manager of the American Boiler Company's Boston office, is generally known as a hustler and all-round business man of capacity, but he shines equally, though in somewhat different manner, after business hours. A *Metal Worker* man a short time ago made the surprising discovery that Mr. Oakes was a dramatic critic of deep penetration and rare good taste As a keen judge of comic opera he is unrivaled, and though his comments are not seen in print, they afford guidance and warning to his numerous friends. In opera his range extends from "Girofle-Girofla" to "The Spider and the Fly"; in drama from "Hamlet" to "The Span of Life," and if there was a Vaudeville Club in Boston there is little doubt that he would be a leading spirit in the organization.

THE BUFFALO FORGE COMPANY, Buffalo, N. Y., have been awarded contracts for the heating and ventilating plants for the new Christ M. E. Church, Pittsburgh, Pa., and the Calvary M. E. Church, Allegheny, Pa., two churches which are referred to as the largest edifices in either of these enterprising cities. The estimated cost of each of the buildings is $300,000. The heating apparatus consists in each instance of 12-foot fans, and heaters containing 6000 feet of 1 inch pipe. In every example of church heating and ventilation installed by this company, the apparatus is so built that it can be used as a cooling machine in summer, as well as a heating and ventilating plant combined during the cold weather. Arrangement is further provided that during the moderate weather hot air and cold air can be mixed, and thus the ventilation is kept up without overheating the audience room. The machinery and materials employed in the heating and ventilating plant for the above buildings constitute more than two carloads.

A CIRCULAR LETTER is addressed to the trade signed by George Bolton as inventor of the Bolton boiler and joint inventor of the G. & J. R. Bolton new improved boiler, in which reference is made to the report that he is liable to suit for infringement for using the G. & J. R. Bolton improved hot-water heater, and he further goes on to tell of his relations with the manufacturers of the Bolton heaters, and a contract that he entered into in 1887. Accompanying the circular is a business card giving his location at 85 Chene street, Detroit, Mich.

LAST WEEK, in referring to the fact that but one out of the 130 boilers made by John Davis of Second avenue and Eleventh street, Brooklyn, N. Y., for John A. Scollay, was defective, it should have been added that this number of boilers was simply the last order of April. Mr. Davis has made hundreds of boilers for Mr. Scollay, and we understand that but three out of the entire number have been returned.

Superintendent Hannan of the New York State Department of Public Works has issued an order that all persons desirous of experimenting with electricity and other power for propelling boats on the Erie Canal must have their applications for the privilege to so experiment on file by June 5. This order is issued in pursuance of a law passed by the last Legislature authorizing the superintendent to designate certain sections of the Erie Canal on which experiments may be made for testing the efficiency of such devices as may be offered for improving by electrical or other means the present system of canal towage, such experiments to be conducted at the expense of the parties making them.

The White Star Line has given an order to Harland & Wolff, the shipbuilders, for the construction of a steamer 800 feet long, which is being built on a new principle as to the engines and steering gear, and is expected to equal the speed of anything afloat.

PLUMBING and GAS FITTING.

New Plumbing Regulations in Mount Vernon, N. Y.

Under the authority of the act of the Legislature known as Chapter 602 of the Laws of 1892, by which the mayor of each city in the State is required to appoint an examining board of plumbers, measures have been taken in Mount Vernon, which received its city charter only last year, to perfect a system of sanitation which will be a guarantee of healthy home surroundings in that suburban city.

Some time ago the initial steps were taken by the appointment by the mayor of the Examining Board of Plumbers in accordance with the act referred to. The following constitute the *personnel* of the board: Alexander Clark of the firm of S. & A. Clark of Mount Vernon and Fourth avenue, New York City, chairman, appointed for three years; E. E. Martin of the Fiske Plumbing & Heating Company, secretary, appointed for two years, and Adam Clark, journeyman plumber, appointed for one year. These, acting in conjunction with Frederick S. Odell, Commissioner of Public Works, and Thomas Grassick, Inspector of Sewers (and now plumbing inspector), form the Examining Board of Plumbing, as called for by the law. The board has already discharged its functions as regards the examination of the plumbers and the issue of certificates, but as the number of the master plumbers is limited the work has not proved onerous in any degree. The duty of preparing a code of rules for sanitary plumbing, however, devolves also on the board, and they have formulated a very sensible set of regulations which have been approved by the Board of Health and are now in operation. Through the courtesy of E. E. Martien of the Fiske Plumbing Company we present herewith a *résumé* of these rules, which are sufficiently comprehensive, if properly enforced, to cover every point necessary to healthy living:

Briefly stated, it is required that all plans for plumbing work in new buildings shall be filed with the Board of Health for approval before the work can be commenced. All materials must be of good quality and the workmanship up to the best standard and separate connection of every house with street sewer by means of earthenware pipe, best quality of salt glaze. The house drain inside to be of cast iron and laid with a fall of ½ inch to the foot where it can possibly be secured. Modification of this permitted where the required fall cannot be secured. The usual trap at front wall is called for; the fresh-air inlet to be 4 inches, and not to open nearer than 15 feet from the nearest window. The trap which is to be used is what is known as the double hub trap: the hub on the sewer side to be fitted with cleaning screw, and the hub on the house side to be used as the connection for the fresh-air inlet.

Cesspools are permitted where streets are not sewered, the cesspools to be constructed subject to the approval of the Board of Health.

Where a well or cistern is on the line of sewer, 15 feet from the house, the sewer pipe must be of cast iron and tested in the same manner as the pipe inside the house.

Changes in direction of horizontal line of soil or drain pipe to be made with bends or Y branches. Cast-iron pipes to be extra heavy. Galvanized back-air pipes may be used where cast-iron would be unavailable. Vertical lines of vent pipe are not to be carried through the roof where they run up alongside of soil pipe lines. They are branched into soil-pipe above highest fixture and at bottom of pipe by means of Y branch. Porcelain water closets, with trap above floor, must be connected by means of floor plates and rubber gaskets.

Pan and plunger closets are entirely excluded. The only joints permissible in iron pipe work are lead or rust joints, the latter made with iron filings and sal ammoniac. House drains to be carried two lengths outside front wall trap before connection with earthen house sewer. The iron-pipe system to be tested by the water or smoke test. Connections of lead and iron pipe to be made with ferrules and lead joints to be all wiped. Vents of water closets and slop-sink traps to be 2 inches, and traps of other fixtures not to be less than 1½ inches, whether lead, galvanized iron or cast iron. Safe waste pipes to be carried to cellar and discharged on floor. If refrigerators are used, the waste pipes to discharge into a water-supplied sink in cellar. Where sewers exist in the street, neither privy vault nor cesspool will be permitted. Work to remain uncovered until inspected and passed by the inspector of plumbing. The entire charge of the plumbing and drainage, from the connection with the street sewer to the introduction of the soil pipe above the roof, to be in the hands of the plumber.

These constitute the provisions of the plumbing code which will be administered under the authority of the Board of Health, which is composed of the mayor, the supervisor and the health officer, the latter the executive officer of the board. The clerk to the City Council also acts as secretary to the Health Board.

It is the purpose of the authorities in carrying out the rules to recognize the plumber as directly liable for his own work, and where such work is reported in violation to the board, the notice of such violation is sent direct to the plumber.

Sheet Metal Pipe Straps.

The Smith & Egge Mfg. Company, Bridgeport, Conn., are putting these goods on the market, as illustrated here-

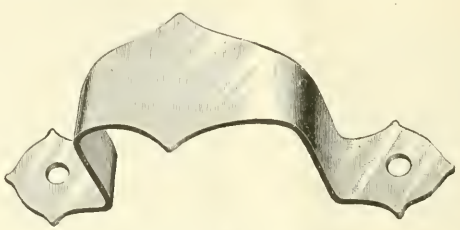


Fig. 1.—Sheet-Metal Pipe Strap.

with. The straps are made of sheet metal, nickel-plated on brass. They are referred to as being light, of ample strength, and as finished nicely for use on open work. The point is made that, being light, freight charges are much less than on cast straps. The strap shown in Fig. 1 is made in seven sizes, for pipe from ⅜ to 1½ inches. Those

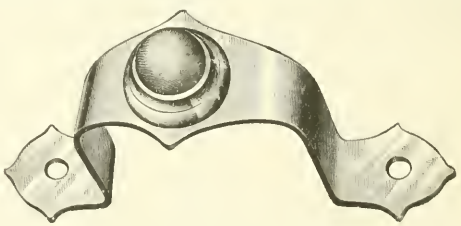


Fig. 2.—Pipe Strap with Rubber Bumper.

with bumpers are made in four sizes, for pipe from 1 to 1½ inches.

Chicago Master Plumbers.

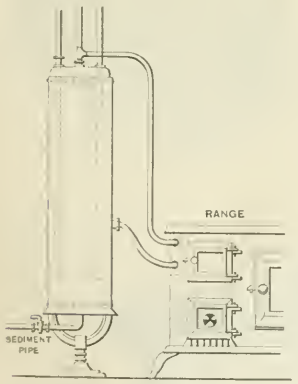
The regular meeting of the Chicago Master Plumbers' Association was held at their rooms, 197 Madison street, Monday evening, May 22. A large and enthusiastic number of members were in attendance, and a general discussion ensued regarding measures to be brought before the National Association. E. B. Kaiser, 161 Southport avenue, and William J. Bowman, 687 West Chicago avenue, were elected members. It was reported that arrangements had been made with the C. & N. W. Railroad for those attending the convention. All visiting delegates passing through Chicago were requested to call at the rooms of the association for further in-

formation regarding the matter; also to make the rooms their headquarters while in the city, and if desired, have their mail sent in care of Secretary Alex. W. Murray, 197 Madison street. In the prize competition for the best essay on "Sanitation," to be read before the National Association, two essays were presented, one under the *nom de plume* of "Old Quincy No. 9," (T. C. Boyd), and the other "Orphan Boy" (Alex. W. Murray). After the two essays had been read before the association it was decided by ballot that "Orphan Boy" was entitled to the prize. As the author desired that the amount of the prize be presented to some deserving orphan asylum, the association was requested to name one. It was decided by the association that the manner of the donation should be left entirely with the author, Alex. W. Murray.

Range Boiler Connections.

From C. S., *Bridgewater, Mass.*—Recent discussions in *The Metal Worker* on the subject of range-boiler connections remind me of some of my experiences in that line that may be of interest. Some years ago we put in a portable range to take the place of a brick-set range that was connected with a 50-gallon boiler. The boiler was set very low, and had been very noisy, and the owner wanted it made all right. As it could not be raised I used the bottom connection for a sediment cock only and connected the range at the side and middle or hot-water pipe at the top of the boiler, as shown in Fig. 1, and the result was satisfactory.

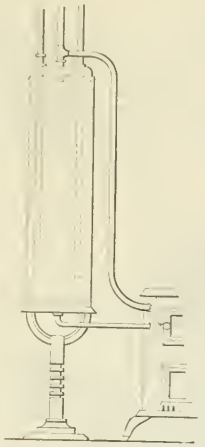
On another occasion I had a 40-gallon boiler connected in the usual way with an 8-inch portable range that would not heat water enough for a bath after



Range Boiler Connections.—Fig. 1.

having a hot fire all day. I tried to cure it by making a connection the same as in the first job, but was not successful. Arranged with a larger water front, it worked all right. I call to mind three other jobs that are connected the same way, one of which I will mention. The kitchen was only 6½ feet high, and as I wanted to use a high stand, and as the pipe had to cross the ceiling, I had a boiler specially made without the side connection and only 4 feet high. The hot-water connection on top of the boiler was 1 inch, and was connected to the range with a 1-inch pipe, as shown in Fig. 2. This heats water quickly; but if a bath or two are wanted before it all gets hot it seems to draw the colder water at the bottom of the boiler through the water front instead of taking the hottest water from the top of the boiler.

Note.—In the reproduction of both of our correspondent's sketches it will be seen that there are two pipes leading from the bottom of the boiler, from



Range Boiler Connections.—Fig. 2.

which we assume that there is a double cold-water supply. This point is not referred to in his letter.

Solder from Old Lead Joints.

From A. P. G., *Scranton, Pa.*—Is it possible to make a decent quality of solder by melting up old lead joints, pieces of pipe, &c., which are always plenty aronnd a plumber's shop? I have been informed that it is possible to do so, but it is difficult to judge of the quantity of tin to be added. Can you help me out with an opinion? Is it worth trying?

Answer.—The quality of home-made solder must be more or less coarse, considering the liability to throw into the mass what may not be suitable. The following has been furnished us as a good way to convert old lead scrap into "good"(?) solder, and we give it for what it is worth: In selecting the material to be melted be careful to throw out all galvanized joints. Melt up the lead and solder, and burn sulphur and rosin on the mass, stirring and skimming it clean. Then add tin until the white spots all disappear when poured out on a piece of iron. This will indicate that the stock is half tin. You can then readily ascertain by weight how much more lead it may be desired to add.

TRAPS AND VENTS.

CHARLES FERDINAND, Paterson, N. J., is an artistic wrought-iron worker, either from designs of his own or those furnished. His line of candelabra, piano lamp stands, hall gas fixtures, chandeliers and candlesticks would please the customer of any gas fitter. Another line is antique fire irons, both massive and delicate, elaborate and plain. Some of the screens or grill panels he exhibits are very handsome. A specialty is made of duplicating ornamental wrought iron of every description.

CHARLES BRABENDER & SON, Paterson, N. J., are coppersmiths whose work finds customers as far away as San Francisco. One of their recent contracts was in connection with the plumbing in a large brewery and amounted to over $1200. Coils and kettles for sugar houses and chemical works, and tanks and copper work of all kinds, as well as tinning copper come within their scope.

THE CENTRAL GAS & ELECTRIC FIXTURE COMPANY, 224 to 232 Canal street, New York, make a specialty of gas, electric and combination fixtures. In Brooklyn they have a large factory where all of their goods are made. At one time they imported many handsome gas fixtures, but claim that at present the necessity is overcome by the grace and delicacy of their own productions and that they now export goods. A recent shipment went to Mexico.

IT IS NOT EXPECTED that the Plumber's Registration bill, now before the British House of Commons, will get through Parliament this session. It has been crowded out by the all-absorbing Home Rule bill business. This will mean a delay of many months before it can become law.

THE TOWN COUNCIL of Leipzig, Germany, offer prizes of 5000, 3000 and 2000 marks for the three best projects for so purifying the sewage of the town that it may be allowed to pass into the river. The competition is open to all, and will not be closed until October 1. Conditions may be obtained from the Rath, Leipzig. A mark is nearly 24 cents of United States money.

JAMES MUIR & SONS, New York, have in hand considerable important plumbing work, not the least important of which is the erection of the plumbing in the residence of Cornelius Vanderbilt. Another feature of their business is that they do no contract work, all of their work being done on the day's labor plan.

AMONG THE NEW YORK PLUMBERS at the convention in Milwaukee will be H. G. Gabay, Frank Reynolds and E. J. Brady.

THE JAMES HAY COMPANY, Allegheny, Pa., have been granted a charter of incorporation, with a capital stock of $50,000. The incorporators are James Hay, James Walker, Ed. G. Hartje, all of Allegheny, and Charles Adams of Sewickley, Pa. This new concern will succeed to the business of James Hay, plumber and gas fitter, located on Ohio street, Allegheny, Pa.

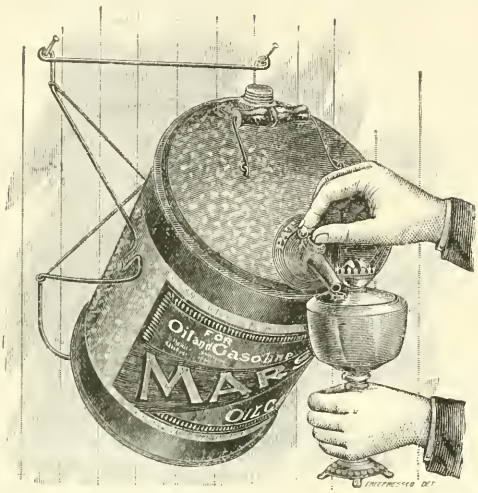
Work on the Public Buildings in Philadelphia has been suspended for some little time owing to the effort which has been made to abolish the Building Commission, under whose charge the work of erection has hitherto been carried on, and to place it under the direction of the Director of Public Works. A decision in the matter is expected shortly, when operations will be resumed. The completion of the structure will, however, take some time longer. All the massive columns and pilasters of the tower, together with some of the smaller iron work for the clock story of the Public Buildings, have been successfully passed through the electo-aluminum plating process at the Tacony Iron & Metal Company's works.

It is intimated from Washington that the Postmaster-General may take measures to hasten the delivery of the European mails by making further improvement in the ocean post offices.

THE RETAIL STORE.

The Mars Swinging Oil and Gasoline Can.

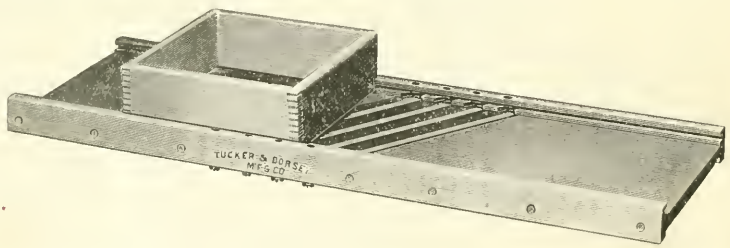
A galvanized steel swinging oil and gasoline can, which is being brought to the attention of the trade by the Detroit Galvanizing & Sheet Metal Works of 171 and 177 Csss street, Detroit, Mich., is illustrated in the accompsnying cut. This can is known under the name of Mars and is referred to by the makers as being exceptionally convenient for fsmily use. The statement is made that evaporation of its contents is impossible, as the valve which is used closes of itself when not held open. There are no pump or taps to get out of order and leak, and the arrangement is such that the can may be hung upon the wall, the side of the house, or in any convenient place. This, it will be seen, does away with the necessity of a shelf, while permitting its use in a position convenient for filling lamps, &c. The view which we present herewith shows the can suspended from nails driven in a wall or partition, and the manner in which a lamp can be readily filled. One of the features of construction is Briscoe's cast-brass valve spout, for which many claims are made. When it is desired to refill the can, it can be lifted out of the frame or standard by which it is supported and carried by the handle in the top. The manufacturers state that this can is well adapted for gasoline, owing to the fact that the gasoline stove may be filled directly from the can, the danger of evaporation being reduced to a minimum, by reason of the fact that there is nothing which can be left open. Only one size of the can is at present made by the company—that having a capacity for 5 gallons. In filling a lamp from the can the latter is tipped forward until the spout is inserted in the opening of the lamp. The lever is then pushed back, holding it with the thumb, or if it is pushed back to the center it will stay itself. When the lamp is filled the lever is allowed to slide into its proper place. Upon releasing the can it assumes its proper position. The manufacturers state that they are meeting with a very gratifying demand for the Mars can, more especially since they adopted the wire standard, by which it can be hung upon the wall.



Position of the Mars Swinging Oil and Gasoline Can when Filling a Lamp.

Adjustable Kraut Cutter.

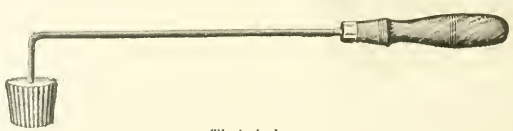
Tucker & Dorsey Mfg. Company, Indianapolis, Ind., are introducing this article, as herewith illustrated. The device consists of rocker-shaped bearings under the ends of the knives, which are held in position by bolts secured underneath by wing nuts. To adjust the knives the bolts are loosened, the knives set at the desired angle and the bolts tightened again. By taking out the bolts the knives are released and may be removed for cleaning or sharpening. It is remarked that any number of different adjustments may be made without fear of wearing down the bearings and thereby throwing the knives out of line. Among other features in the cutter the manufacturers call attention to the following: The frame work, side strips and sliding box are heavy, and are made from thoroughly seasoned hard wood, and the grain of the wood forming the body of the cutter is run crossways as an additional safeguard against warping, and the knives are strongly made of highly tempered steel, finely ground. It is claimed that the knives will last a lifetime, and that they will not bend and give down when in use, but will preserve an even cut.



Adjustable Kraut Cutter.

Timbale Iron.

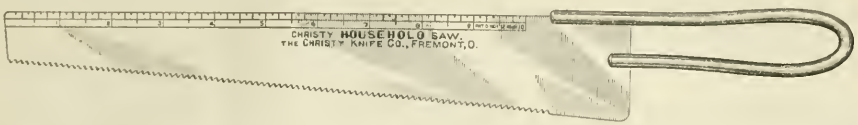
The accompanying cut represents a timbale iron, introduced by the Union Mfg. & Plating Company, Freeport, Ill. The head and blade of the article is a finely-plated casting, either plain round or fluted round, with a hand-polished black walnut handle. In use the head is dipped into hot lard and then into batter, thus giving crullers the form of the head.



Timbale Iron.

Christy Meat and Household Saw.

The Christy Knife Company, Fremont, Ohio, are introducing this article, as herewith shown. The blade is 12 inches long, with a scale measurement etched upon its upper edge. The wire handle is 4 inches long, securely fastened to the blade. The saw is heavily nickel plated and, it is stated, of excellent quality. It is designed for use about the house, for cutting the bone of ham or other meats, also for light work for which a saw is often needed.



Christy Meat and Household Saw.

Bee Smokers.

The accompanying cuts represent bee smokers, being offered to the trade by A. I. Root, Medina, Ohio. The improved Clark smoker, shown in Fig. 1,

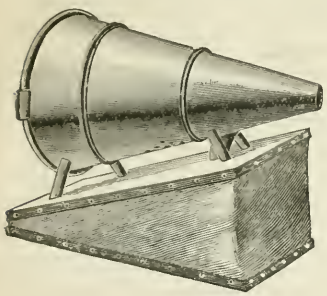


Fig. 1.—Cold-Blast Smoker.

is adapted to the use of planer shavings, excelsior mixed with saw dust, and soft rotten wood. The smoker is provided with a door at the large end for filling, and sandpaper beside the fire pot for lighting the match. The Crane smoker is shown in Fig. 2. The fire barrel is lined on the inside with asbestos

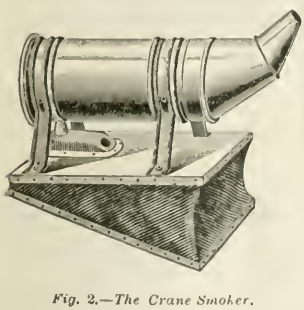
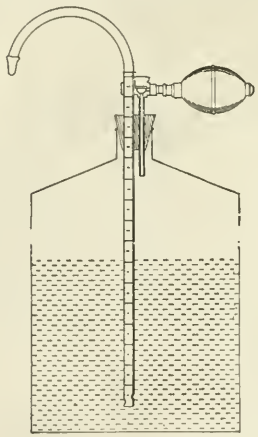


Fig. 2.—The Crane Smoker.

and sheet iron, as is also the cone, to prevent them from becoming uncomfortably hot, or filling up inside with creosote. They also avoid the use of shields, which, it is explained, are liable to get bent or caught. The principal feature of the smoker is referred to as being the valve and fire cup. The point is made that the bellows are large, with a durable elastic spring inside, and that the valve proper is held in position by another spring. The manufacturers state that the Crane hot-blast smoker has the strong blast of the Clark with all the advantages of the hot blast; that it makes no difference whether it is crammed tightly with fuel or not, as it will deliver the same force of hot blast as when empty, and that the smoke is not sucked into the bellows.

Universal Lamp Filler and Liquid Extractor.

Donathen Novelty Mfg. Company, 510 Broadway, Kansas City, Mo., are introducing the above article, as illustrated herewith. The cork is made of rubber, graduated, and slides up and down on the main tube, so as to fit any sized opening or depth, from a 1 quart to a 5-gallon can. It is recommended by the makers for filling gasoline stoves, lamps, &c., from a can without spilling a drop; also for forcing liquid out of bottles, jugs or demijohns. The design of the device is to provide at a small expense an arrangement that will make old cans as serviceable as expensive pumping cans. The article is made in two sizes—No. 2 for 2-gallon cans, and No. 5 for 5 gallon cans.



Universal Lamp Filler and Liquid Extractor.

KARST & BREHER, successors to Foos & Co., West Third and Exchange streets, St. Paul, Minn., have issued a pamphlet in which they state that in connection with their hardware, stove and house furnishing department they have just completed a new workshop, which is under the direct supervision of L. S. Breher, who gives personal attention to all work turned out. The firm handle Jewel and Quick Meal gasoline stoves, Carton furnaces, Hurd refrigerators, Philadelphia lawn mowers, Sterling ranges, Peninsular stoves and other goods of interest in this connection.

An Improved Hot-Air Damper.

We illustrate herewith an improved hot-air damper which is being placed on the market by the Excelsior Steel Furnace Company, Chicago. This concern have made and sold a great many dampers of the form and construction familiar to the trade, but seeing an opportunity of improving the same, they have built new machinery for the purpose, and are now turning out the new goods. In the new damper no rivets are used, the cleat holding the rod being formed of galvanized iron passing entirely through the damper and being clinched on the opposite side. The rod also has been improved by making the handle smaller.

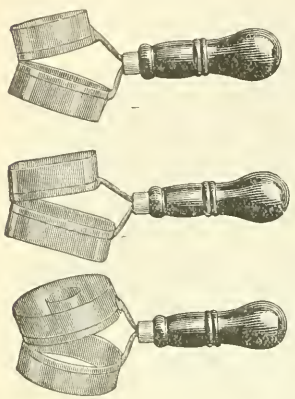
The new damper is made almost wholly on the die process, and, while a small thing, it may be interesting to note that in the course of manufacture it passes through fully a dozen different machines and processes. The disk or body is circled out on a machine built for the purpose, and then passes to a die which perforates eight holes through which the cleat passes. The cleat is cut out by a die in the form shown in the small figure to the right of the damper handle in the cut, and then is formed up by another press to the shape shown in the figure to the left in cut. Next the cleat is placed in position, and clinched by machinery and rod put in. The rod itself is first cut into suitable length from bars of steel, then passes through a machine which turns the handle, after which the rod is drilled and pointed. In spite of these numerous operations the damper complete is sold to the trade at a remarkably low price.

An Improved Hot-Air Damper.

A. E. HALLECK, 269 Court street, Brooklyn, has a sign in front of his store bearing the seasonable suggestion, "Now is the time to have your furnaces and fire-place heaters put in order."

Lebanon Cake Cutters.

Seltzer Specialty Company, Lebanon, Pa., are introducing cake cutters, as herewith shown. They are made in three styles and sizes: Nos. 1, 2 and 3. The No. 1 has one cutter 2¼ inches in diameter, and one 2¾ inches diameter. No. 2 has two oblong cutters, 2 x 2½ and 2½ x 3 inches in size. Both cutters of No. 3 are 3 inches in diameter, but one of them has a center cutter 1½ inches in diameter. The cutters are well and strongly made, with convenient sized black enameled handles. The cutters are attached at the proper angle to be easily manipulated and are designed to clean easily, being entirely open. They are intended for cutting biscuits, doughnuts and cakes.



Lebanon Cake Cutters.

Sales by Manufacturers and Jobbers to the Retailer's Customers.

This matter, which has been discussed at some length in our columns, is attracting wide attention and we are in receipt of many letters from the trade in which the subject is touched upon as seen from the different standpoints of the writers. Some, it will be observed, while protesting against the injustice and demoralizing influences of this practice, regard it somewhat in a spirit of resignation; apparently feeling convinced that nothing can be done or devised that will remove the evil. Others, however, advocate the vigorous adoption of retaliatory measures by the retail trade in the way of withholding patronage from the manufacturing and jobbing concerns by whom this method of securing a market for their goods is practiced, and in several cases it will be seen that our correspondents refer to the success which has attended their efforts in this direction. The formation of a national protective association, comprising retailers in all parts of the country, is also urged as a remedy.

We take pleasure in giving below extracts from a number of letters which have come to hand. These, it will be seen, without exception discuss the question from the retailer's standpoint. There is also obviously something to be said in regard to the interests of jobbers and manufacturers in the matter, and we shall be pleased to hear from them concerning it. The letters which follow are all from Hardwaremen in the State of Illinois, in which, perhaps, the practice in question is more generally encountered than in other States:

We would suggest where jobbers and manufacturers make a practice of selling to retailers' customers that the retailer quit dealing with the firm or firms that do so. That is the plan we would adopt. We are not troubled with any such practices here by jobbers or manufacturers, and the only way for retailers to break up such double dealing is to refuse to buy goods from parties that practice such underhanded business. In our judgment, if all the retail dealers would do as suggested it would very soon break up such practices.

We note with much interest the movement of retail Hardware dealers to protect their business. We find it impossible to secure the trade of the larger and responsible contractors and builders, as we cannot cut under prices obtained by them from the jobbers. In this section, however, the worst evil is the practice of the dry goods firms using Hardware as leaders. Not selling it at a profit, but often at less than wholesale cost to retail Hardware dealers, thereby drawing custom and probable trade for their regular line at prices sufficiently high to compensate them for selling Hardware at cost or less. This, of course, is taking our line of goods for purposes wholly illegitimate. And as the custom is rapidly on the increase the future of the retail Hardware trade is anything but encouraging in its prospects.

We make it a point, not to buy anything of those who cover the retail trade in our city.

We think if every one would adopt our plan, canvassing by jobbers' agents would be stopped.

It is beginning to hurt our trade to a considerable extent, and it has reached the point that the jobbers do not care whether the retail merchant buys of them or not. So you can see that it would not help us not to buy of them. I have, however, been buying of firms that will not sell to any one but the trade. I think that a protective association broad enough to cover the whole United States would be the only way to stop the evil complained of.

We have noticed a disposition on the part of small jobbers and large retailers of Chicago to reach out after trade, and in some cases have heard of manufacturers, especially in builders' Hardware, soliciting trade among the consumers, all of which is more or less annoying. Up to date, however, we have experienced no special loss of business. We can not complain of the treatment accorded us by the legitimate jobbers. We do not know of any of them who are selling direct to consumers, but have noticed an increasing tendency among manufacturers of builders' Hardware, and carpenters' Tools especially, to sell direct—the latter under pretense of introducing new goods. We have no reason to complain as yet, and hope we may not in the future, but are rather apprehensive of what may follow so much competition.

In this city and vicinity manufacturers and jobbers frequently sell their goods to carpenters. I would be greatly in favor of some method by which this practice could be abolished, as it injures the Hardware trade.

Jobbers agree to protect the retailer and then sell to any they can. I try to compete, but there is no use in trying, as I am too small a fish. —— sell direct to consumers at jobbers' prices. Not only these people but others do so who claim to do otherwise.

I have experienced considerable trouble and loss by jobbers and manufacturers selling to consumers and have made it a practice to have as little to do with those who resort to it as I possibly can. I always discourage the use of goods that can be bought from such concerns.

The retail Stove trade has been suffering and meeting with considerable loss of business by manufacturers selling to outside parties from catalogue in my section of country, which is forcing practical Stove dealers to curtail their stock and not carry the large stock of late years, and the Stove dealer is obliged to add other lines of goods to keep up, or shut up shop and go out of business. The combined Tin shop and Stove store are fast going and will soon be numbered with the past. Manufacturers are to a certain extent to blame for this. I have been 26 years in the Stove trade.

Our farmers and town people buy a good many goods from the manufacturers and wholesalers, from whom they obtain them very nearly as cheaply as we can buy them.

We have had some trouble from this source. A few of our commercial travelers are so anxious to increase sales that they are guilty of this practice

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The John B. Varick Company, Manchester, N. H., whose store was destroyed by fire, have recently taken possession of their new building, built on the site of the old one. The building is five stories high, with a frontage of 37 feet and a depth of 100 feet; the entire premises occupied by the firm, including the warehouse, has a floor space of about 40,000 square feet. The building is fitted with modern improvements, and the stock includes Heavy and Shelf Hardware, Bicycles, Sporting Goods and House Furnishings. A Bicycle riding school and a machine shop, where Bicycle repairing is done, are features of the establishment.

STOVE TRADE NOTES.

Exhibits at the World's Fair.

Heating and Cooking Apparatus.

Manufacturers of cooking and heating appliances have not enjoyed special advantages in location. They are not in the central avenue in the Manufactures Building, as that has been dedicated to exhibits of foreign nations principally. A section in the east pavilion of the building toward the northern end was deemed by the authorities of the fair as the best space available for this purpose. It is crossed at several places by galleries containing other exhibits, cutting off the view. Under the circumstances the manufacturers of cooking and heating apparatus have done very well, and those who succeed in finding them will be well repaid for their trouble by the beauty of the exhibits. Beginning at the north end, the first in order is the display of.

COLLINS & BURGIE COMPANY

of Chicago, and

WILLIAM RESOR & CO.

of Cincinnati, who jointly occupy a space extending from aisle to aisle. It is inclosed by graceful pillars of white and gold, supporting a heavy cornice, gilt chains extending between the pillars. The floor is handsomely carpeted. The Collins & Burgie Company show the American Leader, Kalon Leader, and City Leader ranges; the Ardent Leader, Model Leader, and Columbian Leader cooks; the Carbon Leader soft coal base burner, the Oval Leader base heater, the Oak Leader, the Volcano cannon, and the Art Leader base burner. All are handsomely finished, but the Art Leader is especially resplendent in its dress of full nickel, with highly polished exposed surfaces and satin finished body. William Resor & Co. show the Monitor, Peerless Monitor, and Electric Monitor ranges; the Monitor, Peerless Monitor and Eclipse Monitor cooks, two Monitor oaks, three Monitor parlors, and two Monitor base burners. They are all very attractively finished. One of the Monitor Parlors and both the Monitor base burners are full nickeled and polished throughout. Passing down the east aisle, to the right, the exhibit next in place is that of

J. F. PEASE FURNACE COMPANY

of Syracuse, N. Y., who show the Economy steam and hot-water heaters and hot-air furnaces. The patterns exhibited are the Economy steam heater, low-down combination of steam and hot air, regular pattern combination steam and hot air, low-down warm air, regular pattern warm air, the Tropic warm air, combination hot water and warm air, and hot water alone. The different styles of grates and ash-pit sections are shown separately, also the steam boiler as used in the combination furnace. The hot water sections are also shown separately. The variety thus shown covers all kinds of heating apparatus in either separate or combined form. The floor is neatly carpeted and the walls and ceiling are covered with artistic wall paper, forming an attractive showroom. The front is inclosed by a heavy oak railing and balusters. Continuing toward the south, the next exhibit is that of the

AMERICAN RADIATOR COMPANY

of Chicago, whose pavilion extends from the east aisle to the next on the west. The roof of this pavilion is supported by heavy columns, with massive railings running between them. Heavy columns support ornamental arches in the center of the space. The painters and decorators are still at work on this company's exhibit, so that its beauties were not observable by our reporter, but with the very great variety of radiators they make and the well-known high finish of their goods it can well be imagined that the display will be a very fine one when in complete order. Next comes the

CHICAGO STOVE WORKS

of Chicago, with a remarkably pretty display. They have inclosed their space with plain but massive pillars in white and gold, supporting a roof which is ceiled with maroon-colored paper having a gilt border. Cloth hangings of the same color surround the room, while heavy lace and tassels form a very appropriate frieze. The stove platforms are covered with maroon cloth, and the floor is also covered with a rich carpet to correspond. The stoves shown comprise three Gold Coin ranges, two Gold Coin cooks, five Gold Coin base burners, a Gold Coin oak and a Gold Coin cottage. All are exceedingly handsome, the nickel work being especially meritorious. The heating stoves are completely nickeled, except one of the base burners, which is finished with some gilt work, making quite a novel combination. The full-nickeled Oak is worthy of special notice. The body is as highly polished as a mirror, while the fire pot shows up remarkably well with its beautiful polish. Electric lights illuminate this pavilion, a rich chandelier being pendent from the center of the ceiling. Occupying a choice space at the intersection of two avenues is the exhibit of the

MICHIGAN STOVE COMPANY

of Detroit, Chicago, Buffalo and New York. Their pavilion towers above everything in its vicinity. It is in the form of a huge cooking stove, representing the Family Garland, its big legs supported on low pedestals affording ample room to enter the space beneath, the under side of the stove forming a dome about 15 feet from the floor. This stove is a perfect reproduction of a cooking stove as to its exterior. The base skirting is of aluminum, while the company's trade-mark occupies a conspicuous position on the oven door. The words "Garland" on the front and rear, and "The Michigan Stove Company," on the side, will be illuminated at night by electricity from the interior of the stove. Electric lights will also illuminate the dome below, or ceiling of the pavilion. The space is inclosed by a heavy nickel railing made in their own works. The assortment of goods shown is large and extremely attractive, comprising three Monarch Garland steel ranges; the Challenge Garland, Champion Garland, Family Garland and Home Garland ranges, the first two being nickeled all over except the top, the Home Garland and Family Garland cooks, also resplendent in nickel and fine carving; six Art Garland base burners, full nickeled with recessed work gilded, producing a very ornate effect; five Peerless Garland cylindrical heating stoves with reversible flues; an Ideal Garland cottage stove, full nickeled and gilt, and a syphon-oak Garland richly finished in nickel, gilt and black. There are also a number of miniature ranges, complete reproductions of the large ranges, beautifully nickeled and gilded. Included in the exhibits are some rare old stoves, which will attract much attention. Standing beside a beautiful production in nickel, gold and tile, which is labeled, "The latest American base burner," is a quaint piece of stove work, bearing all the marks of ancient stove molding, sharp in its angles, severely square, and towering upward like a church steeple, on which is the placard "The first American base burner." Of the history of the latter we are not informed, but the contrast between the two is most marked. Another stove, fondly regarded as the oldest stove in America, occupies an honorable place in the center of the pavilion. It was imported from France at great expense. It is rectangular in form, made wholly of cast iron, and the side plates show some attempt by the molder at art work, in the representation of figures, vines and other ornaments. It is a wood stove and was made in 1656. A third is said to be the oldest cook stove in America. It was made in 1767 at Hereford Furnace by Thomas Maybury, as shown by the inscription cast on the side. It is also a wood stove, with a fire box and an oven of the class known later as tenplate stoves. One oven door is gone, but the rest of the stove is well preserved. It is not as artistic as its French prototype. These goods have a beautiful setting, with a rich velvet carpet covering the floor, making a superb showing in every respect. Turning the corner, the next exhibit is that of

ORR, PAINTER & CO.

of Reading, Pa. The arrangement here followed is very tasteful. The center of the space is occupied by a square platform, on which are grouped specimens of open fire places, or mantel stoves, in nickel and brass, the Happy Sunshine 4-hole range, the Radiant Sunshine open stove, the Home Sunshine 5-hole range, the True Sunshine 5-hole range and the Glad Sunshine 5-hole range. Rising in the center of these is a high platform, on which stands a Bright Sunshine base burner, with nickel and tile decorations. Running round three sides of the space are platforms on which stand the New Sunshine 6-hole range in two styles, the Kitchen Sunshine double-oven range,

the Domestic Sunshine single-oven French range, with horizontal boiler overhead; also, the same without the boiler; the Othello 6-hole range, the Grand Sunshine cook, the Perfect Sunshine 4-hole range, and the Merry Sunshine, Western Sunshine and Sunshine base-burners. An old-copper tubular railing runs across the front of the space and the floor is richly carpeted. Next comes the display of

THE MASON & DAVIS COMPANY

of Chicago, whose exhibit is inclosed within walls and a ceiling, giving the effect of a beautifully finished apartment. The ceiling is decorated, and a fine frieze ornaments the walls. A heavy oak railing incloses the front, the broad top making a convenient counter. The floor is neatly carpeted, and the ranges are placed round the walls. The exhibit comprises a large 9-hole double-oven wrought range, with charcoal broiler and high and low warming closets, a 6-hole single-oven range with reservoir, a 6-hole gas range with water heater and high broiler, an 8 hole combination coal and gas range, a 4-hole gas range, a 6-hole coal range, the same with high warming ovens, a 4-hole coal range and a laundry stove. The combination range is the most striking feature of this assortment of choice goods. The front and top are full nickeled and highly polished, the high warming closets and broiler are elegantly nickeled and a very pretty Russia iron canopy with an ornamental polished nickel molding and finial surmounts the whole. The gas ranges will be connected and operated during the exposition. Adjoining is the exhibit of the

RICHARDSON & BOYNTON COMPANY

of New York and Chicago They show a superb line of furnaces and ranges, the assortment consisting of the Fire King heater and the Perfect Room heater for large halls, the Perfect double return flue furnace, the Giant furnace, the Perfect wood furnace, the Perfect oval furnace, the Perfect 6-hole wrought range and the Perfect 8-hole double oven range Nos. 11 and 14 The furnaces are shown jacketed, but with portions of the jacket cut away, so that the interior construction may be seen. The grate and ash pit section is also shown separately. Crossing to the opposite side of the avenue the exhibit of the

MILWAUKEE GAS STOVE COMPANY

of Milwaukee, Wis., is reached. This is an excellent specimen of what can be accomplished in a very small space. They have only 6 x 7 feet on which they show a Perfection 6 hole and a Perfection 4 hole range, with water heater attachment, and a separate Perfection water heater, with a copper boiler near by. The ranges and boiler are well finished and beautifully decorated. They stand on a dark green carpet, with brass edging. Ornamental brass railings extend along the sides of the space, and large mirrors on two sides are framed in massive brass frames, while glass signs in black and gold extend across the top. In the next space adjoining is an exhibit of

THE POWERS DUPLEX REGULATOR COMPANY

of Chicago, who show a number of their temperature regulators in various styles of finish. An arrangement has been made by which the effects of varying temperatures are shown in the operation of the regulator. This is done by means of an ice chest with a rubber cover. The thermostat applied to this cover and then to another not connected with the ice chest operates dampers rigged in connection with a furnace near by. The principle of the regulator is thus essily demonstrated. Other applications are shown in a practical manner. The device has been adapted to steam and hot water, as well as hot air, the arrangement for hot water and low pressure steam being very prompt and effective in action. Another device shown is a natural gas regulator operated in connection with the thermostat, for regulating the flow of natural gas to the point of consumption. These regulators are now in use in the natural gas region and are in special favor among natural gas consumers in Chicago. Next in order is the exhibit of

J. W. WARNER

of Oneida, N. Y., who shows samples of his hot-water or steam boiler, styled Warner's Rapid Circulator. Two sizes of the boiler are in place, and in addition are shown some of the sections separately. This heater is built with vertical cast sections, each of which extends its whole hight. They can be coupled in any number desired, for either limited or large capacity. Each section has vertical passages on the sides, three horizontal passages at the top, over the fire pot, and one horizontal passage at the bottom. There are two fire pots—one in the usual place in front and the other in the rear, the latter being fed by a magazine, which opens on the side, near the top of the heater. Next comes the exhibit of the

CHICAGO CLOTHES DRYER COMPANY

of Chicago. They show a handsomely decorated apparatus, consisting of a stove of special construction for heating water and supplying heat for the dryer. In the rear of the stove is a completely metallic closet, with a number of sliding racks on which to hang clothes for drying after washing. The racks are made of galvanized iron, and slide in and out on trolleys running on bars arranged overhead. The stove used in connection with this dryer is a specially designed laundry stove with an oval fire pot and shaking and dumping grate. It is designed for boiling clothes, heating flat irons and furnishing hot water for domestic use, having a large water back. The exhibit of

GEORGE M. CLARK & CO.

of Chicago comes next. The Jewel gas and gasoline stove line will have a fine setting when finished, but the stoves had not been arranged for inspection at the time of the writer's visit. Next comes the exhibit of

H. M. CHAPMAN,

127 West Washington street, Chicago, who shows the heater known as Chapman's Combine, arranged for low-pressure steam heating, hot-water heating and high pressure steam for power.

(To be continued.)

THE STOVE TRADE will regret to learn that E. L. Messenger of Auburn, N. Y., is seeking to improve his health by a trip to East Junction, Col., where he may enter into the fruit-raising business. Having traveled many years for Sherman S. Jewett & Co. of Buffalo, N. Y., and more recently for the Abram Cox Stove Company of Philadelphia, he has many friends in the trade.

James Jones.

James Jones, superintendent and one of the directors of the Carton Furnace Company, Utica, N. Y., died a few days since at his residence in Utica after an illness of eight months. He was born in Manchester, England, March 1, 1824, and learned the trade of a molder. He came to America in March, 1848, and located at Waterville, where he worked for some time at his trade. Later he was employed in Albany, Troy, Cohoes and Leonardsville. He served with distinction in the Civil War, and at its close returned to Leonardsville, where he took charge of the molding shops of H. Dwight Babcock's Agricultural Implement and Furnace Works. About the year 1880 he went to Utica and took charge of the molding shops in the furnace works of E. A. & W. J. Carton. He was one of the incorporators and trustees of the Carton Furnace Company, which was formed in July, 1883. Mr. Jones was a man of the strictest integrity, straightforward, capable, and one who faithfully fulfilled the many duties devolving upon him. He leaves a widow and four children, one of whom has acted as superintendent of the Carton works since his father's illness.

Trade-Mark of the Art Stove Company.

The Art Stove Company, with office and works at Russell street, Milwaukee avenue and Boulevard, Detroit, Mich.,

Trade-Mark of the Art Stove Co.

have just been granted a patent on their trade-mark, an illustration of which is presented in the accompanying engraving. The trade-mark is not exactly new, but only recently has it been patented. The design is appropriate, considering the line of goods which the company are manufacturing, and if "laurels" have anything to do with success it is the impression that the Art Stove Company can use them without any hesitation. During the past two years the concern have increased their plant four times, and now state that their orders are such as to engage nearly the full capacity of the present plant.

The Brand Stove Company

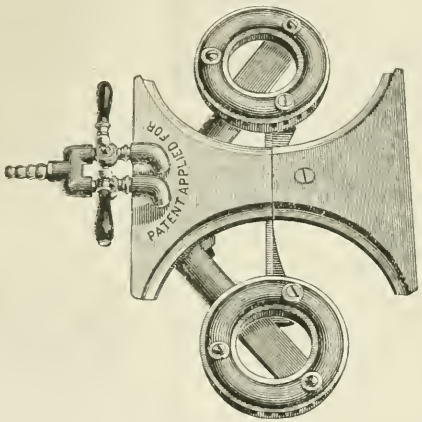
of Milwaukee, Wis., have issued two seasonable catalogues. One covers the company's Famous Wisconsin furnaces and the other their Famous gas ranges and stoves, and oil range and oil and lamp stoves. The furnace catalogue comprises 16 pages. It announces the expansion of their furnace department into a speciality. A short treatise is given on the subject of selecting and properly setting a furnace. This is followed by an explanation of the construction of the C series of furnaces, which have a cast V-shaped upper section or radiator, causing the heated smoke to travel in zigzag form before the outlet of the smoke pipe is reached. The furnaces in this series are made in

four sizes, for either brick-set or portable form. A line of steel radiator furnaces has been added this year in two series, known as F and R series. The steel radiator has a bowl shaped deflector. The furnaces of the F series have from 12 to 14 3-inch wrought iron cylindrical flues ranged perpendicularly along the inner side of the steel radiator. The radiator in the R series is of plain steel, adapted to meet the demand for a low-priced and quickly heating furnace. There are four sizes in each of these series. All have very large ash pits and revolving grate bars. The gas and oil stove catalogue consists of 24 pages. The Famous gas range is first taken up and its special features are treated in detail. Two sizes are made, the larger being adapted to a hot-water attachment. The water coils for the latter are so situated that the waste heat provides power for two cooking holes. Particular attention has been given to accuracy of fitting of all valves and connections, and the company give an absolute guarantee as to perfect operation. These ranges are artistically designed, lavishly ornamented with nickel work, and have finely polished edges. A line of junior gas stoves or hot plates is also made. The Famous oil range has been on the market for a number of years, and has won for itself a most excellent position in the trade. The burners are constructed on the principle of the student lamp, so that the tank is away from the flame, keeping the oil constantly cool. This range is mounted on a high cast-iron stand of ornamental construction, fitted with casters. The burners are drawn out by a sliding plate for cleaning or lighting. The drum is made of either cast or Russia iron. When made of cast iron it is provided with facilities for heating sad irons on the side while cooking on the top. Stoves of the same type are made with low stands, and with one to four burners. The Famous lamp stove is made with one to three burners.

THE CENTURY STOVE COMPANY of Dighton, Mass., who manufacture the Century ranges, are about to make an addition to their foundry, put in more machinery and rearrange the entire plant so as to afford the largest possible producing capacity. This concern is under the management of G. L. Walker, an experienced all-around stove man, and we are advised that the Century ranges are being very well received by the trade and that the demand for them is steadily increasing.

Coal Range Gas Attachment.

Geo. Bovier of New York has recently patented a gas burner attachment for coal ranges, which is being put on the market by the Harlem Gas Appliance Exchange, at 155 West 125th street, New York. The cut gives a clear idea of its use. The device consists of two gas burners attached to a short cross piece made for 6, 7, 8 and 9 inch stoves. The cross piece is made short on the points to fit any stove, and in two parts, cut in the center so that it may be lengthened or shortened as required and fastened at the desired distance by a stove bolt, which can be adjusted with a screw driver by any one. The burners are so attached as to be centrally located under the cooking holes and at the proper distance below them to give excellent combustion. It is claimed that the whole top of a stove is heated and the oven made available as a warming closet. Each burner has its gas cock, so that one or both may be used. To apply it for use only requires that the covers and cross piece be removed from the stove and the gas burner attachment set in place and a gas hose connection made with the nearest supply. It can be removed with equal facility when a coal fire is desired.



Coal Range Gas Attachment.

Heating by Electricity.

Much has been said and written about the future of electricity as a heating agent, one of the latest contributions to the subject being an article in an English gas journal. Although it is difficult to estimate the possibilities of the electric current, the difficulty, says the writer of the article, is rather one of setting bounds to the ingenuity of man within the limits set up for him by the nature of things than one of ascertaining what these limits are. This is especially true in regard to heating by means of the electric current. Ingenuity may be infinitely varied in regard to the use made of the heating properties of the current; but vary the application as you will, you cannot by any possibility get a given electric current to produce more than a given amount of heat, though you may concentrate the development of that heat upon so small a quantity of matter as to produce a very high temperature.

If we have a given quantity of heat and diffuse it through greater quantities of material, we obtain lower temperatures; but if the temperature be adequate, the important question comes to be, in reality, How many units of heat can I get at that temperature for a penny? In this particular application the question takes the form, How many units of heat can I get from a given supply of electric current? The answer is this, that there is a limit beyond which you cannot go; so much electric energy corresponds to so much heat, no more and no less. You may waste some of your current or some of your heat; but you can certainly never get any more heat out of a given current by any form of apparatus than the current energy itself will transform into. Then what is this maximum? Suppose we take 1000 watt-hours, the quantity of electric energy which is quoted at all sorts of prices from 3 half-pence to 15 pence, the Board of Trade 8 pennyworth (3 cents to 30 cents, say an average of 15 cents), and let us transform this into heat and see what we get. Of course we shall have to do some calculation, but the data are quite well known. Taking the energy unit known as an erg, the 1000 watt-hours are equal to the apparently large amount of 36,000,000,000,000 ergs; but if we translate this into foot-pounds we find that it is equal to 2,654,340 foot-pounds. Now, it requires 773 (?) foot-pounds of work in the form of heat to raise the temperature of 1 pound of water by 1° F. This was Joule's great discovery. Therefore the 8 pennyworth (15 cents) of electrical energy could raise 3434 pounds of water through 1° F.; and this quantity of energy could, in the form of heat, raise 2.95 pounds of steam at atmospheric pressure, and no more than that.

But the heat of combustion of about ¼ pound of coal could do the same thing; and assume, if you like, that you only recover 5 per cent. of it, and that the electric current costs only 5 pence (10 cents) per Board of Trade unit, then electricity at that price is equivalent in cost, for general heating purposes, to coal at 147 shillings 1 penny (over $35) per ton. One ought, however, to be able to recover a great deal more than 5 per cent. of the heat of combustion of coal, and if you do the equivalent figure goes up in proportion.

Electricity as a heating agent has, accordingly, its limits. It may be very convenient or even indispensable in particular cases; but for the general purposes of heating, the same qualities which are of advantage to it when it has to boast of its cool glow lamps and cool arc lamps stand in its way when it wants to enlarge upon its own remarkable heating powers.

ODD PLATES.

IT REMAINED for the Gobeille Pattern Company, Cleveland, Ohio, to find an appropriate use for the Columbian stamp. The reason for the colossal size of these publications has been as inscrutable as the existence of the mosquito, and probably the former. In the short time they have been before the public, have called forth more condemnation in verse and prose than has been launched against the mosquito since the discovery of New Jersey. The Gobeille

Pattern Company, however, have divined the intent of the designer of the issue and send out two-cent specimens carrying a quaint little advertisement printed over the mucilage, to the effect that any who are interested in originality in stove patterns will do well to use this stamp, and incidentally they refer to the Gobeille Pattern Company.

Spicer Stove Company, Providence, R. I., are showing to the trade their Model Grand range with latest improvements for 1893. The range is very substantially made, handsomely designed and ornamented in quiet, good taste. Some of the newer features are a patented portable shelf held in place by a lattice-work support, and a combination oven rack and rake, which, on being pulled out, carries with it any article that may be at the base of the oven and too far back to be reached easily by the arm. A feature of this range is the solid square-shanked oven door knob, which cannot be broken or twisted. Spicer Stove Company also show a line of French model double oven portable ranges, and manufacture toy ranges that are perfect *fac-similes* of the larger stoves, including flues and working parts. These little ranges may be operated the same as the larger one's and will produce somewhat the same results on a smaller scale. We are advised that they have met with a large sale, especially in the West.

The B. C. Bibb Stove Company of Baltimore will shortly issue to the trade a new catalogue of their furnaces. They are busily engaged at their works on orders and stock for the coming season and expect to increase their line by the addition of a new range and a heater.

The Kernan Furnace Company and Gurney Hot-Water Heater Company have established offices of the Chicago branch of their business at 59 Wabash avenue. These offices have been newly equipped and will be used jointly by the companies named for office purposes. Storage facilities of 8000 feet in the Walker-Oakley Building will be devoted to a display of a line of samples of each of these makers of heaters and for the storage of stock for Western shipment. Joseph Kernan and Wm. J. Owens will represent the interests of the Kernan Furnace Company in Chicago.

A new soft coal heating stove will be one of additional attractions to the Continental line of stoves made by the Buckwalter Stove Company at Royersford, Pa.

A gas cook stove, made by the London Fire-Appliance Company, on a novel principle, is illustrated in the London *Ironmonger*, and is said to be the first of its kind yet built. The method used is that of condensing tubes, in which, it is said, all deleterious fumes are converted into water and become perfectly harmless. No flue is used, but it is not shown exactly how the deleterious matter is eliminated from the vapor. The advantages claimed for this method of utilizing gas for cooking purposes are absolute freedom from smell, economy in consumption of gas, with better cooking results, and doing away with burners inside the oven.

S. B. Sexton & Son of Baltimore are finding that although they enlarged their factory buildings to a considerable extent last year the enlargement did not meet their requirements. They have recently been compelled to utilize their stables for foundry room, and to enlarge their warehouse by a one-story addition. They expect to put on the market this season a line of new furnaces of return flue construction, and will add several new patterns to their line of Baltimore heaters. They will remodel their Grand heater and their Baltimore range. The Grand Record range, which they introduced a season or two ago, will also be remodeled. The latter, they state, is meeting a splendid demand, and has proved to be a good seller.

The contest which has been extended over the past year in the case of the Front Rank Steel Furnace Company, St. Louis, Mo., vs. the Wrought Iron Range Company, St. Louis, Mo., has at last ended in a victory for the former, and the Wrought Iron Range Company's Home Comfort round steel furnace has been held by Judge Hallet of the United States Circuit Court to infringe the patent of the Front Rank furnace. A decree has been entered awarding the Front Rank Steel Furnace Company damages, profits and costs, and an injunction granted forbidding the Wrought Iron Range Company to manufacture, use or sell any more of these infringing furnaces. The legal fight between these two companies has been a long and bitter one, both realizing that the furnace in question was the best, so far as principle of construction goes. Evidence was taken in Chicago, Boston, Philadelphia and St. Louis, but the patent granted to the Front Rank Steel Furnace Company has stood the siege and come out unscathed. The Front Rank Steel Furnace Company very naturally feel elated over their victory, as their business last year showed an increase over the preceding year of over 60 per cent. and they see still greater gains during the present year.

H. W. Knight & Son, Seneca Falls, N. Y., are making a specialty of hair line Gothic letters and figures, which are turned out expressly for the use of stove manufacturers. The letters and figures are said to be very light, thus requiring little metal, while leaving nearly a smooth surface.

Adams & Gregory, 35 Arch street, Boston, Mass., have issued circulars of the Standard gas generator, a simple device for the use of kerosene oil as a fuel for heating and cooking purposes. The device is of such a character that it can be readily employed in connection with an ordinary cook stove or range, and the manufacturers claim that it gives entirely satisfactory results in operation.

The J. D. Smith Foundry Supply Company of Cincinnati, Ohio, have issued a series of circulars relating to their leading specialties. Prominent among these may be mentioned improved tumbling barrels, made in a substantial manner and furnished in octagon or square shape in almost any size desired. Attention is also called to Radiant facings and to a full line of Monk's celebrated molders' solid steel tools. These include a number of the latest shapes and sizes of handy tools suggested by practical molders. The company carry a large assortment and any tool in the list will, we understand, be mailed free on receipt of price.

The William Miller Range & Furnace Company of 9-11 West Fifth street, Cincinnati, Ohio, send us a copy of a family catalogue which they have just issued relating to the Miller Monitor wrought steel ranges. In the opening pages are given 12 reasons why these ranges are the best, following which are *fac-similes* of first premium gold, silver and bronze medals awarded at the Centennial Exposition in Philadelphia in 1876, the Centennial of the Ohio Valley and Central States at Cincinnati in 1888, and at other fairs and expositions where the company displayed their goods. The Miller Monitor range is illustrated in various sizes and styles, while descriptive letterpress gives an idea of the general construction, the principle features embodied, the sizes in which the stove is made, the area of the oven, top cooking surface, &c. There is also shown a line of wrought-steel laundry or tailor stoves, intended for burning coal, coke or wood. Another feature of the pamphlet is found at the close in explicit directions for setting up and operating the wrought steel Miller Monitor ranges.

The Great Western Stove Works, located at Leavenworth, Kan., are reported to have sold more stoves last year than in any other similar period since the works were established. The company are now running full in all departments, getting ready for the fall trade.

Armstrong & Co. of Baltimore, Md., have been delayed in getting out all the sizes of their new range, but expect to have them on the market very shortly.

The Quincy Steel Range Company, with a capital stock of $10,000, is the name of a concern recently incorporated at Quincy, Ill. The incorporators are Lemuel C. Ross, Edward J. Drake and William H. Goverst.

The Anshutz-Bradberry Company of Allegheny, Pa., send us a copy of a 48-page catalogue which they have issued in the interests of furnacemen and builders. Within the terra cotta colored paper covers attention is invited to a complete line of warm-air furnaces made under the name Tremont. The claim is made that these furnaces combine all essential points which go to make a superior heater, that they are constructed of cast iron and steel plate and are adapted to anthracite or bituminous coal, coke or natural gas. The Tremont furnace is carefully illustrated and described, while tables are presented giving dimensions and capacities of the various sizes in which the heaters are made. Some general remarks on cold-air supply, the piping of furnaces, principles embraced in the Tremont warm-air furnace, a table giving capacity of pipes and registers and numerous suggestions of general interest in this connection are other features of the pamphlet. Fully one-half of the publication is devoted to testimonials and recommendations of those who have used the goods named. At the close of the pamphlet attention is invited to the Perfect Tremont six-hole range, made in three sizes, garbage burners, grate fronts, bake oven doors and miscellaneous goods.

"The House Comfortable, or Handbook of Hints on Warming and Ventilation," is the suggestive title of a 48-page pamphlet which is being issued by the Weir Furnace Company of Des Moines, Iowa. Within its colored paper covers is presented a great deal of matter relating to the subjects named, which is of intesest and value to the furnaceman and builder. It is designed to be circulated among people who are interested as to the best means of warming and ventilating their homes

and those who desire information of a practical character that may be applied to making the house not only comfortable but healthful and clean. While issued primarily for advertising purposes, it touches upon phases of warming and ventilating which are of general interest. Numerous illustrations are introduced showing some of the buildings in connection with which the company's systems have been employed, together with cuts of the Weir portable and brick set furnaces. We have before us four copies of "The House Comfortable," one of which bears the imprint of the Weir Furnace Company, and each of the others the name of one of the company's branches. These are the Lincoln Range & Furnace Company, Lincoln, Neb.; F. Meyer & Brother Company, Peoria, Ill., and the Standard Mfg. Company, Kansas City, Mo.

The numerous friends of William Corry who for nearly two months past have missed his genial presence from the neighborhood of Beekman street, will perhaps be interested in knowing that he is summering on his farm at Douglaston, Little Neck Bay, L. I. Here he is busily engaged in the mysteries of fin keels and models of big yachts for the Douglaston Yacht Club, in which Mr. Corry is deeply interested.

H. Shapiro, 107 and 109 Walker street, New York, in addition to manufacturing a line of plain stamped and japanned tinware, has recently brought out a line of gas stoves and oil stoves.

"Public Opinion" is the name of an interesting publication which is being issued with the compliments of the Carton Furnace Company of Utica, N. Y., and Chicago, Ill. It is what may be designated as a reference catalogue, containing as it does a large number of testimonials relative to the Carton furnaces and heaters. The letters emanate from all sections of the country, covering a wide range of territory and a period embracing nearly half a century. Among the letters are to be found those from persons who have used the Carton heaters for the past 30 years, and who after such a severe test particularly emphasize the merits of the company's goods. In addition to the long list of testimonials there are presented illustrations of the company's heatets, together with descriptive letterpress.

James Boyle & Co., Salem, Ohio, favor us with a neat calendar for the month of June. It is of the same size and style as the calendars which the concern have issued for previous months of the year, and carries in addition to the days of the month and week a view of the Perfect Oak stove. On the back of the card we find descriptive particulars referring to the Perfect Oak as possessing a number of interesting features. All the doors are said to be fitted against lap joints and fastened with turn keys and latches. The draft slides are wedged so that when closed they are air tight. The grate is of the shaking and dumping cone type, which, the makers claim, prevents clinkers and requires less fuel than the flat grate. Other features include extra sectional linings, double cut off wood grate with the makers' special shaking arrangement, extra large ash pan and attractive decorative features.

The Ohio Stove Company of Tiffin, Ohio, contemplate removing their stove works to Fulton, Ill., as soon as they can complete the erection of their new works. The latter includes a main building three stories in hight and 40 x 200 feet in size; molding room 100 x 150 feet; scratching and tumbling room 30 x 100 feet; engine room 32 x 45 feet; carpenter shop and nickel plating building 20 x 40 feet and two stories in hight; fire proof pattern building 25 x 40 feet and three stories in hight, and sheds 20 x 200 feet. All the buildings with the exception of the sheds, which will be frame, are being constructed of brick with metal roofs. The buildings are located at the junction of the Chicago and Northwestern and the Chicago, Milwaukee and St. Paul railroads, with "Y" connection with the Chicago, Burlington and Quincy road. We understand that the cause of the removal on the part of the company is that the bulk of their trade is West, and it is their desire to locate their works as near the center of distribution as possible. Fulton is on the Mississippi River 136 miles west from Chicago and the company feel that by their removal they will not only enjoy increased manufacturing facilities but also better means of distributing the finished product.

Giles F. Filley of St. Louis, Mo., has recently been granted a patent for an improvement in cooking stove construction, by which the heat is conducted more evenly from the fire space over the oven and delivered more uniformly to the bottom flue beneath the oven. A patent has also been issued to Mr. Filley covering range construction where a reservoir is employed. The object sought is the same as that mentioned in connection with the first patent. A third patent is for an improvement relating to three-flue cook stoves and ranges having a low-down reservoir In such stoves it has heretofore been the practice to warm the reservoir with the heat from the diving flues of the stove. In the present construction the reservior is not heated at the expense of the oven, but with heat which has passed around the oven and into the ascending flue and which otherwise would escape to the chimney.

E. E. Barto, representing the Abram Cox Stove Company of Philadelphia, is looking after the interests of his customers in New York and vicinity. The New Splendid range attracts the interest at present, while the Starling parlor goods are investigated with interest preparatory to the fall trade.

B. W. Baeder, representing the Lehigh Stove & Mfg. Company of Lehighton, Pa., is visiting the stove trade in New York and Brooklyn previous to a trip through the State in the interest of the Lehigh stoves and ranges.

Southard, Robertson & Co. of Water street and Peck slip, New York City, are about introducing to the trade a new range intended for use in flats. It is known as the Waldorf, and is said to have the largest oven of any stove of its class now on the market. It embodies the modern features and is neat and attractive in appearance.

Harry King, formerly with the Abram Cox Stove Company, is now representing the Kernan Furnace Company of Utica, N. Y. He has been spending a few days in New York City, where he has made some sales.

Practical Experience vs. Theory is the title of a circular sent out by the Bedford Heating Company of Brooklyn. It states that an experimental year, under the management of Chas. B. Hotchkiss and R. W. Cunningham, has been satisfactory to the extent of requiring increased facilities for handling the business. They add to their line of Bay State and Beaver furnaces the Bedford Ideal furnaces, and have the Maywood sectional art tile mantels, hearths and facings. Ranges and kitchen furniture to meet the modern demands are a part of their stock. Heating, ventilating, range and tile work receive their special attention and the benefit of a long experience of the managers with the Barstow Stove Company.

The Quick Meal Stove Company, St. Louis, Mo., have placed on the market a new hot-plate gas stove, made in one, two and three burner styles. The entire stove is of cast iron, of artistic design and furnished with gas-needle valves. The goods are meeting with much favor at the hands of the trade.

The Detroit Stove Works are particularly pleasant employers. They entertained their travelers of both Chicago and Detroit, 25 in all, at Detroit, on May 4, 5 and 6. The first day was spent in inspecting the company's mammoth works, which are now so extensive that the company claim to have the largest stove plant in the world. In the evening the visitors were taken to the theater, and afterward given a banquet at the Detroit Club. The table was set for 30 plates, all the officers being present with the exception of President E. S. Barbour, who had been slightly indisposed and was consequently unable to attend. Speeches and merry making followed until the "wee small hours," and a very jolly time was enjoyed by all. The next day was spent in the offices and sample rooms, and the travelers returned to their respective stations the day following, being much benefited by their short outing.

The Indiana Stove Works of Evansville, Ind., have issued a postal card to their friends in the trade, calling attention to a slight fire on the afternoon of Friday, May 19, which damaged a portion of their stock. The following morning, however, the company were busy in all departments, and they state that they are now ready to promptly fill all orders as before.

The Western Stove Mfg. Company,

with office and salesroom at 506 North Main street, St. Louis, Mo., have issued a neat stove catalogue of 68 pages, bound in colored paper covers and carrying illustrations of many of their leading specialties. The lines shown are made under the name "Bake-Well" and embrace constructions embodying the modern features and decorated in a tasteful manner. The list includes the Model Bake-Well for soft coal or wood; the Granger, Tariff, Midland, Bonnie Bake-Well, a range for wood only; Waco, Cherry and Eureka. The leading place among the heaters is given to the Value, a very neat parlor stove, which has been added this season to the company's assortment. It is made in two sizes direct draft, and in the same number as a base burner. An interesting variety of oaks, round base burners, Franklins and cottage parlor stoves are presented, while special attention is invited to the Rattler, a heavy egg cannon stove, made in two sizes. The Uncle Tom and Mascot are cheap laundry stoves, while the Artistic, Daisy and Silver Moon are tastefully decorated Todd stoves. A miscellaneous line of stove hollow ware and trimmings completes the work.

TRADE REPORT.

The Iron Market.

The situation as reflected by the Pittsburgh market presents a few encouraging features this week, and it is the impression that between now and July 1 there will be considerable activity among the mills, with a probability of higher values for some lines of goods. The advances in Bessemer Pig and Steel of last week have been sustained and the tendency of the market is in the direction of still higher prices for both materials. Makers of Structural Material are being favored with increased business, the very low prices ruling having stimulated buying to considerable extent.

In Wire Rods, Wire and Wire Nails, there is only a fair business with prices stationary. Pipe and Tube makers are having a busy season and a strong effort is being made to adhere closely to established discounts. Bars are in better demand, and buyers are hurrying in orders for shipment before July 1 in anticipation of trouble over the wage scales.

In the vicinity of Chicago the Iron trade has been remarkably quiet, and extreme stringency prevails in the money market; banks are curtailing discounts and accumulating heavy reserves to meet heavy possible demands from depositors.

Pig Iron.—Southern lines announce that the rail and water rates to Baltimore, Boston, New York, Philadelphia and Providence are not affected by the advance in arbitraries on Pig Iron north of Hagerstown, Md., and Alexandria, Va. The advanced rates, which will be issued at an early date, will, of course, affect chiefly interior points in Central and Eastern Pennsylvania, and even indirectly will not materially influence the markets tributary to New York, except possibly to increase the pressure by a part of the amount of Pig Iron crowded out of the district affected. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 @ $14 50 for No. 1; $12.75 @ $13.50 for No. 2, and $13 @ $13.50 for No. 1 Soft.

The condition of the Philadelphia market is somewhat complicated, owing to the announcement of a new schedule of freights from the South. All that can be fairly claimed at present is that the market is unsettled, and that sellers ask more money. Buyers are not much disturbed in regard to the matter, they would be glad to see an upward movement; but in the meanwhile they are not buying anything that is not actually needed.

General quotations for Philadelphia and equivalent points are about as follows:

American Scotch, No. 1X...	$16.00	@	$16.50
American Scotch, No. 2X...	15.00	@	15.50

Chicago merchants report that their principal occupation at present is making collections. New business is slow, and every effort is being made to obtain money due on past transactions. Northern and Southern Coke Iron are equally neglected. Prices are unchanged, as sellers believe it is useless to offer inducements while existing conditions prevail. Lake Superior Charcoal is also quiet, but sellers report the market hardly as firm as it has been. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal.....	$16.50	@	$17.00
Local Coke Foundry, No. 1	13.75	@	14.25
Local Coke Foundry, No. 2.....	13.00	@	13.25
Local Coke Foundry, No. 3.....	12.75	@	13.00

The stringent money market has caused a curtailment of operations among many Southern customers of Pig Iron, especially car works, and the purchases have been light, individually and in the aggregate, during the week. Buyers who have previously purchased liberally for forward delivery are not now anticipating their wants more than a month or so, and there is, therefore, no large buying, but there are numerous small purchases, which keep the market from absolute stagnation. The demand is mainly for No. 2 Foundry Coke Iron and Gray Forge. More would sell, but it is scarce and the sales of No. 3 Foundry are in considerable demand. The stronger Southern Iron companies are not urging their Iron on the market, but there are liberal offerings by other furnaces, so that purchasers can buy Gray Forge at $7.75 ℔ ton, f.o.b., Birmingham, and No. 2 Foundry at $8.75. Of course these prices are not for single car lots. The tone of the market is anything but strong, but we hear of no lower prices even suggested, much less made. Quotations are as follows:

Foundry.

Southern Coke, No. 1.	$13.00	@	$13.25
Southern Coke, No. 2.....	11.50	@	11.75
Southern Coke, No. 3.....	11.00	@	11.25
Ohio Soft Stone Coal, No. 1....	16.00	@	16.25
Ohio Soft Stone Coal, No. 2 ...	15.00	@	15.25
Mahoning and Shenango Valley	14.75	@	15.00
Hanging Rock Charcoal, No. 1..	19.00	@	19.25
Hanging Rock Charcoal, No. 2..	18.00	@	18.50
Tennessee and Alabama Charcoal, No. 1	15.50	@	15.75
Tennessee and Alabama Charcoal, No. 2....	14.50	@	14.75

The State of Kansas has just opened an employment bureau, "and will seek to supply employers with help at five cents for each situation, or, rather, for placing employer and employee in communication with each other."

Metal Market.

Pig Tin.—Heavy importations, further additions to the surplus stock here, practical elimination of "short" interest in the speculative arena and extreme caution on the part of investors, along with some minor influences, have brought about a further sharp decline in prices. A week ago market prices were about 19.85¢ for May, 19.95¢ for June and 20.10¢ for July delivery, Those prices looked low at that time, particularly when compared with the figures prevalent at the time that the McKinley "boom" was at its hight, but the events of the past week have put a different complexion upon affairs, chiefly through showing that rock bottom was not reached when the price went to 19½¢ or about 2¢ ℔ lb below recorded market value one year ago. Between the statistical position, present low prices and the uncertainties as to the future of the McKinley duty, the market is an extremely hazardous one for speculative ventures.

Copper.—Business has been moderate, demand has dropped off somewhat as well, and the offering has reflected no change in the attitude of sellers. Prices have not suffered to any marked extent, but the market has a rather soft appearance at this writing. There are sellers of Lake Superior Ingot at 11¢, Electrolytic at 10¾¢ @ 10¾¢ and Common Casting Copper at 10¢ @ 10¼¢, for delivery three to six months ahead. Spot stock, in wholesale quantities could have been secured at about the same prices.

Pig Lead.—Early in the week a few parcels of common domestic were picked up at 3.80¢ @ 3.82½¢. Subsequently about 300 tons were placed at 3 85¢. The entire business makes an indifferent showing, however, and the apparent turn for the better in tone of the market would appear to be due more to lighter offering than to scope of buying or demand.

Spelter.—The offering of Western brands at 4¼¢ for delivery during the next six months has been freer and rumor had it that some business was put through at a shade below that price. The demand at present is extremely tame, leaving the market in quite as unenviable shape as it was a week ago and suffering under the weight of excessive production.

Antimony.—About the usual business in small parcels has been effected. Otherwise the market remains very quiet, with little change in prices. Cur-

rent quotations are 9 90¢ @ 10¢ for Hallett's, 10¼¢ @ 10½¢ for L.X., and 10½¢ for Cookson's, in wholesale lots.

Tin Plates.—Business has not improved. Spot goods have moved out in rather small quantities only and futures, drawing the line at some few specialties that are mostly bought direct by large consumers, have received little attention. Prices have been quite well maintained, however, remarkably so considering the full supply and sluggish condition of the market. The market from the consumers' standpoint remains unchanged, prices and demand being about the same as last week.

Coal.

The Anthracite Coal trade is quickened into temporary activity by the question of an advance in prices June 1, many consumers providing for present wants, or at least holding themselves in readiness to buy should an advance be determined upon. Whatever the result, an advance is practically realized by operators in some instances. The Lehigh Valley, for example, will not sell at the prices quoted a week ago. Pea and Buckwheat are in better supply and easier; Pea at $2.60, f.o.b, and Buckwheat about $2; Egg and Broken, $3.90. The fact appears to be that while the companies all around have been shading the schedule for Stove, which is $4.15 ₱ ton, the disposition now is to stand out for full prices, and if the advance, as predicted by some, will be only "on paper," it will at least peg up prices to the old circular. At the same time, some of the companies have coal on hand which may be dumped on the market if nothing better can be done.

Bituminous Coal is firmer, especially Clearfield. Cumberland is about $3.10, f.o.b., and Clearfield averages $2.85. The question of railroad tolls causes some irregularity, as they are considered too high, and relief in this respect is hoped for.

Chicago Report.

Scrap.—The local market is stagnant and Old Material is very abundant. Dealers have been buying lately at the following rates :

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12.00	....
Machinery Cast	9.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	6.50	....
Burnt Iron and Grate Bars	4.00	....
Sheet Iron and Hoops	3.00	....
Plow Steel and Breaking Stock	8.00	....
No. 2, such as Shovels, Hoes, &c	4.50	....
Old Boilers—whole (Iron)	7.00	....
" (Iron)—cut in single Sheets and Rings	10.00	....
Old Gas-Pipe and Boiler Tubes	7.50	....
Cast Borings	4.00	....
Turnings	5.50	....
Horseshoes	12 00	....
Copper Bottoms	....	8¢
Copper Clips and Heavy	....	9 ¢
Heavy Brass	....	8 ¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	2¾¢

Anthracite.—A continued movement in stocking up is reported among the dealers, but consumers have not yet begun to buy. We continue to quote carload lots of 12 net tons as follows:

	Egg, Grate.	Sto. and Ch.
Chicago, Ill	$5.35	$5.60
Milwaukee, Wis	5.35	5 60
Kansas City, Mo	8 55	8 80
Council Bluffs, Iowa	8.55	8 80
Lincoln, Neb	8.70	8 95
Sioux City, Iowa	8.55	8 80
Aberdeen, S. Dak	8.60	8 85
Dubuque, Iowa	6.65	6 90
Madison, Wis	6.85	7.10
St. Paul, Minn	7.85	8.10
Burlington, Iowa	6.85	7.10
Des Moines, Iowa	8.30	8 55
Davenport, Iowa	6.65	6.90
St. Joseph, Mo	8.55	8 80
Leavenworth, Kan	8.55	8 80
Omaha, Neb	8.55	8 80

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

THE GILBERT & BENNETT MFG. COMPANY of Georgetown, Conn., New York City and Chicago, are well represented at the World's Fair. In the Manufactures Building they have an exhibit which includes Gold, Silver, Brass, Copper, Galvanized and Pearl Wire Cloth (over 100 kinds), Galvanized Netting, Wire Fencing, Gates, ornamental Wire Work, Screens, sample of first Netting made in America by power machinery, which has been exposed over 25 years in the open air, also Woven Fencing used equally as long, house furnishing Wire Goods, and a large variety of articles made of Wire. They have another in the Horticultural Building, where they show a Wire Summer House, patent Knockdown Flower Stands, Chairs, Settees, Flower Trellises, Vine Trainers, ornamental Fences, Gates, Tree Guards, Flower and Lawn Guards, &c. At the Terminal Railway Station can be seen about 3 miles of Woven Fencing made by the Gilbert & Bennett Mfg. Company, used to inclose and divide the railroads; also, 8 acres of "G & B" Netting was purchased by the World's Columbian Exposition to suspend under the glass roofs in various buildings to prevent glass from falling that accidentally might become dislodged. About June 1 they will have ready an artistic publication giving a history of their works, with fine illustrations of methods of manufacture, &c., which will be distributed free as a souvenir commemorative not only of the World's Fair, but also of their seventy-fifth year as manufacturers.

ANNOUNCEMENT IS MADE that the Plumb & Lewis Mfg. Company, Grand Rapids, Mich., have sold the patents, trade-mark and good will of their Wringer business to the American Wringer Company, 99 Chambers street, New York, who will hereafter supply the trade with the Gem and other Wringers heretofore manufactured by the former company. It is stated that the high quality of the Gem Wringer will be maintained by the American Wringer Company, who also announce that they are manufacturing their own rubber rolls and are thus in a position to furnish Wringers of all kinds at the lowest possible prices. The Plumb & Lewis Mfg. Co. will continue the manufacture of Carpet Sweepers as heretofore.

CONDITION OF THE

Hardware Trade.

THE VOLUME OF BUSINESS is moderate, some leading houses referring to it as exceptionally quiet. Manufacturers, also, in most cases report a decided falling off in orders and are making their preparations for the summer dullness. In some lines, however, there is still an excellent demand and manufacturers are full of orders. Prices are without important change, and are, as a rule, lower than a year ago. While manufacturers are disposed to complain of narrow margins, it is gratifying to note that many of them are doing a profitable business, as evidenced by regular dividends. There is much complaint in regard to collections and a conservative course is being pursued in regard to credits.

Advices from Chicago.—The Shelf Hardware trade has improved owing to better weather. The Northwest was visited by balmy winds the past week, and orders consequently show a distinct improvement. Packing floors here are more fully covered than they have been for the two or three weeks previous. The demand for Lawn Mowers and other garden tools has grown decidedly. Refrigerators, Screen Doors, &c., are moving very freely; Screen Doors particularly are in very short supply. Wire Cloth is firm at $1.75. Poultry Netting is now quoted by jobbers at discount 75 and 10 per cent. Some heavy transactions in Tin Plate have occurred during the week. One order placed by a packing house called for 25,000 boxes, the contract having been secured by a local importing firm against the competition of leading importers in other parts of the country. Heavy Hardware is only moderately active, but the volume of business is really better than at the corresponding time last year, as this section of the country was then passing through a period of continuous rains which severely affected trade. Collections are rather slow, but no worse than they have been.

Notes on Prices.

Cut Nails.—The Cut Nail market is sluggish, with a moderate demand. Quotations are unchanged, being in the East on a basis of $1.10 for carload lots at mill, from which price, however, concessions are made in some cases. Small lots from store in New York are held at $1.35 @ $1.40. In view of the present unsatisfactory condition of things, and the prospect of light trade during the next month or two, some of the mills are making preparation to shut down, and it is thought that this will be done earlier and for a longer time than usual.

Advices from Chicago.—Wheeling and other Nail centers are again competing quite aggressively for a share of

the Steel Cut-Nail trade of this locality. The inducements offered, however, are not so large as in former times, when a cut of 5 cents per keg was common. A cent or two is now enough to influence an order. Prices for factory lots have been reduced to $1.25 to $1.30, Chicago. These prices, however, are not so cheap as they seem to be, because manufacturers are unwilling to take orders for base Nails for any considerable quantity. Prices on small lots from stock are continued at $1.35 to $1.40.

Wire Nails.—Wire Nails are regularly quoted at $1.50 for carload lots at mill, but in some cases $1.45 is obtainable. The volume of business is moderate and the tone of the market is not buoyant.

Advices from Chicago.—Exaggerated reports of stocks of Wire Nails in manufacturers' hands are in circulation and efforts are being made to counteract the effects of such rumors. Prices on factory lots are somewhat easier and $1.50, Chicago, is quite a general quotation. Carload lots, however, are selling at $1.55. A somewhat better feeling exists among manufacturers, notwithstanding the lower prices. Orders have begun to come in again and not a few buyers are telegraphing, so as to secure prompt shipment. A considerably better trade is expected in June, when many contracts now being filled will have run out. Jobbers report Wire Nails a little easier from stock, and while $1.65 to $1.70 are regular quotations, good buyers can shade them to some extent.

Barb Wire.—The Barb Wire market has developed no new features since our last report. The demand is moderate and prices steady. We quote $2.45 to $2.50 for Four Point Galvanized in carload lots at mill. Small lots delivered in New York are quoted at $2.70 for Galvanized and $2.30 for Painted.

Advices from Chicago.—Manufacturers of Barb Wire have felt the influence of the better weather of the past week in the increased volume of business with which they have been favored. Trade, however, is very much below what they would like to have at this time of the year. They report no change in quotations, but continue to sell factory lots of Painted at $2.20 and Galvanized at $2.60. Jobbers have also enjoyed a better trade in this branch and quote prices steady at $2.30 to $2.70 respectively.

Grass Catcher.—Cleveland Novelty Company, Cleveland, Ohio, for whom the Ross & Fuller Association, 33 Chambers street, New York, are agents, are selling their Eureka and Bieder Grass Catchers at the prices given below:

	Per dozen.
Eureka	$6.50
Bieder, No. 7	8.00
Bieder, No. 13, for high wheel Mowers	12.00

Cataract Window Brush.—Enterprise Brush Company, 17-21 College place, New York, are manufacturing this Brush, which they are selling to the trade at $8 per dozen.

Saw-Filing Attachment. — Henry Disston & Sons, Philadelphia, are selling the Ball and Socket Clamp, with file and filing attachment, at $1.75.

Puritan Coffee Pots.—The Puritan Coffee Pots, manufactured by Bronson Supply Company, 72 Beekman street, New York, are sold subject to a discount of 25 per cent. from the following list:

No.	20	30	40	50
Pints.	2	3	4	5
Per dozen	$6.50	7.50	9.00	10.50

Wrought-Iron Pipe.—This market shows some indication of improvement and prices are a shade stronger than they have been. A number of heavy orders have recently been received and the mills are well occupied.

Jack Chain.—The manufacturers of Jack Chain have made a reduction in their prices, as they are giving somewhat larger discounts from the new list, which was adopted March 10, 1893.

Mrs. Potts' Sad Irons.—Enterprise Mfg. Company, Philadelphia, announce that all prices and quotations heretofore made on Mrs. Potts' Sad Irons are withdrawn, and that a new list will be issued in a few days.

Screen Wire Cloth.—The supply of Screen Wire Cloth continues quite insufficient for the demand, and those having stocks on hand are in a position to realize a handsome profit. There is a good deal of unevenness in the prices at which goods are sold, prices in some cases, we are advised, reaching as high a figure as $2.50 or even $3 per 100 feet. A quotation of $1.75 to $2 is more general. It is thought that the market will soon be relieved, as the Clinton Wire Cloth Company hope soon to be in a position to put some on the market.

Glass.—There have been no developments in the Glass market of especial interest during the past week, nor have there been any changes in prices. Trade with jobbers remains comparatively quiet, the demand being limited to present requirements, which do not increase with more favorable weather. Business in this line seems to be about where it was several weeks ago, and may be considered satisfactory, everything being taken into consideration. It is understood that additional members have been secured to the National Window Glass Company, from Baltimore, and that in the Philadelphia market established prices are being more closely adhered to. Various factories are closing each week, and will continue to do so until July 1, thus reducing the production of Glass. The fact that present stocks are not large, taken in connection with decreased production, points to a scarcity, especially in desirable sizes, and a possible increase in prices. Imported Glass remains in the condition reported last week, showing no improvement in demand or price. The unfavorable spring weather has had a depressing effect on Plate Glass; so much so, in fact, that the demand for it is exceedingly limited. It is reported by a Pittsburgh paper devoted to the Glass interest that the Kokomo and Elwood factories of the Diamond Plate Glass Company, the Charleroi Plate Glass Company, Charleroi, Pa., and Crystal City Plate Glass Company, of Crystal City, Mo., have become part of the National Plate Glass Company, and that last week these factories were shut down to allow of an inventory of stock and properties to be taken, preparatory to turning them over to the new company. This new concentration of capital may be able to reduce stocks and hold up prices, at least to such an extent as to improve the present condition of the market. It is understood that Plate Glass jobbers from all points west of the Alleghenies to the Pacific slope recently met in Chicago and organized the Western Plate Glass Jobbers' Association, with headquarters at Chicago. It is stated that the object of the new association is to maintain prices and to be prepared, if necessary, for any move the manufacturers may make that would be prejudicial to the interests of jobbers, but that the jobbers are disposed to act in harmony with the manufacturers. Quotations are as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, ton lots, ℔ lb.	@	$0.03½
Rubber Shoes, ton lots ℔ lb.	@	.04
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔ lb.	@	.04½
Wringer Wire Rolls, ℔ lb. .01	@	.02
Syringes, ℔ lb.	@	.05

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags	℔ lb	4 ¢
No. 2 White Rags	℔ lb	3 ¢
Mixed Rags	℔ lb	1½ @ 1¾
Blues and 3ds	℔ lb	1¾ @ 2
Hard Sized White Shavings	℔ lb	2¼ @ 3 ¢
No. 1 White Book Shavings	℔ lb	2¼ @ 2⅝¢
No. 2 White Book Shavings	℔ lb	1½ @ 1¾¢
Light Book Shavings	℔ lb	⅞ @ 1 ¢
No. 1 Mixed Shavings	℔ lb	1½¢
No. 2 Mixed Shavings	℔ lb	¾ @ ⅞¢
No. 1 Printed Books	℔ lb	1⅜ @ 1½¢
Ordinary Mixed Books	℔ lb	¾ @ ⅞¢
Newspapers	℔ lb	1⅜¢
No. 1 Manila Paper	℔ lb	1½ @ 1¾¢
No. 2 Manila Paper	℔ lb	⅞ @ 1 ¢
Bogus Paper	℔ lb	⅝ @ ¾¢
Common Paper	℔ lb	⅜ @ ½¢

Straw Chips	₱ lb	½ @ ⅝¢
Binders' Clippings	₱ lb	½ @ ⅝¢
Jute Butts	₱ lb	1¼¢
No. 1 Jute Bagging	₱ lb	1¼ @ 1⅝¢

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	₱ lb	9½¢
Light and Tinned Copper	₱ lb	8½¢
Heavy Brass	₱ lb	7¢
Light Brass	₱ lb	6¢
Lead	₱ lb	3½¢
Tea Lead	₱ lb	3¼¢
Zinc	₱ lb	2¾¢
No. 1 Pewter	₱ lb	14¢
No. 2 Pewter	₱ lb	7¢
Wrought Scrap Iron	₱ gross ton,	$13.00
Heavy Cast Scrap	₱ gross ton,	9.00
Stove Plate Scrap	₱ gross ton,	6.00
Burnt Iron	₱ gross ton,	4.00
Mixed Bagging	₱ lb	1 ¢
No. 2 Bagging	₱ lb	¾¢
Hemp Twine	₱ lb	2½¢
Manila Rope	₱ lb	2¾¢
Jute Rope	₱ lb	1⅞ @ 2 ¢
Mixed Rope	₱ lb	¾ @ ⅞¢

Trade Notes.

CURTIS & CURTIS, Bridgeport, Conn., report business very good. They are intending to erect an additional building which will nearly double the capacity of their plant. The building will be equipped with the latest and most approved tools and machinery in this line.

BALDWIN REFRIGERATOR COMPANY, Burlington, Vt., advise us that for the past two seasons they have had all they could do to fill orders and state that at the present time they are unable to turn out goods fast enough to meet the demand, although they have been running their factory for months past to its full capacity.

SHEPARD HARDWARE COMPANY, Buffalo, N. Y., whose plant was destroyed by fire a short time since, advise us that they have received inquiries as to whether their well-known Lightning Ice Cream Freezers will be on the market for 1894, and desire us to state for the information of the trade that the Lightning Freezers will certainly be made and offered to the trade in ample time for the season of 1894. The company are still occupied in making up statement of loss for the insurance companies.

THE PLUME & ATWOOD MFG. COMPANY, 18 Murray street, New York, have now their new line of table and banquet central-draft Lamps ready for the inspection of buyers. They are made in numerous shapes and styles and finished in gilt, nickel, silver, black, oxidized copper, satin silver and satin gold finishes. A number of them are made with onyx, joining the base and founts. There is also a new patent lighting lift, which has recently been added to the burner as formerly made.

W. R. WALKLEY, of Peck, Stow & Wilcox Company, has been invited to prepare and read a poem before the Phi Beta Kappa Society on the occasion of the one hundred and tenth annual commencement of Dickinson College, Carlisle, Pa. Hon. A. K. McClure, editor of the Philadelphia *Times*, will deliver the oration of the evening, immediately preceding Mr. Walkley. The exercises will be held in Basler Memorial Hall. Rev. George E. Reed, D.D., LL.D., formerly of Brooklyn, N. Y., is president of the college.

THE LUDLOW-SAYLOR WIRE CO., St. Louis, Mo., are sending to the trade a very handsome catalogue containing illustrations of work made in their art metal department, which is comprehensive in form, and will prove welcome wherever received. The catalogue in question is 10 x 15 inches in size, handsomely bound in heavy cardboard covers, and printed upon a high grade of paper. The first six pages contain engravings made from photographs of outdoor work, in which are included artistic Wrought Iron Gates and Posts, Lamp and Electric Light Posts, boulevard Gates and Fences, bank Gates and entrance Gates to office buildings, &c. Then in succession follow artistic Iron Lamps, Grilles, bank Counter and Partition Railings, Iron Balustrades, theater trimmings, such as Foot Rails, Proscenium Railings, &c., elevator inclosures and Cages, Hinge Plates made from original designs, fancy Fire Screens and Fenders, &c. The last pages of the catalogue are devoted to views of the Chemical National Bank and Commercial Bank of St. Louis, showing Railings, Partition and general inside furnishings which were supplied by this company.

THE NEW FACTORY of Waddel Wooden Ware Works, Greenfield, Ohio, is now in active operation, and we are advised that Cash Registers, Money Drawers, Automatic Registers, Ideal Coffee Mills, Animal Traps, Inktsands, Toys, &c., are now being made and will be placed upon the market at once. Jno. M. Waddel, who established the Jno. M. Waddel Mfg. Company, who were recently succeeded by the Sun Mfg. Company, informs us that he is the sole owner and manager of the new company. He states that nothing but first-class goods will be turned out, and that the chief characteristics of the manufactured articles will be novel ideas with convenient features.

THE SNEAD & CO. IRON WORKS, Louisville, Ky., and Chicago, Ill., have issued 22 plates handsomely illustrating ornamental iron work, showing what the company have done and what they are prepared to do in that line. The illustrations are of artistic stair railings, grille work, bank railings, doors and arches, gates, arched doors, winding stairs, andirons, hinges, &c. The plates are bound in book form. The company state that they are prepared to make the finest castings and to do the best forged work, to finish by electro plating or by either of the rustless processes, to execute examples in galvanoplastic and to furnish designs when required. A separate catalogue is devoted to book stack and shelving for libraries, of which they are making a specialty. All the parts of this work, including the shelves, are of iron, thus constructing, it is stated, a library entirely fireproof and rendering valuable works safe almost beyond peradventure.

THE EXCELSIOR STEEL FURNACE COMPANY of Chicago have recently issued to the trade a very elaborate catalogue on which they have expended over $3000. In order to keep the catalogue up to date and to avoid the necessity of spending such a large sum another year on a new catalogue, the company have conceived the idea of issuing from time to time a bulletin in which to chronicle the changes and improvements in their line of heating specialties and to make such announcements as may be necessary. A copy of No. 1 of this bulletin, bearing date of May 22, which has reached us, is a four-page affair with pages similar in size to those of the catalogue referred to and of which it is expected to become a part, as a request is made therein that this bulletin be placed in rear of catalogue, and thus the catalogue can be revised up to the latest possible date. The bulletin is devoted chiefly to the Excelsior hot-air damper, which has just been brought out by the Excelsior Steel Furnace Company. In addition to this the company call attention to some minor changes in sizes of their goods and improvements in the same, and also to the fact that they have on hand a large supply of very fine hammered steel Tin Plates, coke finish, which they are supplying to the trade at very favorable figures. The idea of this bulletin is a good one, and those dealers on the mailing list of the Excelsior Steel Furnace Company will doubtless welcome its coming from time to time.

G. A. CROSBY & CO., 176 and 178 South Clinton street, Chicago, have just issued a fine catalogue of presses, dies and special machinery, particularly adapted to the use of canners and packers. This catalogue comprises 48 pages of illustrations and descriptive matter, but the firm state that the list of machinery and appliances given comprises only a small portion of their regular line of manufactures. They have confined the publication to such goods as they consider of special interest to canners and packers who are manufacturing their own packages or contemplate doing so. The machinery covered comprises power presses, lever presses, foot squaring shears, power and hand forming rolls, double headed and upright power crimpers, adjustable bar folders, soldering frames and cylinders, solder holds, rotary solder kettles, solder melting kettles, patent foot forming machines, foot and power squeezers, gang soldering machines, capping machines, capping irons and steels, Star patent coppers, Merriam's patent floating or soldering machines, gasoline and air tanks, power and hand air pumps, fire pots and gasoline burners, &c. They also handle Clark's kerosene oil heater, for use in heating soldering irons in large factories, the system of using which is fully illustrated and described. Special attention is paid to fruit-can factory outfits. The other lines of machinery manufactured by the company are treated in another catalogue, a new edition of which is now in preparation.

A FOUR-PAGE CIRCULAR issued by the Star Baker Company, Belleville, Ohio, illustrates and describes the Columbia Roaster and Baker manufactured and recently placed on the market by them. The utensil consists of two Steel Pans of equal size, with metal projections running lengthwise of the Pan, strengthening the bottom and keeping the Pan off the floor of the oven, while allowing a free circulation of air around it. The Pans can be attached to each other so that the heat and steam are retained inside and the food, it is claimed, does not become dry and hard. A further feature of the Columbia is a Grate fixed in the Pan, by means of which the meat is kept out of the water and fat at the bottom and does not sodden. Full directions are given for its use in the case of various articles of food.

E. J. KNOWLTON, Ann Arbor, Mich., issues a little circular illustrating and describing Knowlton's bathing apparatus known under the name of the Universal Bath. A variety of illustrations are presented, showing the application of this device and its merits are pointed out. A list of testimonials is appended.

THE BAILEY-FARRELL MFG. COMPANY, Pittsburgh, Pa., send out an advertising circular relating to "S. S. S.," the initials standing for Sure Satisfaction Solder. The announcement is made in an entertaining way and will attract attention.

FRANK CLAUDAT has an old-established jobbing brass and bronze foundry at 446 West Sixteenth street, New York, where he is making a specialty of ornamental castings in those metals. Some small castings turned out by him in the way of Lamp Bases, Decorative Plates, &c., display considerable artistic merit. Special mention may be made of some spirited animal figures for clock ornaments or paper weights, which are of unusual excellence. Mr. Claudat is a Frenchman who has had an art training which he has put to a good use during an experience of 30 years in the brass foundry business.

THE SAFETY FURNACE PIPE COMPANY, Detroit, Mich., distribute a serviceable catalogue relating to the special Hot-Air Pipe of their manufacture. Illustrations show the fittings. Price lists are presented and a very ingenious plan of illustrating the different combinations of pipe and fittings by means of pages cut in the middle is adopted at the back of the book.

AN INCREASING DEMAND for high-grade Tinners' Tools and Machines finds the present plant of Jacob Brombacher's Sons at 30 Cliff street, New York, too cramped. A fine manufacturing building has been secured at Fulton and Front streets, Brooklyn, and in the near future a plant will be put in operation having increased facilities and under careful supervision the quality of the output will be maintained at the top notch of excellence.

THE LISK MFG. COMPANY, Limited, makers of anti rusting tinware, have recently removed their manufacturing establishment to Canandaigua, N. Y., where they have purchased extensive grounds and erected a large factory adjoining the various lines of railroads. In their new illustrated catalogue, with which we have been favored, the company state that they are now able to make better wares and more of them than was possible under the old conditions, and that they use only the best materials in their manufactures, the tin plate being the highest grade, IX, IXX and IXXX. All their goods are guaranteed not to rust. The catalogue just issued by the concern is a 50-page pamphlet, with red and gold paper cover. A view of the new works is given as a frontispicce, and the various wares made therein are fully illustrated in the pages. These include Anti-Rusting Pails, Dippers, Measures, Wash Basins, Tea Kettles, Boilers, Bathtubs, Slop Jars, Dish Pans, Oil Cans, Tea and Coffee Pots, Roasters, Stew Pans and other domestic and culinary utensils.

THOMAS MÜLLER & SON, 104 Centre street, New York, who make Sheet-Metal hotel, restaurant and bar appliances, Hot-Water Urns, Tea and Coffee Urns, Measures and Funnels, have hung out a new sign and put out a showcase of fine samples of their work.

THOMAS CARLIN'S SONS, Allegheny, Pa., "F" catalogue, just issued, illustrates the extensive line of sewer castings and gutter crossings manufactured by them. These include cast-iron inlets, trap plates, man holes, ladder irons, stop cock frames and lids, &c. The catalogue also gives a partial list, with illustrations, of the firm's Road Rollers, Crushers and Contractors' Tools, together with Pumps and Stationary Engines and Boilers, made and sold by them. A separate four-page circular calls attention to the firm's Locomotives and Road Engines, also Hoisting Engines and Machinery and Derricks. The class A, Link-Motion, Reversible Hoisting Engine, consisting of a marine vertical engine, positively connected to a drum by means of strong, heavy gearing, and so arranged that the load is held easily under control by means of a reversing lever and foot brake, is an article offered by the firm which is claimed to have special recommendations.

THE E. J. MANVILLE MACHINE COMPANY, Waterbury, Conn., well-known as manufacturers of special Wire-Forming Machines, are also makers of a large line of Power Presses, which may be arranged for special work. In their advertisment on another page is shown their double-action Cam Press, which is one of the many styles made by them.

GILBERT & SHERIDAN recently formed a copartnership at 48 Centre street, New York. Both members have previously had a wide experience and will act as manufacturers' agents, exporting and dealing in Hardware, Machinists' and Mill Supplies. They have placed a number of substantial orders for Tinners' Tools and Machines in the Canadas, New Brunswick and Newfoundland. Emery Wheels and Grinding Machinery will be one of their specialties.

THE NEW JERSEY IRON & METAL COMPANY of Paterson, N. J., handle several hundred carloads of old and new metal and old machinery during a year, gathering from all sources. The disposition of it is of some interest. The castings naturally drift to the foundry and the wrought iron to the forge, but old hoop iron, borings and turnings leave the mechanical trades altogether, being used for refining gas, for the production of chemicals, and large quantities being used for making black dyes.

SCRAP.

SAVE A FEW TONS COMING from Devonshire all the tin of Great Britain is from the mines of Cornwall. The ore occurs in veins both in the granite and the overlying slate. No alluvial deposits are worked at the present day. The Cornish mines are probably the oldest worked tin deposits in the world, traces of Phœnician operations there before the Christian era having been clearly established. The tin obtained from Cornwall is not used in the manfuacture of tin-plates, not being as suitable for that purpose as the metal mined in the Straits settlements and Australia.

THE BRITISH TIN-PLATE INDUSTRY is reported as quiet. Returns for April show about the same amount of tin and terne plates exported to the United States as last year during the same month. Strikes and labor controversies as to limitation of production have marked the last few weeks among the Welsh works.

A LARGE TIN PLATE WORKS has been erected in France at Besse Indre, near the city of Nantes, by Messrs. Langloise & Lintz. A number of Welsh tin platers have left for France to start the new mills. Italy has already one or two tin-plate works, and it is said that, encouraged by American success in this direction, other works are likely to be erected on the Continent of Europe.

THE LONG DROUGHT IN ENGLAND has led to the stoppage of several tin-plate mills for want of water.

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THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, June 3, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street.
PHILADELPHIA.....220 South Fourth Street.
BOSTON.....146 Franklin Street.
PITTSBURGH.....Room 509 Hamilton Building.
CHICAGO.....59 Dearborn Street, cor. Randolph.
CINCINNATI.....Rooms 22-24 Pickering Building.
ST. LOUIS.....Bank of Commerce Building.
CLEVELAND.....312 The Cuyahoga.

BRITISH AGENCY: The Ironmonger, 42 Cannon street, London, England.

A Word to Correspondents.

A very excellent pattern maker used to say, "I do not care how many lines there are in a drawing, provided they mean anything. I may not need them all as a guide to my work, but if I don't need them, they do no harm. What bothers me in the work of too many draftsmen is that *they do not put in lines enough.*" This might be paraphrased to make it apply to letters of correspondents who write to us for information upon various subjects. An editor does not care how many facts are stated, provided they are facts; what bothers him is the unpleasant fact that, generally, there are not facts enough. Any superfluous fact stated may be neglected in answering a query, but if important data are omitted he must either run the risk of error in his reply, or must base his answer upon assumptions. What are assumptions? An assumption may be said to be a guess that something that might possibly be, actually is. An answer based upon an assumption, while entirely correct in itself, may be very far from correct as applied to the particular case about which a correspondent seeks accurate information, yet what can be done when the facts supplied are deficient?

Give all Particulars.

If an inquiry be neglected, the correspondent feels aggrieved; and either something must be assumed or a letter must be written asking for the essential facts omitted before an answer can be given. This extra labor should not be imposed, when, by taking a little more time and pains to state everything completely, even if much that is stated may not be pertinent to the inquiry, the essential facts and conditions are all got in somewhere. If correspondents expect to receive complete and satisfactory answers to their queries, such expectation should rest only upon a complete and satisfactory statement of the facts necessary to an intelligent comprehension of their questions. For instance, if the amount of heating surface necessary to heat a room is asked, tell all about the room, its hight, length, breadth, the kind of building of which it is a part, how situated with reference to other rooms, what side or corner of the house it faces, and what it is used for; also whether steam or hot water is used for heating. Add also the material of which the building is constructed, and the thickness of the walls. Give the number and size of the windows in the room, and state whether the building is much or little exposed to winds. Now, all these are facts essential to be known before an accurate estimate of the surface required can be made. It is not supposable that every one should know them to be essential; but the greater the effort to give all the particulars that the correspondent can think of, the greater the probability that the essentials will be given, whether the inquiry relates to a room to be heated, a pipe for the conveyance of water, a pump, or whatever it may be upon which information is sought.

A Substitute for Litigation.

An institution which promises to be one of great value has just been established in London as a substitute for the expensive litigation which so often attends business disputes in the law courts of England. A Chamber of Arbitration has been organized, and is now a recognized feature of the business life of the British metropolis. Composed of a body of approved arbitrators selected from every branch of trade, from among whom one or more are chosen to hear and decide upon each controversy brought before the chamber, the benefit of this institution to business men is very apparent. The use of this method of settlement is, of course, voluntary, but the advantage of submitting a matter of trade dispute to the judgment of a body of individuals fitted by training and experience to deal with the subject is one which will not be overlooked. The system has already been tried with the best results in Australia, and there is little doubt that the new departure will prove equally acceptable to London business men. The fees are said to be moderate and the forms of procedure simple. At one time, not so very long ago, the possibility of the institution of just such chambers of arbitration was decided as the dream of visionaries, in the same manner as the substitution of international arbitration for war is in some quarters still laughed at. But it has come to pass; and to men in all countries who are sensible enough to see where their best interests lie, such a common-sense, economical method of deciding their business disagreements, in place of the tedious and costly procedures of the law courts, must surely recommend itself as a thing most desirable and to be imitated.

The Value of General Information.

There is a vast difference between merely acquiring information and so storing it away in one's knowledge-box that it will always be at hand for ready reference. Plenty of persons take in large stores of information—frequently, it is true, of that kind which has been aptly termed "instruction ladled out in a hurry"—which, if they were able to systematize and, as it were, properly pigeon-hole it, would be of immense service to them. But the majority of individuals, especially the more ambitious among the young men of the present day, who earnestly desire to improve their minds by the acquirement of wide information, make the mistake of attempting to stow away too much undigested matter. Their aim is to get as much knowledge as possible of a sort which they believe will help them along in their several callings. They pick it up greedily, anywhere and everywhere—often in such big blocks as are impossible of proper assimilation. As a result, their minds shortly lose much of the digestive property, and the information they have taken in becomes so congested and overlaid as to be practically useless to them when required in a hurry. They know all about a thing, but cannot readily connect the relative facts in regard to it. And this, be it understood, applies to technical knowledge as well as to "learning" as popularly understood. The tendency of the day to learn about everything cannot be a true benefit to men of untrained intellect. It is true that a man who drives at being a master of his craft or profession must, in most walks of life to-day, possess a very great deal more information outside of, but in some way touching, his own immediate sphere of work than was at all requisite even 15 or 20 years ago. General information must in some measure be absorbed by the man who wants to rise; but it cannot be of much more than superficial quality. The field is too wide and life too short for the busy man to acquire profound knowledge of general subjects.

Special and General Knowledge.

Science, which is but another name for knowledge, has so enlarged her borders of late years that no ordinary man can hope to grapple with a fraction of the "general information" now abroad. The old question, then, comes

up again: "Which is the more worth while, to know something of a great many subjects, or to be master of one or two—to be, in short, a jack-of-all-trades or an expert in one?" Looking to the financial results achieved by specialists and general practitioners in the professions, most people would, we believe, favor the specialists. And yet there is much to be urged in favor of what is known as "a wide range of information." Dr. Johnson, of dictionary fame, who himself possessed more general information than most men of his day, used to say that there are two kinds of knowledge—that which we know ourselves and that upon which we know where we can find information. It is perhaps most desirable to possess some knowledge absolute, directly bearing on one's particular sphere of work, together with a competent mastery of the second sort of knowledge—that is, to know where readily to lay one's hand upon information required and appropriate it as wanted. In other words, a due combination of Johnson's two kinds of knowledge will pay the ordinary man best. An ability to use intelligently the numerous text and reference books on every conceivable subject now published and obtainable at moderate cost, or which are to be found in most public libraries, places one who has a competent knowledge of his own special calling in a far better position than he would probably hold did he attempt to memorize a great quantity of general information instead of learning thoroughly his particular trade.

A Bankers' Panic.

The severe curtailment of banking accommodations is unnecessarily intensifying commercial distress. Banks everywhere seem to have adopted the policy of refusing to discount paper except for their very best customers, and refusing to renew discounts except under very special circumstances. They are ostensibly fortifying themselves against possible sudden demands from their depositors, and for that reason aim to accumulate a very large percentage of their deposits in actual cash. The legal reserve required by the national banking laws is now far below the limit that bankers are imposing upon themselves. It has become by no means unusual for a bank to have 50 per cent. of its deposits on hand in actual cash, and some bankers are striving to attain $66\frac{2}{3}$ per cent. Taking the country as a whole, there has perhaps never been a time in its history when the banks held so much money in their vaults. Bankers may well claim that the banking institutions of the country are on a very solid basis. Having collected a very large part of the currency of the country, and securely locked it up, they are in an excellent position to claim financial strength.

This strength of the banks, however, is the weakness of manufacturing and commercial interests. The volume of business in general has not shrunk in proportion to the curtailment of banking accommodations. It is not possible for great business operations to suddenly shorten their lines, reduce expenses, discontinue purchasing supplies and stop making preparations for future business. They must go on with their plans for continuing trade on about the same scale, and in about the same way. Many large manufacturers are heavy borrowers at this season, especially those who depend to any great extent on agricultural interests. Later in the year they receive their returns on the outlay they have made and are then amply supplied with funds. Numerous business interests must conduct a genuine campaign, requiring a long period of elaborate and costly preparation, followed by a sharp conflict between salesmen, after which the fruits of victory are collected in the shape of payments by those who have bought the goods. There are trades in which nine months of preparation are necessary for but three months of active business. Manufacturers and merchants in such lines are handicapped by curtailments of banking privileges and their plans may be seriously disarranged. There are also plenty of business houses whose trade has outgrown their capital, but their management is superb and their solvency is never questioned. They must have banking accommodations, however, and when these are heavily curtailed, as at present, there will be embarrassment.

There appears to be a bankers' panic, caused by a few bank failures in various portions of the country, some failures in manufacturing and commercial circles, the great failures in Australia, and the general uneasiness concerning the silver question, together with growing financial stringency in all channels of trade. For the financial stringency the banks themselves seem to be largely responsible. By locking up the greater part of the circulating currency of a community, and sharply restricting credit, the banks of that locality may make themselves very strong, but they make the community itself very weak. Of what advantage is it to the country that the banks are able to report themselves immeasurably better equipped for a panic than ever before, if other business interests are without means to properly conduct their operations? An instance has been brought to our notice in which a bank that boasts of a reserve of 55 per cent. refused to discount a note for $10,000, drawn by a manufacturer of high standing and indorsed by a friend estimated to be worth at least a million dollars. The refusal was accompanied by the emphatic statement that the note would not be discounted if it was secured by ten times its face in Government bonds. This may be a very extreme case, but it illustrates the gravity of the situation from the standpoint of a panic-stricken banker.

Bankers are habitually asking their customers what is the condition of trade, and if the reply is unfavorable they mechanically ask the cause of the dullness or depression, and how soon there will probably be a change. The situation now is rapidly developing such a phase that the answer may soon be returned that the banks are causing the greatest trouble, and until bankers cultivate a fresh crop of confidence there will be no improvement. Caution and conservatism are most excellent qualities at this time, it is true, but there should be moderation and discrimination in the exercise of even such admirable qualities.

Market Quotations.

The enemies of trade journals, says *The Iron Age*, and, unfortunately, many of their friends who entirely mistake their functions, are generally very active in denouncing or reproving them during periods of declining markets. There are a few men in nearly every line of business, sometimes occupying positions of influence, whose one idea is that every buyer is a natural enemy, and that capacity to deal with him is measured by the success attained in deceiving him. This is the man whose business is booming when half his mill is idle, who represents the market as stiffening when he has offers out right and left to sell at unprecedented prices. He is the one who is always eager to pour into the ears of every journalist his tales of general prosperous trade, and of individual success. He is the one who becomes the violent enemy of the trade journal when he finds at last that while his tales are patiently listened to, they never reach the public. He is comparatively harmless, because his reputation protects those whom he attacks.

There are others who hold that the special function of trade journals is to hide bad news as long as possible and proclaim favorable developments with the utmost alacrity. When an advance has taken place it must be chronicled at once. A decline must be kept back, and quotations must remain stationary while still a stray buyer exists who has not heard of the lowering in prices. The true office of the trade journal, according to these critics, is to constitute the rear guard in retreat, and the picket line in every advance.

We hold that it is the function of the commercial reporter to seek the truth persistently and diligently, and to present it fairly and candidly. If developments are unfavorable, the sooner their significance is generally understood the better. It will make the weaker sellers quicker to abandon hope and will make buyers more watchful of their opportunity, thus aiding in steadying the markets. The idea that secrecy was the only safeguard of merchants and manufacturers has been long since abandoned in all the markets of the great staples, such antiquated business methods being now regarded as childish. No one attempts the dangerous and unsatisfactory *rôle* of being the special guardian of any commodity, protecting it against untoward declines, or blowing it up during its brief days of expansion.

TIN PLATES.

Tin Plate Works of A. A. Thomson & Co., New York.

In the list of importers who have within the past two years become manufacturers of tin plates is included the firm of A. A. Thomson & Co., 213 and 215 Water street, New York, who have been long and favorably known in the tin-plate and metal trade of this city. Their tinning works, which are situated at 546 West Sixteenth street, have, until comparatively recently, been run under more or less experimental conditions. For the past few months, however, the plant has been in active operation, turning out a large quantity of various grades of roofing plates, including "Thomson's Puritan," "Central," "Old Colony" and "Durham," most of which names are well known in the market. The works were started under the personal direction of George W. Jaques, a member of the firm, who has been for long familiar with the process of tin-plate manufacture, having made it a special study both in its theoretical and practical aspects. All the labor employed is American. The plant was established and has been run from the first without any extraneous help, and each of the workmen and boys employed has been trained in the establishment. It should be mentioned that the greater proportion of the employees are boys, who, we are told, are able to accomplish quite as much work as the average run of workmen. This circumstance it is which in a great measure enables the firm to keep down the cost of production, and to offer their plates advantageously as to price in competition with the imported article. These boys were, Mr. Jaques says, able to pick up the necessary knowledge and dexterity in a very short space of time, and soon became proficient tin platers. Another advantage gained is the absence of trouble which so often accompanies the employment of skilled labor.

Although as yet of modest size, Thomson & Co.'s establishment is capable of turning out good work and that in some quantity. With their two tinning stacks an average of 800 to 1000 boxes a week are put out. So far production has been confined to roofing plates, for which the firm have had a very gratifying demand, which has caused the works to be for the past few weeks to some extent behind hand with orders, although running night and day. The tinning machines in use are of the Leyshon pattern, with certain alterations and improvements designed by Mr. Jaques, which have resulted in considerably increasing their capacity. In consequence of the pressure of orders it is probable that a third stack will be placed shortly, although the somewhat circumscribed space at their disposal renders many desirable extensions and improvements, which the company have in contemplation, rather difficult to arrange. The principal brands, the production of which in sufficient quantity is now taxing the resources of the establishment to their utmost, are "Thomson's Puritan," a heavily coated roofing plate of superior quality, in the manufacture of which great care is exercised, and "Central," a cheaper terne with moderate coating. The former is claimed to be one of the heaviest and most evenly coated rolled plates made. These plates are very carefully cleaned and assorted, and great pains are taken to keep them up to standard. "Central" is said to be much in request for ordinary work. The necessary power and steam are supplied from a neighboring works, but a small gas engine in the shop is used as an auxiliary and for contingencies. The black sheets hitherto used for coating are imported. The only reason for this, however, is on account of the greater ease of handling the foreign sheets in their boxed condition, whereas native sheets come in bulk, and as yet the works are unsupplied with a side track or facilities for getting carloads into their shops. We are informed that, otherwise, they would greatly prefer using the domestic sheets and will do so as soon as they can obtain the necessary facilities for handling them. The sheets before receiving their coating go through the usual process of white pickling and washing, which is very carefully carried out. Jets of steam are used for creating a circulation in the pickling vat, into which the sheets are placed with a slight layer of sand between each to keep them separate so that the preparation may act equally on every part of their surface. A constant stream of water flows through the swilling vat. Storage tanks then receive the sheets ready for the metal pot. After the tinning process the finished plates are carefully cleaned, sorted, squared and stamped, and are then boxed and shipped. Each day's product is sent out at once, no stock being piled up.

SCRAP.

A PROCESS OF ELECTRO TIN PLATING is the subject of a patent granted to Louis Aronson of New York, who has assigned one-half to James H. Hoffman, also of New York. Referring to the former methods of tin plating by electricity, the specification states that it has been difficult to deposit the tin so that it would adhere to the black iron; another difficulty being that the tin was so soft it was liable to be rubbed off in the process of polishing. Electro-plated tin plate, it is furthermore stated, can be made considerably cheaper than when plated in the ordinary way and would come into use were it not for these defects. The invention referred to is claimed to overcome these difficulties.

IN *Manufacturers' Record* of last week the establishment of six new canning factories is recorded in as many Southern States—namely, one each in Alabama, Florida, Maryland, Mississippi, Tennessee and Texas.

THE UNITED STATES IRON & TIN PLATE MFG. COMPANY, manufacturers of tin and terne plates, are making some changes in their boiler equipment, and also in the method of placing them, which is expected to effect a considerable saving in fuel.

MARSHALL BROS. & Co. of Philadelphia, manufacturers of tin and terne plates, are running their rolling mill at its fullest capacity. They are now supplying black plates to the trade, and the demand in this direction with the requirements of their own business taxes their mill production to the utmost. They are contemplating a large increase in their plant in order to keep up with the demand for their black plates, and it is quite likely that by next fall they will be able to produce 150 tons of plates per week. Their present capacity is about 75 tons.

A LEAFLET distributed by the U. S. Iron & Tin Plate Mfg. Company, Demmler, Pa., advertising their special brand of American tin plates—the "U. S. Bright"—reproduces an article from the editorial columns of *The Metal Worker* of April 22, 1893, on the manufacture of bright plates in this country, with the assertion that such are the plates made by their firm.

INDIA is becoming a larger customer for British tin plate. The manufacture of certain kinds of tinware is carried on in the Punjaub; and a prominent firm at Mooltan is said to import large quantities of tin plate of good quality for the production of dispatch boxes and other japanned wares.

THE PRODUCT OF TERNE PLATES from the works of the Laufman Tin Plate Company, Pittsburgh, for the quarter ended March 31, was 430,466 pounds, as against 321,930 pounds for the previous quarter. A still greater increase is expected for the present three months, when the million mark will possibly be reached. The present average output of the works is reported as 100 boxes, or 22,500 pounds, of 20 x 28 plates per day, which is at the rate of 6,750,000 pounds per annum. The Laufman terne plates are as genuinely American as they can be, being made of black sheets rolled at the company's own works at Apollo, Pa.; the labor, too, is exclusively American, and the only foreign element is the pig tin, which applies equally to Welsh plates.

DANIEL EDWARDS, proprietor of the Dyffryn Steel & Tin Plate Works, Swansea, Wales, completed the final tests of his patent automatic "catcher" toward the end of April, and is, we understand, so satisfied with the complete success attained that he has decided to place the apparatus upon the market shortly as an adjunct to his tinning machines, which, during the past 12 months, have been introduced into Brooklyn, St. Louis and other works.

THE FALLING OFF in the exports of tin plates and pig tin from Great Britain to Canada during the first quarter of this year was most marked. According to official returns the value of tin plates sent to the Dominion during the three months ended March 31 was $117,355, against $222,629 worth during the corresponding period of last year. Pig tin in 1893 shows $7992, as compared with $34,310 in the first quarter of 1891. Lead imported from England also shows a heavy decrease, viz: $2203 in 1893, against $12,197 in 1892.

THE LETTER BOX.

Flow of Air Through Furnace Pipes.

From K. G. R., *Lucknow, Pa.*—I would like to get information on the following points concerning the flow of hot air through 8, 10, 12 and 14 inch tin pipes, with 2 feet elevation in 6 feet of run: What would be the flow at the register face, or does the size of the air pipe make any difference? I believe there is a difference, but how to get at it I do not know. I can get the capacity of pipes and registers and subtract one-third for the fret work on the registers. Is that enough allowance?

Note.—To answer our correspondent in the inverse order in which he puts his questions, we would say that the rule of subtracting one-third of the area from the register face is held by some to be hardly sufficient. A method that has been suggested for determining the actual proportion of fret work to the open space in a register is to lay the register on a smooth board and fill in the openings with seed or shot, or something that will not pack. Then remove the face and arrange the filling material to cover solidly the thickness of the register face. Then measure that area and compare it with the total area of the register. It must be borne in mind, however, that the actual openings in the register face do not determine its capacity, for when the air is broken up into little streams by the fret work its flow is much more retarded than if the total opening area was in a single hole. Returning to our correspondent's inquiry about the flow of air through the pipes he mentions, it is not possible to tell what the flow will be without knowing the temperature. If the cold-air box is wide open on a still day, and there is but little fire in the furnace, the flow will be much more sluggish than if the fire was burning bright, because the hotter the air the quicker it will rise. The difference between the carrying capacities of the pipes is, we think, not very great, provided all of them are of greater area than the area of the register face through which the air must flow to reach the room. That is, the friction on the register face is so much greater than the friction on the surface of the pipes that the difference in the capacity of the three sizes will be inappreciable. It must be borne in mind that the capacity of a pipe, roughly speaking, depends upon the area of the smallest section, the same as the strength of a chain depends upon the strength of the weakest link. So, if the air has to be contracted in volume in going through the register face it is a matter of comparative indifference as to whether the hot-air pipe is 8, 10, 12 or 14 inches in diameter. It is by no means an easy matter to get at the exact capacity of a hot-air pipe by experiment—that is, in cases where the opening is covered by a register face. Many different plans have been tried, with varying success. If the pipe is vertical a good plan is to place an instrument called an anemometer, which is a device for registering the velocity of air currents, in the pipe below the register face and then put the register face in position. By determining the velocity of the air current in that way and multiplying it by the area of the pipe the result should be the quantity of air flowing in at a given time. In the case we mentioned above we assumed that the air box was wide open and that no wind was blowing. Our correspondent will readily understand that by varying the conditions of air box and outside air currents the velocity of hot air in the pipes will change within very wide limits.

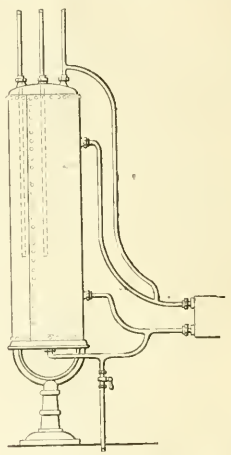
Plating with Aluminum.

From SNIPZ, *Columbus, Ohio.*—Has any process been discovered whereby the polished edges and surface of name plates and other castings can be coated with aluminum, the same as nickel?

Answer.—No satisfactory method of coating iron or other metals with aluminum is given in the text-books. The following is an abstract of an account of the process of electro-aluminum plating, as carried on at the works of the Tacony Iron & Metal Company, Philadelphia, where a quantity of such work is done. Although intended primarily for the coating of large-sized castings, the process is equally applicable to smaller articles. At the Tacony Works six long and deep tanks are used. The article to be plated (in this case a heavy iron column) is placed in tank No. 1, containing a solution of caustic soda, in which it remains 24 hours to clean it of grease. Thence the casting is removed to tank No. 2, where it undergoes pickling for the removal of scale and oxide, remaining 24 hours more. It is then thoroughly cleaned by hand, with steel scratch brushes, preparatory to being placed for a further period of 24 hours in tank No. 3, where it receives a primary deposit of copper. In the fourth tank, to which it is then removed, it receives a very heavy electro deposit of copper, remaining in this tank for 72 hours. This prepares the casting for the reception of its aluminum coating, which is imparted to it in tank No. 5. Here it also rests for 72 hours, an even coating of $\frac{1}{16}$ inch of aluminum being deposited. The last tank to which the plated casting is then removed contains hot water in which the casting is allowed to remain just long enough to be thoroughly washed. The process is then complete, and the article emerges with a "matt" or dead-white finish of aluminum, which can be burnished at will. The lengthy process detailed above was found necessary for the heavy work done at Tacony, but the principle stands good for smaller castings also, of which a number of specimens have been turned out from those works.

Double Pipe Connections for Range Boiler.

From W. B. K., *Boston, Mass.*—In recent issues of *The Metal Worker* you have given sketches of different ways of setting range boilers. Four years ago I was sent to a town in New Hampshire to add a few more fixtures to the work that was in the house. It was here that I saw a boiler setting, of which I send a sketch. It was a fine piece of work, $\frac{7}{8}$-inch brass tubing, union bends on boiler and range, the pipes all bent to fit, and no ells. It was the nicest piece of work I have ever seen. Will you please tell me what advantage this way has over the usual way of setting boilers, or if it was done for looks only?



Double Pipe Connections for Range Boiler.

Note.—The accompanying engraving was made from our correspondent's sketch, and shows the double system of connecting the water back and boiler. We fail to see, however, what particular advantage is to be gained by doubling the pipes in the way shown. The natural circulation will be through the lowest and highest pipes—that is, the water from the bottom of the boiler will enter the bottom

pipe to the range water back, and returning, will rise through the top pipe above the boiler. If each of the two pipes from the water back to the points where the double pipes begin was of a capacity equivalent to the combined capacity of the two pipes, then there would be circulation through all four pipes. But we assume, and in fact our correspondent says, that $\frac{7}{8}$-inch pipe is used throughout. We cannot see, therefore, what good purpose the doubling of the pipes will secure.

Forms for Estimating Blanks.

From F. S., *Philadelphia.*—Can you or your readers help me in getting up a blank for estimating on furnace and range work and tin roofing that can be bound in book form for reference, and itemized or arranged so as to guard against omitting anything that should be counted in an estimate.

In furnace work, castings, sheet-iron work, smoke pipe, registers, hot-air pipe, &c.

In range work, range, water back, boiler and stand pipe, plumbers' connections, &c.

In roofing material, getting it ready, putting it on, solder, charcoal, &c.

No doubt some one in the trade has a better system of estimating than mine, and if given it will be of value to others besides myself.

Note.—Doubtless the forms used by any one could be changed more or less to suit our correspondent's case. We refer him to page 72 of *The Metal Worker* of April 8, which describes and shows part of just such a blank used by the customers of the Excelsior Furnace Company of Chicago, Ill. Most of the large manufacturers of furnaces and ranges have some sort of a blank form, samples of which could easily be secured by writing for them. A plan that has been followed by some dealers with satisfaction is to take good manila wrapping paper and sew through the crease with strong thread, making a book of about 48 pages and 18 x 24 inches in size, though some prefer to fold the paper once more and make the book 12 x 18 inches. In using the book, on the right-hand page a plan of the first floor is drawn to a scale of $\frac{1}{8}$ or $\frac{1}{4}$ inch to the foot and on this plan the various registers and flues are located, and the furnace, with air duct, smoke pipe, hot-air pipes and chimney, all are plainly marked and drawn. The plans of the upper stories are either omitted or drawn roughly as memoranda. When drawn, however, there is less liability of leaving out some stack of pipe, or register or damper. On the left-hand page the name of owner and address of the property is recorded, and then for convenience the page is ruled with two $\frac{1}{2}$-inch columns on the extreme left and with three $\frac{3}{4}$-inch columns on the extreme right. The word "cellar" is written at the top of the wide column and under it all that is used in the cellar, beginning with two No. 280 sanitary air-warmer castings. List, $100. Cost, $87.50. Sells, $105.00. Then give lumber and carpenter work for air duct; bricks, mortar and mason work for foundation: smoke pipe and everything except hot-air pipes. Then take each room separately under its name. For instance, under Hall, one 8-inch collar on furnace, 10 feet of 8-inch IX tin pipe, one 8-inch hot-air damper, one 8 x 10 IX tin register box, one 8 x 10 nickel-plated register, 2 sheets 14 x 20 tin protecting joists, &c.

By following this method, with a plan of the building on the opposite page for a reminder, every room is taken in turn and each detail of the work is followed, so that the probability of some item being overlooked is very small. If the cost is kept by cost marks, the book can be used in after years not only as a reference but also as an aid in selling, by showing a customer houses similar to his own that you have heated and how it is done, the effect of which can be intensified by having a letter expressing satisfaction from the owner pinned to the page. It also is an excellent school for the apprentice that you have agreed to teach the trade, and before his time is out you will reap the benefit of having such a book if it is well kept.

Some similar plan, no doubt, can be reported by some of our range and roofing readers, which, no doubt, will be appreciated by many besides the inquirer.

Bolted Pump Cylinders.

From J. A. B., *Riverhead, N. Y.*—Many readers of *The Metal Worker* have undoubtedly experienced more or less trouble in re-leathering the bolted pump cylinders and found that the bolts are made too short. As they come from the factory these cylinders are neatly bolted and when screwed down the nuts are flush with the threads. As repairs are needed, oftentimes thicker leather and better stock is used, the result being that the greater thickness shortens the bolts and the threads are stripped. Far away from a blacksmith the workman is compelled to return to his home, wishing that the manufacturer who made the pump cylinders could have some of his everyday experience. How much better it would be if all the bolts for the pump cylinders would be made longer so as to do the service that is required of them without stripping.

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Lead Burning.

From J. P. B.—What process is employed for joining lead, or soldering lead with lead, and what kind of acid is used for the work?

Answer.—In lead burning, as it is called, which is the process of joining lead with lead, hydrogen gas is generated in a properly constructed apparatus, and used in connection with air supplied by a bellows, blast or air tank. A rubber tube supplies hydrogen gas from the generator and a similar tube supplies atmospheric air from a proper receptacle. The two pipes meet at a three-way stop cock, to which is connected a third pipe provided with a burner to give a suitable flame. In soldering by the aid of this flame no acid or flux is used. The edges of the work are brought together, scraped clean, and a small bar of lead, also scraped clean, used in place of solder. The hydrogen is ignited, and size of flame regulated by means of the stop cocks connecting the pipes, thus allowing the proper amount of air and gas to mingle until a clear bluish flame is produced. The point of the flame is then held over the seam, and a small quantity of the strip lead melted off and melted into the seam. This operation is repeated after the general method of blow-pipe soldering until the seam is completed. For a description of apparatus and process used in lead burning, see *The Metal Worker* of September 3, 1892.

Tin Roofs.

From B. B., *Ashley, Ohio.*—I would like to have an expression of opinion from the readers of *The Metal Worker* regarding the laying of tin roofs on large buildings. Supposing a building to be 80 or 100 feet deep, and the roof has a fall of $\frac{3}{4}$ or 1 inch to the foot. If the tin roof is laid with a standing seam, during such severe winters as the past the snow is liable to collect in considerable quantities on the roof, and, as it melts from underneath, the water is liable to find its way through the seams. Would it not be better to lay such roofs with flat seams, which, being soldered, would prevent all danger of leakage?

Note.—Many roofs of the size and fall mentioned that have been put on with standing seam are in existence and are in every way satisfactory. The secret is: 1, in stopping the standing seams at a point where it is impossible for the water in the valley or gutter to rise and flood them and continuing with flat seams to the gutter; 2, in closing the standing seams tightly in such a roof. Some tinners prefer to go over the seams with a hand groover after the machine and make them surely tight. Where such care is observed trouble seldom results. Where the fall of the roof is so little as in this case, to get back far enough with the seams to keep them out of danger might leave but a small portion of the roof for standing seams and make extra labor by changing from one style to the other.

Gutter Trough.

From C. H. M., *Ohio.*—Somewhere in these great United States there is manufactured a trough for soldering together 5$\frac{1}{2}$-inch gutter. Can you tell me where it is, so that I can get one?

Note.—On inquiry we fail to find trace of the trough mentioned, though some reader may be able to give the information. We find as a rule the troughs used are home made and in every way satisfactory.

Micrometer Calipers.

From C. F. S., *Trenton, Tenn.*—Please inform me through the columns of *The Metal Worker* what kind of micrometer calipers are suitable for tin-shop use.

Answer.—Micrometer calipers that would fulfill our correspondent's requirements are manufactured by the Brown & Sharpe Mfg. Company, Providence, R. I., and L. S. Starrett, Athol, Mass.

WORLD'S FAIR NOTES.

Installation Nearing an End.

There will always be a few people behindhand. Perhaps in July the sound of hammers and saw may be heard in some one of the buildings, showing that a belated exhibitor is at last getting something in shape. The work accomplished last week, however, brought forth many noticeable changes in sections that on the opening day were so far behind it then seemed impossible to get them in shape much before the middle of June. Great progress has been made in the Electricity Building. The entire floor is now covered with installed exhibits in various stages of completion, and a formal opening is to be made this week.

In Manufactures Building there are a great many boxes yet to be unpacked, but the entire exhibit is rapidly taking shape. The Russians have the frame work of their pavilion practically in place. The Norway pavilion is ready for the painters and decorators. Denmark will be prepared to receive visitors in a few days, and the Canadian exhibit is far advanced compared with what it was a week ago. Having completed the exterior decorations of their pavilion, the French are exerting themselves in the work of installing goods.

Most of the State pavilions in the Agricultural Building have been completed and in a majority of them the exhibits are in shape. Russia, Spain, Brazil and the Argentine Republic are considerably behind, but they have large forces of men employed, and are pushing the work. Washington, South Dakota, Kansas, Colorado, Utah and some other Western States expect to finish their exhibits this week.

In the Transportation Building the exhibits are more nearly completed than in any other department on the ground. During the week the French engines and cars were received and transferred to the tracks on which they will stand during the entire exposition, and the German pavilion, made at Berlin and brought here in sections, was put up. It is one of the most attractive in the building.

The first notable evidence of the fact that all the exhibits for the Mines and Mining Building have been received was noticed last week when workmen commenced to remove the railroad track. All the spaces are occupied with exhibits, but some of the pavilions are incomplete, and for that reason the goods remain unpacked.

The wine and fruit sections of the Horticultural Building show a vast improvement. Nearly every display in these two departments was installed last week.

The Wisconsin fish exhibit in the Fisheries Building was pushed forward and the exhibits will be installed this week.

Many of the State buildings have been thrown open to visitors. California is getting the various county exhibits in condition and the building is now an attractive place for visitors.

By the close of this week the fair will come out with flying colors.

Fighting the System of Awards.

The rebellion against the World's Fair system of awards is not confined to the commissioners of foreign countries. On Thursday last over 130 United States exhibitors in the Manufactures Building alone addressed to Director-General Davis a note which, it is expected, will be followed at an early day by the withdrawal of their exhibits from examination for awards.

This movement originated with John G. Low, president of the Low Art Tile Company of Chelsea, Mass., who have an extensive exhibit in the northwest corner of the building. He was speedily joined by S. D. K. North, secretary of the National Association of Wool Manufacturers and secretary also of the Special World's Fair Committee of Woolen Manufacturers of the United States, about 130 in number, who are exhibitors and who approve of his course. The other signers represent very important interests, whose exhibits are of the highest character as representations of skill and national technical progress. The matter has been well presented by Mr. North, who is quoted as follows:

"It may be that we are to blame for the misunderstanding, but the fact is that we came here with our exhibits for the express purpose of competing with other manufacturers and carrying off a prize for the best goods. The discovery that there is to be no competition, but only a medal and diploma for merit, without any hint at superiority or supremacy, disappoints and disgusts us. If we had known it we would never have sent an exhibit. It seems to me that Mr. Thatcher might just as well give us all a medal apiece now and let us go home; for anybody can get one, and it means nothing and is worth nothing.

"As the medals are no account it makes no difference in fact whether they are awarded fairly or unfairly, and yet, as a matter of principle, we object just as strenuously to the rules concerning awards. As I understand the rules there is to be a board of judges of about 500 members; these judges are to be divided into thirteen departmental committees; each committee is to subdivide its department among its individual members; each individual member is to award medals in the territory assigned him; and in case of injustice an appeal is to be, first to the departmental committee, then to the board of judges, and finally to the commission itself. Now, this is all bosh. In the first place no one man can be an expert in all the exhibits in his field. Suppose such an expert were assigned to woolens, we have 150 different lines, and no one man can be an expert in all of them. Supposing that he is a competent expert, still everything will depend on his integrity and his freedom from prejudice. If he does an exhibitor injustice the right of appeal is worthless. The exhibitors will not know what his decision is until the last moment. An appeal will involve a regular trial, with witnesses and some one to conduct it, and may consume months of time, and finally, if there should be many of these appeals, they could never be adjudicated in the world. The right of appeal, therefore, is worthless, and the system practically leaves every award to the judgment of one man.

"There is a comical side to this, too. I am told that there are 39,000 exhibitors and that Mr. Thacher has ordered 36,000 medals. It would seem from this that the poorest person and the poorest exhibitor will hardly be overlooked. But if any one is overlooked his complaint will be a very ludicrous one. He cannot complain that another exhibit was unfairly adjudged better than his; he can only appeal from the judgment of the expert that his exhibit had no merit worth noticing. All this is ridiculous."

Mr. Thacher makes the following explanation of the course of the Committee on Awards in adopting the system which is so much condemned:

"It is an American system and was adopted and used at the Centennial. Aside from the question of the merits of the two systems, the Congress of the United States has definitely decided that there can be no such thing as a competitive system, it having decreed by a legislative act which no foreign representative nor American exhibitor can very well change. It has decreed that there will be but one kind of medal and diploma, both being constructed under the direction of the Secretary of the Treasury. We could not, if we wished, now provide for gold, silver, or other kind of medals except the bronze. Therefore the competitive system, certainly as operated from graded awards, is impossible. This is not my system, but the American system, put into operation at Philadelphia, and forming the only precedent to which we have access. This system is going to stay, too. I do not say that in an offensive spirit, but I believe it is a good system capable of being operated satisfactorily to every one and to change it now would simply bring disaster upon the fair. The system, as it is, will not be changed and as far as the competitive system is concerned it could not be done. Section 3 of the act of Congress, approved March 3, provides that it shall not be a competitive system."

"Would not the system of awards, as it now is, result in the giving of medals to about every exhibitor at the fair?"

"Any exhibitor who has an excellent article will not be deprived of a medal."

Sunday Opening Wins.

By a vote of 29 to 28 the National Commission approved the rule adopted by the local directory providing for opening the fair on Sundays. This action was taken on May 23, very unexpectedly to those in favor of Sunday closing, who had been confidently counting on the commission arraying itself in opposition to the directory. The intervention of the United States having been appealed to, Attorney-General Olney has directed the local district attorney to make a test case in the United States Court for the district, and the question will be decided whether a portion of an act of Congress can be disregarded. The constitutionality of the provision will be an important phase in the legal fight.

Interesting Belgian Exhibits.

Nothing in the Belgian exhibit in Manufactures Building is more curious, interesting and beautiful than a group of bronzes placed near the main entrance. It comes from the foundry of the Société Anonyme at Brussels. The large pieces consist of a vase 8 feet high, a life-size statue of Leonidas at Thermopylæ, and a piece 5 feet high consisting of a beautiful female figure with three or four Cupids clambering over it called "Innocence Tormented by Love." The smaller pieces consist of wreaths of flowers of the most delicate and intricate molding imaginable.

The chief interest in these bronzes arises from the process by which they are made, called "the lost wax process," known to have been in use by the sculptors and foundries of antiquity, but long since and for many centuries lost and unknown. Of late years it has been, as is supposed, rediscovered, and is now in constant use at the foundry of the Société Anonyme. The process in

ordinary use, called the sand process, gives better results in some kinds of castings; but where delicate outlines and shapes are desired nothing is comparable to the lost wax process.

Molding in wax is the most delicate and exact molding that is known and enables the artist to preserve every vine and flower and filament of vegetation, and every pore of the skin in a statue of the human body. The wax process consists of making a negative mold in cement from the wax figure, and then removing the wax by the application of heat. On the same principle runners through which the melted bronze is to be poured into the negative and vents through which hot air and vapors of the wax are to escape are provided. When the statue has been cast the negative is broken away from it, and the bronze casting is so perfect and minute that the slightest touch of the artist's finger on the wax model reappears faithfully in the bronze.

The exhibit of H. Pieper of Liége, is a young arsenal of everything in the way of small firearms that will kill man or beast. There are rifles, muskets, shotguns and pistols, and every conceivable size and style of each. The strangest feature of all is the different styles of guns made for the trade in half-civilized countries like Africa and Arabia. The natives of these countries have their own ideas of what constitutes a handsome and effective weapon and will have no other kind. The African races prefer a smooth-bore gun about 3 feet long, with a yellow or green stock, looking like a toy gun, and Mr. Pieper, rather than lose their trade, gets up a fascinating line of these bright-hued arms. Then the Arabians must have a gun 7 feet long, with a black or bright red stock running the whole length of the barrel. In the exhibit is a large lot of shotguns that will excite the envy of every sportsman that inspects them. They have one, two or three barrels, as one may choose. Some of the two-barreled and three-barreled guns have one barrel rifled for a bullet and the other smooth for shot.

In connection with the shotguns there are exhibits that explain how the delicate tracery on these gun barrels is produced. Each gun barrel is made by wrapping a ribbon of metal around an iron rod and afterward welding its edges together. This ribbon is made of two, three or four small square rods, some of iron and some of steel, welded together. In some cases these small rods are twisted before welding, and twisted in different ways. When the gun barrel is made and polished it is then dipped in an acid, which eats the iron and steel unequally, and so produces all the wonderful tracery that is so much admired. This process is designed primarily, however, to produce greater strength, and the tracery is almost incidental.

The pistols in this collection are a particularly sad feature, as they are intended entirely for killing human beings, in time of peace, and are got up in such quantity and variety as show conclusively the widespread and growing popularity of this amusement.

The rope exhibit of F. Vermeire-Hellebout of Hamme is never passed unnoticed. Hung against the wall in perpendicular parallel lines are samples a few feet long of 50 sizes and kinds of rope, from a cord ¼ inch thick to a cable 6 inches in thickness and apparently as hard and inflexible as an oak tree. The admiration for the workmanship is increased by the fact that it is all entirely hand made.

One would suppose, from looking at it and feeling it, that the largest sample could never be twisted into its present form by anything less than the Allis quadruple expansion and condensing engine; and the statement that men have made such an article with their naked hands excites considerable astonishment. It is also claimed that hand-made ropes are double as strong as ropes made by machinery.

Mechanical Tests.

It is altogether probable that the series of mechanical tests contemplated in the report of the committee of the American Society of Mechanical Engineers to the Committee on Awards will be made. The question now before the World's Fair authorities is rather one of means and methods than of desirability. There is a disinclination on the parts of exposition officials to exact further fees from the exhibitors, yet rather than to let the great opportunity slip the exhibitors will be called upon. As to the importance of such a series of tests there is no difference of opinion. Exhibitors, engineers and World's Fair officials unite in saying that the tests should be made and made thoroughly by the most eminent experts.

Ten Thousand Mexicans Coming.

The St. Louis Spanish club is in receipt of advices from the Hathaway Excursion Company that they expect to bring in special excursions to the World's Fair over 10,000 Mexican visitors. Among them will be a large number of the leading merchants and professional and business men of Mexico. The first excursion will arrive at St. Louis about June 24, composed mainly of merchants of the city of Irapuato and vicinity. Governor Cosio of the State of Queretaro is expected to accompany this party.

Implement Exhibitors Organize.

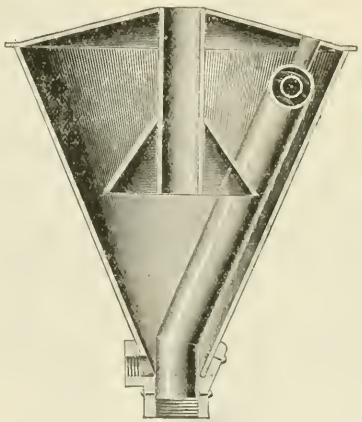
The agricultural implement exhibitors at the exposition met at the Grand Pacific Hotel last week and effected a permanent organization to advance their interests at the fair and to meet once a week for the exchange of ideas. The following officers were elected: President, H. C. Staver, Chicago; secretary, R. I. Ardrey, Chicago; treasurer, A. D. Frary, Chicago; vice-presidents, James E. Deering, Illinois; J. D. Oliver, South Bend, Ind.; James Manning, New York; F. E. Myers, Ohio; Charles E. Whitman, St. Louis; Stephen Bull, Milwaukee; P. S. McGowan, St. Paul; W. D. Mitchell, Chattanooga, Tenn.; Mr. Mann, Louisville, Ky. The question of entering into a competition for awards without a field trial of the implements, contemplated by the Committee on Awards, was deferred until a future meeting.

The Ferris Wheel.

The Ferris wheel is a sure enough wheel now. The great felloes were joined together on Friday last and the work of lighting up was begun. Twenty-five of the 36 cars which will be suspended from the wheel have already been completed, and they will be swung into position this week. The engine is in place and the contractors expect to see the wheel in operation on June 10.

Number of Visitors.

Comparisons daily made with attendance on corresponding days at the Centennial show that the number of visitors is steadily over 50 per cent. larger. Arrangements have now been made for great electrical displays on Tuesday, Thursday and Saturday evening of each week, which are expected to prove very popular and greatly increase the gate receipts.



The Eclipse Exhaust-Pipe Head.

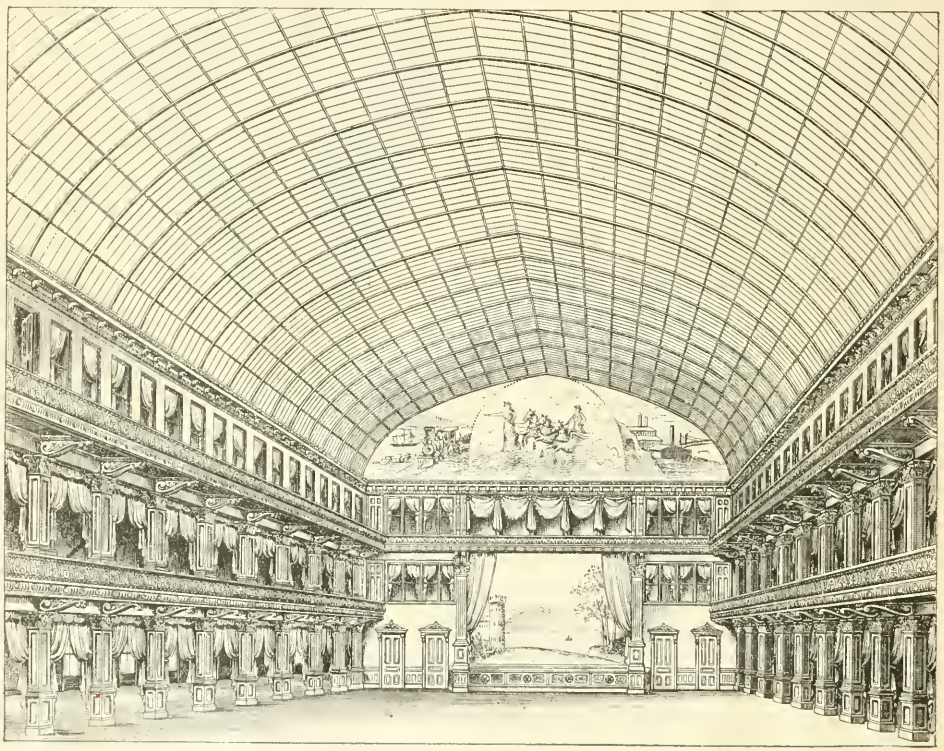
The Eclipse Exhaust-Pipe Head.

The New York Exhaust & Blow Pipe Company, Hartford, Conn., with New York office at 136 Liberty street, have been granted a patent on the Eclipse exhaust-pipe head, which they are placing on the market through dealers. As shown in the accompanying sectional view, the exhaust steam as it enters the head is carried near the top, then discharged horizontally around the head, giving it a centrifugal motion, and, it is said, driving all the solid matter to the outer wall, when it runs down and out of the drip. The light and dry steam escapes through the center of the top. In addition to the above centrifugal motion, for separating the heavy matter from the light, there is a small pipe running from the outside, and so connected that when the exhaust steam is going through the large pipe it causes a suction in the smaller one, thereby drawing cold air into the head, which, combined with the centrifugal motion, makes, it is claimed, a very efficient system of condensing the steam. We understand that the manufacturers are meeting with great success, and look forward to a large trade in this device.

ROOFING AND CORNICE.

A Large Glass Roof.

The New York Industrial Building (Grand Central Palace) occupies the entire block bounded by Lexington avenue, Depew place and Forty-third and Forty-fourth streets, adjoining the Grand Central Depot, New York City. It covers an area 200 x 275 feet, with a floor space of 310,000 square feet. A notable feature of this building is the glass arch over the auditorium, which has a clear span of 84 feet and is 155 feet in length. The illustrations presented herewith give some idea of the extent of this roof and the methods of its construction. Fig. 1 is an interior view of the auditorium, while Fig. 2 is a sectional view through the building, illustrating the method of supporting the glass roof, which embodies a peculiar adaptation of the Hayes system of iron and glass roof. It is at the same time an arched ceiling and roof of glass, supported by seven pin-connected steel trusses, each weighing 17 tons, which rest upon the walls above the glass work and are not seen from below. Another feature to which particular attention is directed is that no shadows are cast. From these trusses are suspended 6-inch steel ribs, transversely to which are 3-inch angle iron purlins. Upon purlins are secured the immediate bearings for the glass, which are the guttered bars and horizontal frame work, so arranged that they permit the collection and discharge of all vapor or moisture which may condense upon the under side of the glass. The arrangement involves an intricate application of the system, and embodies special features not before employed in glass-roof construction. The supporting trusses perform the dual function of sustaining the roof-ceiling, as described, and also of supporting the floor to the summer garden, which is to form one of the most attractive features of the building. The arrangement as embodied in this building was conceived by L. R. Mestaniz, a member of the Industrial Association. The structural iron work was carried out by Charles O. Brown, civil engineer of the Riverside Bridge & Iron Works, Paterson, N. J., and the superstructure of glass by George Hayes, New York City.



A Large Glass Roof.—Fig. 1.—Interior View of Auditorium.

Trouble With a Roof.

From H. B., *Prairie du Chien, Wis.*—I notice in *The Metal Worker* of May 13, a letter from J. M. S., Platteville, Wis., about trouble with a tin roof. No person should go on to a tin roof with leather boots or shoes on, but always with rubbers. In shoveling off snow a wooden shovel should be used. No ice should be chopped on it. The best recoated terne plate should be put on, coated by the palm oil process, as acid will cause the iron to rust. Then, if the roof is kept well painted, there need be no leaking.

FLASHINGS.

The Garry Iron & Steel Roofing Company of Cleveland, Ohio, have increased their capacity by adding a 150 horse-power engine and several other machines necessary to improve and expedite their work, as the rapid increase in business demands it.

J. Flanagan, 396 Fourth avenue, New York, is now engaged on the sheet-

metal work of the American Theater at Forty-second street and Eighth avenue, which is said to be one of the largest theaters in the United States. The roof will be of Spanish tile and copper. Some of the sheet-metal work for the front is of special design and is being erected with creditable skill. A piece of work to which Mr. Flanagan points with pride is the sheet-metal front on the office building at Thirty-fifth street and Fifth avenue. It is very elaborate and the entire work and making of all the ern Mineral Wool Company, Cleveland, Ohio. They advise us that they have a full stock on hand and are in a position to fill all orders entrusted to them with promptness. There is a growing demand for mineral wool, not only for insulating refrigerators and cold storage rooms but also for packing steam and water pipes, for deadening and packing walls and partitions, to make apartments warmer in winter and cooler in summer. On account of the large difference between the freight rates on car

important data that people are apt to forget, such as size of the collar, number of bank book, &c.

THE CANTON STEEL ROOFING COMPANY, Canton, Ohio, are established in their new plant which replaces the one destroyed by fire December 7 last. The main building is larger than the old one, giving them more facilities for their work. The entire establishment is not yet completed, but the office and buildings back of the main building are now

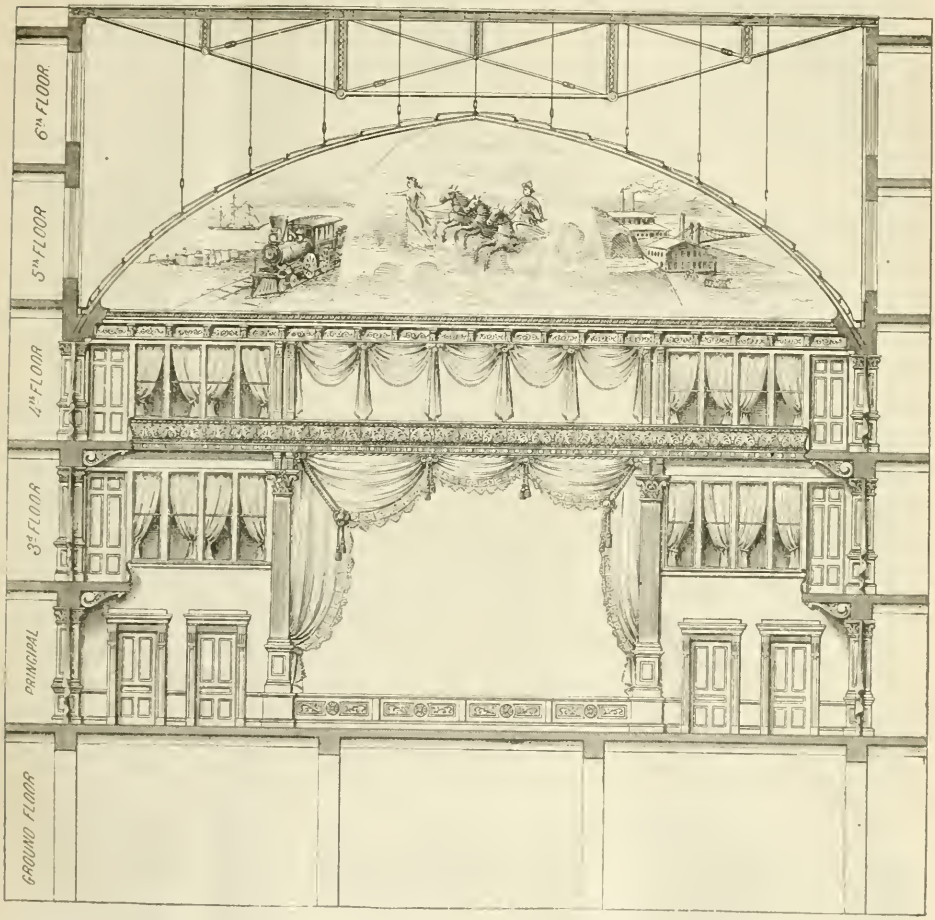


Fig. 2.—Sectional View through Building.

ornaments was done in his shop and by his men.

B. CONLAN & CO., 47 Lawrance street, Newark, N. J., make a specialty of fancy brass and sheet-metal ornaments of all kinds. The company occupy a four-story building, having the heavy presses and drop hammers in the basement, a machine shop on the first floor, where the office is also located, and on the upper floors are rows of foot presses and benches for stamping out and finishing ornaments and devices.

THE KANSAS CITY METAL ROOFING & CORRUGATING COMPANY, Kansas City, Mo., have been appointed agents for Kansas City and vicinity for the Westloads and less than carloads the Western Mineral Wool Company found it absolutely necessary to establish a depot for distribution at Kansas City, as the rates on small lots from Cleveland or Chicago are extremely unfavorable to the Western trade.

THE AMERICAN ROOFING COMPANY, St. Louis and Cincinnati, send out a little identification card. The card, which folds once, carries on the outside reference to the American Roofing Company and their manufactures of corrugated iron and other goods. Within are blanks for the name and address of the person to notify in case of accident to the bearer, and memoranda for various

under contract and there are other structures to be erected as soon as the present lease on a portion of the ground expires. The company have equipped their works with the latest and most improved machinery for manufacturing their line of sheet-metal goods, and are now filling all orders promptly. They report their trade for the first four months of the present year as greater than for the same period in any previous year.

Fifty Oregon merchants are in San Francisco to encourage coastwise trade and two more steamers will be put on between that city and Yaquina next autumn.

Lalance & Grosjean Mfg. Company's Works.

As the pioneers of seamless stamping and sheet-iron enameled ware manufacture in the United States, the Lalance & Grosjean Mfg. Company of Woodhaven, L. I., and Harrisburg, Pa., have a justly deserved reputation, while the fame of their agate ware extends far beyond the limits of the United States. It is probable that the familiar trade-mark of the firm, affixed to articles of their manufacture, is known in almost every corner of the globe. A story is even related, as strictly veracious, to the effect that one of the members of a recent polar expedition picked up an agate ware cup at nearly as high a latitude as has ever been reached by man; a relic, doubtless, of some former explorers in that icy region.

The following brief mention of the rise of this important industrial establishment will be of interest:

The firm of Lalance & Grosjean is one of over 40 years' standing. The present head of the concern was one of the original founders. He is Florian Grosjean, a native of Switzerland, who in early life emigrated to the United States. About the year 1850, he started in business in a small way with a compatriot, W. Lalance, as importers of sheet metal culinary vessels. These articles the partners shortly commenced to manufacture for themselves on a limited scale in the city of New York. Prospering in their undertaking, they moved, in 1863, to Woodhaven, Long Island, where they built a factory, employing from 75 to 100 hands. In 1869, the business having increased in size and importance, the firm was incorporated under its present title, and continued thriving until February, 1876, when the whole plant was destroyed by fire. The buildings were, however, quickly re erected, and on a much more extensive scale than before; so that in July of the same year, after a stoppage of but five months, the works were again in full operation. Since that period the history of the Lalance & Grosjean Mfg. Company has been one of unbroken progress and prosperity, until they stand to-day as the largest manufacturing concern of their class in the world.

Mr. Grosjean, who on the death of his partner became head and principal stockholder of the company, is still actively engaged in the business as president. He can look with natural pride upon the vast industry which he originated and has built up from the smallest kind of an enterprise to its present dimensions. President Grosjean is a notable example of the boundless possibilities which lie before every self-helpful and intelligent young man in this country. Starting in life as a poor boy, with absolutely no advantages to speak of, he has managed by enterprise and perseverance to place himself among the foremost and most honored captains of industry in the United States.

The Woodhaven Factory.

A brief sketch of the Woodhaven factory of the Lalance & Grosjean Mfg. Company and some facts in relation to the manufactures there carried on are appended. Considering the immensely increased use of enameled ironware for household purposes everywhere, it will be readily understood how large a business is done by the company in this line of goods alone, not to speak of the extensive list of household utensils in bright and japanned tinware, in plain iron and steel and other material, which are also produced at the factory. It is said to run into millions of dollars annually. Consequently the visitor to Woodhaven will expect to find a very large establishment. And he will not be disappointed. The great pile of red brick buildings, with high clock tower and chimney, which constitute the factory, are a very noticeable feature on the line of the Long Island Railroad. Woodhaven Junction, near which they are situated, is less than half an hour's run from the Brooklyn terminus of the road, and is very easy of access. The circumstance of the railway running under the walls of the establishment furnishes it with the best of shipping facilities. The buildings cover three-fourths of the company's ground, or three whole blocks. A fourth square is still available for future extensions, being at present occupied by workmen's dwellings and some large oil tanks, which will be presently referred to.

By a reference to the ground plan presented with this article the disposition of the buildings, yards, &c., will be plainly seen. The whole plant covers some 16 acres, and is upward of ¼ mile in circumference. The main block, situated to the east, which is almost wholly covered by buildings, measures 500 feet square. On three sides, as will be noticed on the plan, it is surrounded by an unbroken line of shops and warehouses. These run to three and four stories in hight, some parts having a basement in addition.

Stamping Department.

The whole ground floor of the outer buildings fronting the north, parallel to the line of railroad, as well as of those on the east side to the middle of the block, is occupied by machinery for pressing and stamping sheet steel and iron goods, except at the northwest corner, where is situated the machine shop. The presses used for the purpose, some of which are the most powerful tools of their class ever made, were mostly designed and manufactured on the spot. Thirty-five machinists and a corps of draftsmen are constantly employed on this work, which is a very important item in the economy of the establishment. The stock of tools of various kinds in hand is valued, we are told, at over $750,000. A special fire-proof storehouse is provided for the more expensive ones.

In the stamping shops rows of presses and stamping machines are lined on each side. Here the sheet iron and steel are cut out and stamped into culinary vessels and the various articles of household use manufactured in the factory. The majority of these are passed on to the enameling shops to be turned into agate or other enameled ware. The largest presses used are capable of forming articles up to 3 feet in depth and 4 feet in diameter, exerting the enormous pressure of 4000 tons. These machines are said to do the largest work in seamless stamping that can be accomplished by any concern in the world. The metal sheets used for this purpose are anywhere from No. 7 to No. 27 gauge, according to the use to be made of the objects and the strength required. Bathtubs, for example, which are probably the largest articles stamped out of one sheet, are often formed of comparatively thin metal, and, provided the subsequent annealing is carefully done, are said to be perfectly strong and efficient, notwithstanding their tenuity. Strong kettles for special uses and other large articles require, of course, the heavier gauges of sheet metal. Boiler heads take the thickest metal used in the factory.

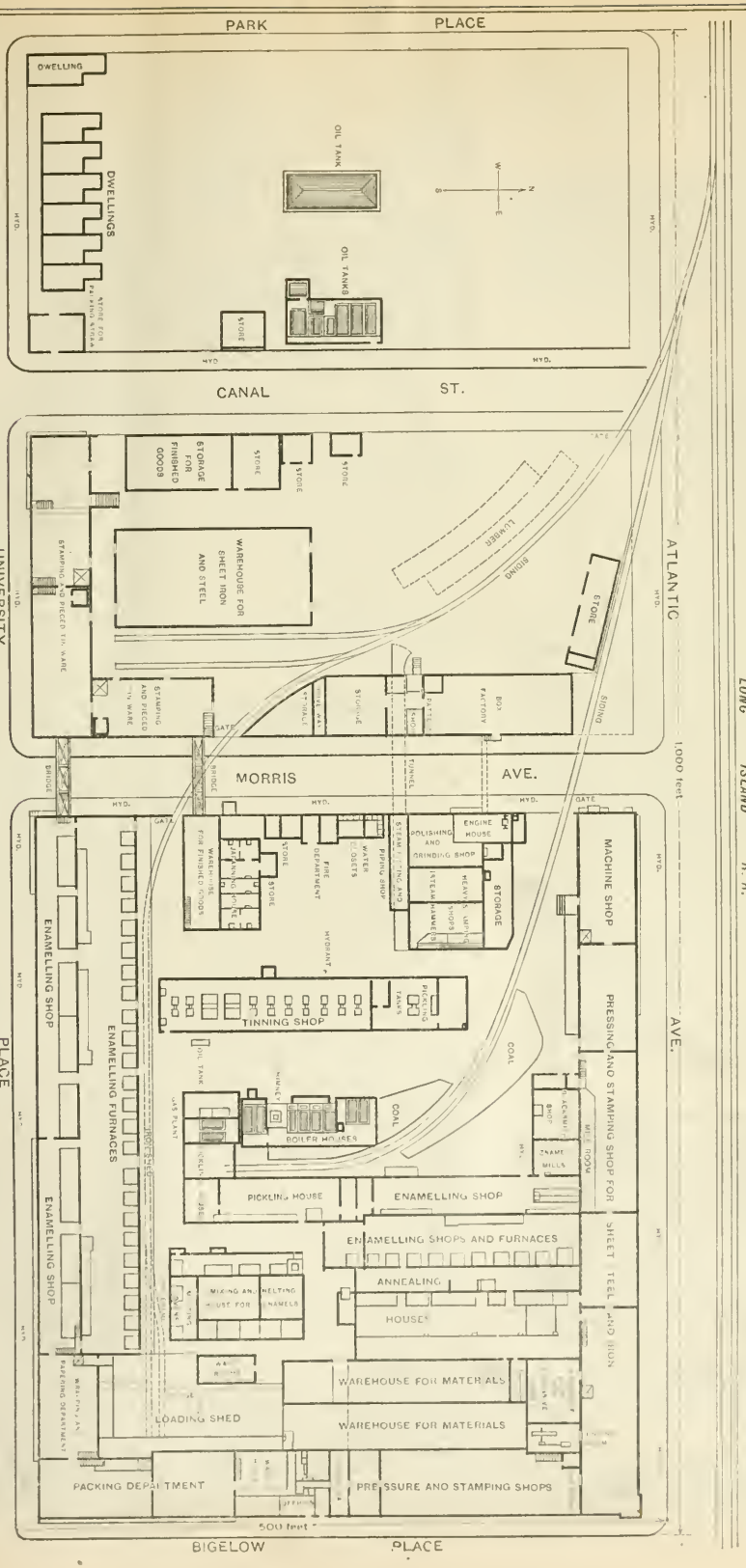
Spinning lathes are placed in the second story of the north front, the third floor being used for tin work. A great part of the soldering work of the establishment is carried out on this floor, the soldering stoves being heated by gas.

Immediately above the stamping shops on the northeast face are the power presses for the smaller goods. As an instance of the volume of work compassed by one of these tools, it may be mentioned that a single stamping press seen here was turning out cheap teaspoons at the rate of 21,000 daily, the spoons flying out from the press almost faster than the eye could follow them. The attendance of one boy was all that was required for handling the articles and operating the machine. After witnessing this operation, one could more readily understand how it is possible to put such goods on the market at the seemingly ridiculous price of 60 cents a gross. The third floor of this portion of the establishment is occupied by japanning ovens devoted exclusively to the preparation of the larger sizes of tea trays, of which great quantities and varieties are turned out.

Enameling Department.

The extensive line of enameled goods manufactured by the Lalance & Grosjean Mfg. Company forms, however, the main feature of their business; and the space allotted to this department is naturally large. The whole of the southern portion of the main block is occupied by shops where only agate ware is treated. This well-known ware is made of sheet iron, which is found to take the enamel coating better than steel. The process of coating is not a complicated one, and may be briefly described as follows: The enamel preparation, which is a kind of glass mixture, the actual component parts being of course, more or less of a secret, is mixed and melted in large vats and ovens placed in the center of the block. When ready for use, the composition is transferred to a series of baths located in the south wing, where a number of women and boys are employed in dipping the article to be enameled. It should be mentioned that each article requiring coating is previously pickled and then scrubbed and thoroughly cleansed in order to remove all impurities which would prevent the enamel adhering to the metal. The article, after receiving its first coat of enamel preparation, is transferred to one of a long range of ovens placed parallel to the dipping troughs. Here it is fired for about seven minutes; after cooling it is redipped, and again fired —the process being repeated until the object receives its last coating. This is of a different kind and imparts the necessary gloss and hardness to the enamel coating. The quality of the ware depends entirely upon the number of coats it thus receives.

The enamel used for the last coat on agate ware is said to be the only preparation of its nature yet discovered which is capable of withstanding the action of acids. Sulphuric acid has absolutely no effect upon its surface. For this reason the firm have developed quite a large business in special pans and vessels for chemists' use. They are cheaper, stronger, and more lasting than those formerly used for this purpose.



PLAN OF WORKS OF THE LALANCE & GROSJEAN MANUFACTURING COMPANY, WOODHAVEN, L. I.

Agate ware pans, too, are now largely used by photographers for their work, being more economical and effective than the more expensive receptacles heretofore made use of, besides being easily kept clean. In fact, we are told that agate ware is constantly finding fresh uses.

Besides this specialty, other ware in blue, white, pearl and mottled enamel is turned out in large quantities. Shops for operating these lines of goods are situated in another part of the block at right angles to the north front, and adjoining the annealing furnaces. More dipping troughs and ovens are placed in them, the process of enameling being essentially similar to that above described.

Oil Fuel.

Fifty-four furnaces are in use for firing enameled goods, besides which 20 large annealing furnaces, standing in juxtaposition to the stamping and pressing shops, are kept in full blast for treating the stamped iron vessels. These, and all furnaces on the works, are heated by oil fuel, which has been found to give here the best and most economical results. Crude oil, the material used, is consumed to the amount of about 9000 gallons daily. The oil is kept in large storage tanks, marked on the plan in the as yet unbuilt on square to the west. These tanks have an aggregate capacity of 160,000 gallons. The oil is conveyed into them by natural flow through pipes connected with stand pipes adjoining the railroad track, the material being delivered direct from the tank cars. From these reservoirs the oil is pumped to the various portions of the works as required. The system of firing used is that of the Aërated Fuel Company of Springfield, Mass., who erected the oil plant. The saving of time and labor and the gain in cleanliness involved in the adoption of oil fuel is said to be immense. The dirt and ashes attending the use of coal are entirely avoided, and the fires can be instantly lighted or extinguished. The second floor of the south wing is used for the manufacture of wash boilers in tin and copper, of which a very extensive line is made. The wash-boiler shop is one of the finest of its kind, being more than 300 feet in length. All the various processes of piecing and finishing the utensils are carried on here —soldering, riveting, &c. This shop is connected, by means of a bridge over the intervening street, with the second floor of the new tinware department in the center block.

Tinning Shop and Boiler House.

A large proportion of the tinware made at the factory is retinned after manufacture, particularly that which has been at all heavily stamped. For this purpose a large tinhouse is provided. It is located almost in the center of the eastern block, as will be seen by reference to the plan. The tinhouse contains 40 pots, holding in the aggregate about 150,000 pounds of melted tin. These pots are kept constantly at melting heat, year in and year out, the material being never permitted to solidify.

Parallel to the tinning shop are the boiler houses, containing a battery of eight tubular boilers of 100 horse-power each, made by Smith Brothers of Brooklyn. Next to the boiler house, and between it and the gas plant, rises a brick chimney 157½ feet high, which serves to carry off all the smoke and vapors of the factory. Every fire in the entire establishment is connected with this central chimney by means of a spider-web-like ramification of underground flues leading from all parts of the establishment. Power is supplied by two horizontal engines. One Corliss engine of 500 horse-power is placed near the northeast corner of the main block, and one of 250 horse-power, made by the Fitchburg Machine Company of Fitchburg, Mass., is located near the northwestern corner. The latter supplies the power for the new buildings on the second block.

Adjoining the second engine house is the polishing and grinding shop, containing a large number of emery and corundum wheels. Next to this department are the shops containing the steam hammers, mounted on a foundation 35 feet deep. These hammers are very powerful and are capable of striking a blow of 2 tons.

In addition to the departments we have briefly mentioned, a large number of others are housed in the numerous buildings which cover the main block. Exigencies of space, however, forbid further enlargement in this direction. One can only name the japanning houses, the blacksmith's shop, the departments for making ears, bails and handles of vessels, the mills for grinding enamel, and other places where are conducted the hundred and one minor processes incidental to a great factory. Specially designed machinery is employed for the carrying out of almost every detail connected with the various manufactures, a great part of which really deserve a detailed description, which it is impossible to afford at present.

Reference should not be omitted to the great castellated clock tower standing at the northeast angle of the square, which is a very prominent feature of the works.

The Tinware Factory.

Passing from the northern quadrangle, which is nearly covered by houses, we come to the second square on the western side, where is situated the newest portion of the factory buildings. This part of the works is connected with the main buildings by means of two bridges on the second floor, and a subterranean tunnel. The L-shaped building, 300 x 40 feet, which stands in this portion, was erected only last year. It is four stories in hight, brick built, and in general features similar to the outer buildings of the northern square. Here is conducted the bulk of the tin and japanned ware manufacture. Some of this class of goods are, as will have been noticed, still made in the older portion of the works, but it is intended to eventually transfer the whole of the tin work to this side, leaving the main buildings exclusively for the operations connected with enameled goods, the growing demand for which calls for largely increased space. All kinds of domestic tinware, stamped and pieced, plain and decorated, are turned out in the numerous shops of the building. Machines of special design for seaming, wiring, bending, flanging and otherwise operating the various articles of tinware manufactured enable the sundry operations to be carried out with the greatest quickness and economy of labor. Indeed, the actual hand labor put into the work all over the factory appears to be reduced to the finest minimum. Machinery accomplishes almost all the mechanical operations in which the intervention of the human hand was formerly considered essential, and does it with far more accuracy and celerity. A great deal of the soldering here is done by women and girls.

Some very handsome decorating is conducted in a portion of the new building, on such articles as may be appropriately embellished—namely, tea and coffee pots, tea trays, water coolers and other enameled or japanned goods. A department of considerable size is tenanted by the company's designers and decorators. The outline designs are usually laid upon the object to be decorated, the color being subsequently applied by hand. Some of the japanned articles, as tea and crumb trays, coolers, &c., are decorated with ornamentation in gold and colors, which is placed on the article from transfer paper, on which the patterns have been stamped by means of chromo-lithography. The lithography is also carried out on the spot.

Warehouses and Stores.

Adjoining the tinware factory is a large building containing the raw material in sheet iron and steel. About 50 tons of this material are used weekly. The whole of the supply is furnished by the company's new rolling mills at Harrisburg, Pa., which were first put into operation about three months ago, and of which a detailed description was published in a recent issue. The amount of tin plate used in the manufacture of tinware reaches a weekly average of nearly 1000 boxes. It is likely that a department for the manufacture of tin plates will before long be added to the firm's Harrisburg mill, in order that they may supply themselves with this important item. This course has already been taken with great success by a large stamping company of St. Louis.

Several other storea for material, and also for finished goods, are located on the second block. The principal warehouses are, however, placed in the southeast angle of the main block. The ground floor of this section is used for office purposes and for wrapping, papering and packing goods. These goods are then either stored in the large warehouses on the floors above, or are, when boxed and required for shipment, transferred to the adjacent loading shed. A very large stock of goods is carried by the firm not only here, but also in their New York, Boston and Chicago stores.

The facilities for shipment are excellent, and can be readily seen on the accompanying plan. The sidings from the line of the Long Island Railroad traverse the works in a number of directions. Several tracks are arranged for delivering the raw material alongside the various stores. The line which communicates with loading shed divides into a double track, and is so arranged that the cars for the East are always loaded at one side of the shed, and those for the West on the other side. About four carloads of goods are sent away on an average daily, besides some 500 cases for the New York trade, which are dispatched separately.

For the packing of these goods about 2,000,000 feet of lumber is cut up yearly, the packing cases—for which no charge is made—costing the company in material and labor some $50,000 annually. The lumber store and box factory are located on the middle block, as shown in the plan.

Precautions Against Fire.

It is stated that the insurance companies regard the Lalance & Grosgean factory as one of the very best risks they have, owing to the excellent fire arrangements provided. There is a regular fire brigade composed of 50 employees, who are said to be a most efficient corps. Every precaution has

been taken in the buildings to make them as nearly fire proof as possible. The roofs are all of metal with galvanized iron cornices. All the wood work of the interior is lined with metal, and sliding iron doors divide the various shops. A supply of buckets, with vertical pipes and hose, are placed in each building, while 25 hydrants are located inside and outside the yards. These are all connected with two reservoirs of 4,000,000 gallons capacity, situated on an elevation at about three quarters of a mile from the factory. The pumping capacity is about 1,000,000 gallons daily, the water being obtained from artesian wells. These reservoirs constitute also the chief water supply of the town of Woodhaven. Every precaution has been taken to avoid the risk of a similar disaster to that of 1876, and, so far as human foresight can go, the preventive measures adopted almost entirely preclude any recurrence of such an unfortunate event. The buildings are heated partly by steam and partly by stoves.

Organization and General Arrangements.

A feature of this great industrial establishment which is well deserving of lengthened description, but to which we can afford but a passing reference, is the efficient system of organization which pervades the entire factory. Although some 1700 hands—men, women, boys and girls—are employed, all seem to know exactly what their work is and appear to do it thoroughly. There is no crowding and no hurry. There are, it appears, about 40 different departments, each one of which is in charge of a foreman, to whom is relegated the entire control of the workers in that department, and who is directly responsible to the general superintendent, E. W. Ball, for the work of his branch. Several of these departments are again sub-divided into sections controlled by leading men who are responsible to the foreman in charge. The system, which is of the nature of that in a large regiment, is stated to operate with clock-work regularity; but it must have required a vast amount of organizing skill to bring it to perfection. The space allotted to each worker is very generous, and one of the most striking points in the whole establishment is the amount of elbow room possessed by all. The arrangements for supply of light and air are excellent, and the general health of the workers is consequently said to be exceptionally good.

The firm exercise a wise liberality toward their employees, and in many ways evince a concern for their well-being and comfort which is apparently fully appreciated on their part. Strikes are unknown, and we are told that some hundreds of the men now working for the firm have been continually in their employ for the last 10 to 25 years. Most of them have grown up in the concern and take the greatest personal pride in its success and progress. The surroundings of the factory are very attractive. A park has been laid out immediately adjoining it, where green sward, flowers and trees, and benches for rest, are provided for the pleasure and refreshment of the workers and their families. From all reports there is a remarkable contact or personal interest and sympathy between employers and employed, which fully accounts for much of the success of the concern, and which can but make for good and cheerful work on the part of their employees.

The presidency of the Lalance & Grosjean Mfg. Company is held, as we have mentioned, by the venerable founder, Florian Grosjean. Mr. Grosjean is ably assisted by the vice-president, Augustus J. Cordier, to whose energy and judgment much of the later success of the concern is due. E. W. Martin is secretary and treasurer, and E. W. Ball has charge of the factory.

Besides the immense domestic business done by the company, they have a very large foreign connection. Their principal markets abroad are found in Canada, Australia and Brazil, although they are doing a good trade in South Africa, China, Japan, India and other quarters. This foreign business is yearly increasing. The main office of the Lalance & Grosjean Mfg. Company is at 19 Cliff street, New York City.

Prize Competitions

$25.00.

Prize Competition No. 26.

SUBJECT:

To What Extent Are Manufacturers and Jobbers Justified in Selling to Consumers.

This competition is suggested by the fact that frequent complaints are made that manufacturers and jobbers interfere with the retailer's business by selling to his customers. It is intended to draw out the views of the trade on the subject. In discussing the question the following points may, perhaps, naturally be touched upon:

The annoyance and injury to which the retailer is thus subjected:

What the rights and privileges of the manufacturers and jobbers are in this matter;

What it is feasible for retailers to do for their own protection.

This competition will remain open until July 1, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which, in the judgment of the Committee of Award, are most suitable for publication and of the most general interest

We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than July 1, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96-102 Reade street,
New York.
Prize Competition No. 26.

The committee to whom the contributions in Prize Competition No. 11 were referred have awarded the prizes as follows:

First Prize of $50 to J. E. JANSSEN, Eureka, Cal.

Second Prize of $25 to H. P. COLE, Council Bluffs, Iowa.

Third Prize of $15 to J. C. MOORE, Saltsburg, Pa.

Fourth Prize of $10 to HARRY G. DRUMMOND, Newark, N. J.

We also take pleasure in announcing the decision in Competition No. 12 as follows:

First Prize of $12.50 to J. E. JANSSEN, Eureka, Cal.

Second prize of $7.50 to A. Q. CASSELBERRY, Pittsburgh, Pa.

Third Prize of $5 to CHAS. F. BUGG, Farmville, Va.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 24. Closing June 3.
Short Methods of Figuring Discounts.

No. 20. (Reopened.) Closing June 10.
A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

No. 25. Closing June 24.
Show-Window Display.

No. 26. Closing July 1.
To What Extent Are Manufacturers and Jobbers Justified in Selling to Consumers.

Another subject will be announced in our next issue.

As foreseen, the issues of silver certificates are steadily forcing out of circulation other forms of currency, and are now in such excess and are returned to the Treasury with such regularity that their issue is practically suspended. Custom House receipts to the extent of 40 per cent. are of this description, whereas before the passage of the Sherman law from 75 to 95 per cent. were gold certificates, which at the present time are withheld altogether. So marked has become the tendency to unload silver certificates upon the Government, while hoarding better forms of money, that packages of large certificates have been sent back unbroken within a week or ten days in payment for customs dues by banks which received them in the West.

It is officially reported from the computations by naval engineers that the cruiser "New York" on her trial trip made 21 knots, allowing for tidal currents.

STEAM AND HOT WATER.

The Heating and Ventilation of Halls and Theaters by the Blower System.

BY WALTER B SNOW.

In the hall or theater we seek that instruction, recreation or amusement which should drive from our minds all the cares of the hour, and, like a holiday, leave us rested and refreshed. But how many go away from a theater feeling rested? Is there not instead too much of a feeling of weariness, with perhaps a dull headache? The reason is not far to seek.

THE NECESSITY OF VENTILATION.

We have been for perhaps three hours in a room, large enough it may be, but filled to overflowing with human beings each vitiating beyond healthful use not less than 30 cubic feet of air per minute. Possibly, although we may hope not in these days of electric lights, this theater is illuminated by a mulitude of gas jets, each doing the work of five to six ordinary men in vitiating the atmosphere.

In a theater containing 1000 persons there will thus be rendered useless by human agencies alone—leaving the gas out of account—30,000 cubic feet of air per minute. We may realize how great is this volume when we see that, traveling at a velocity of 500 feet per minute, it would require a conduit of 60 square feet cross sectional area. How many of us imagine that, without extraordinary preparations in the original design of the building and its system of heating and ventilation, any approach to such an amount of air is supplied in the average theater of this seating capacity.

Perhaps, indeed, some attempt has been made toward this end; the ingenious architect and the economical owner have decided on ceiling ventilation, or possibly ventilation through wall flues, but while the opportunity for escape of air has been provided no adequate provision has been made for its admission, and consequently the entire system has been rendered nugatory.

With all the luxury of the modern theater, its upholstered and adjusted seats, its beautiful adornment, its agreeable and hygienically perfect incandescent light, it does seem that there must have been a sudden lapse in the usual business sagacity of proprietor or manager when, to offset all these inducements to the theater goer, he allows the air to become so overheated and polluted as to be almost unbearable.

CARBONIC ACID GAS IN THE ATMOSPHERE

Pure outdoor air contains about 4 parts in 10,000 of carbonic acid gas; good ventilation is considered to exist when the amount does not exceed 6 to 8 parts in 10,000. Tests in many of the finest theaters of this country and Europe have, however, shown carbonic acid present in a proportion mounting up to 40 and 50 parts in 10,000, while, except in the most modern theaters, it is doubtful if, as a whole, the proportion will average below 20 parts in 10,000 at the middle or toward the end of a performance.

The manager expects that all his other efforts toward ornamentation and comfort will be repaid in patronage. Why should he not introduce an adequate system and then advertise his as the best ventilated theater in the city, and make a strong point? This scheme is, in fact, being followed up by some managers who have introduced successful mechanical ventilating systems, and there can be no doubt that, other things being equal, the public will resort to the best ventilated theater. If the manager can only be made to look at his system as a financial investment, and can see wherein it pays, it will not take long for him to make a forceful move in the right direction.

DIFFICULTY IN HEATING AND VENTILATING A THEATER.

Many circumstances militate against the successful heating and ventilation of a large auditorium. Most important of all is the fact that it is not permanent in its confines. At one time it is almost one with the stage; at another (between acts) many doors are opened into the corridors; at other times there exist various combinations of the three. The room is extremely high, it has no outside wall exposure; the occupants are located in different strata, and owing to the levity of heated air these strata have naturally different temperatures which must be counteracted; the large number of occupants remaining for several hours require an enormous air supply, and the dimensions of the auditorium are such as to usually make it impossible to successfully heat and ventilate from openings in the walls. There is a science in planning a system under these circumstances, and there is a science in operating it that should place the successful operator on the roll of honor with the gas engineer, the stage carpenter and his compeers.

Systems now in successful operation prove conclusively that theaters can be effectually ventilated, and prove with just as much certainty that natural means are inadequate and mechanical means must be employed to secure the proper air movement. Such successful results are, however, not obtained without the most exhaustive consideration of the entire problem as it presents itself in the case of each individual building.

THE HEATING AND VENTILATING ENGINEER.

Coincident with the selection of an architect should be the choice of a thoroughly competent heating and ventilating engineer, who should, throughout the entire time of construction, work jointly with the architect. In no other type of building does the work of the engineer so interweave itself with that of the architect. With unity of purpose many an important feature of the ventilating system may be treated in such a manner, from an architectural and artistic standpoint, as to make it appear but a beautiful piece of ornamentation on a much-needed column or beam. How fully these professions are thus united will be evidenced by some of the descriptions to follow.

The first work of the engineer is to decide upon the system to be introduced. As in all other blower system work, there is possible either arrangements for vacuum or plenum vent or a combination of the two.

It is extremely difficult to secure success with the vacuum system alone, for some mechanical means is required to properly distribute the air as it enters.

PLENUM SYSTEM.

With the plenum system the fan is usually placed in the basement and is frequently of special form, other than the cased fan. A type of "cone" fan employed for this purpose is illustrated in Fig. 1. This fan, standing in a comparatively large apartment, draws the air from the adjacent apartments through the inlet and discharges it all around its circumference into the plenum chamber in which it stands. The air, preferably taken by means of a vertical shaft from above the roof, is heated by coils of steam pipe either before or after passing through the fan; generally dependent on available space; and from the plenum chamber is forced at low velocity through large ducts to its desired destination.

In a small theater in which a simple system is desired, the fan may readily be of the cased type and the air may be conveyed at reasonably high velocity to the bases of vertical flues, from which, at proper hight above the various floor levels, the air may be discharged toward the center of the room. Ventilation must then, almost of necessity, take place through wall registers and flues, the register openings being at floor level.

Such an arrangement is, however, entirely inadequate to the requirements of a large auditorium. Here the most careful attention must be given to distribution, no volume of air moving more rapidly than 2 feet per second must be allowed to come in contact with the person of any occupant, and yet, so far as possible, each occupant must have individual ventilation. To this end, the usual custom has been to so arrange the system that the movement of all air, accelerated by the heating action of the body, shall be upward, and that each individual volume of air shall traverse the person of only a single occupant. In reality, the dispersion of gases in the atmosphere is so rapid that these imaginary volumes readily assimilate. Various devices have been applied for the purpose, but with all there is necessary a complete distribution over the entire floor area. The simplest of devices consists in forming of the basement beneath the auditorium a clean and tight air chamber, into which the air is forced at low velocity, or throughout which it is distributed by a system of pipes designed to give to the air as little movement as possible within this space, the idea being that the entire space shall contain air under slight pressure. It then naturally tends to escape at uniform velocity through all outlets. If, now, the rising floor has been constructed as shown in Fig. 2, with each riser left

clear of the tread beneath it by such a distance as will allow the requisite volume of air to enter without exceeding a velocity of 2 feet per second, there will ascend along each person an equal volume of pure and fresh air, which, having done its duty of removing, by absorption, the exhalations of the person, will rise and pass out through properly located apertures in the ceiling. The balconies and galleries are more difficult to arrange, particularly as their occupants will be subjected to the inconvenience of having somewhat mixed with their own supply a portion of the vitiated air from the more favored ones below, for this foul air is bound to disperse to a greater or less extent.

Although the arrangement just described is the simplest of all for general distribution, yet many other schemes have been adopted for this purpose. For instance, the intersection of each riser and tread may be constructed as indicated in Fig. 3, the corner being formed by a heavy sheet-iron guard so generously perforated as to allow the air to escape in an infinite number of fine jets at low velocity, and thence to pass directly upward around the occupant of the chair above. The admission from the plenum space below to that immediately beneath the chair is clearly shown.

As an additional supply for the balcony, the scheme shown in Fig. 4 has been adopted, in which case the ventilation is backward toward the wall and ceiling, passing over the occupants of the balcony.

Still another device consists in supporting the chair upon a single hollow central stand, which being perforated along its vertical sides and receiving a supply of air from the plenum space beneath, readily distributes it beneath the occupant of the seat.

With ceiling ventilation there must always be means of adjustment, either by the closing of louvered openings in the ventilator top or by the movement of a massive candle snuffer (in form) shutting down over the central ventilator shaft from the auditorium. Of course, where gas is employed as an illuminant the vent openings should be placed immediately above the chandeliers, to thereby obtain the effect of the movement of the volume of air heated by the jets.

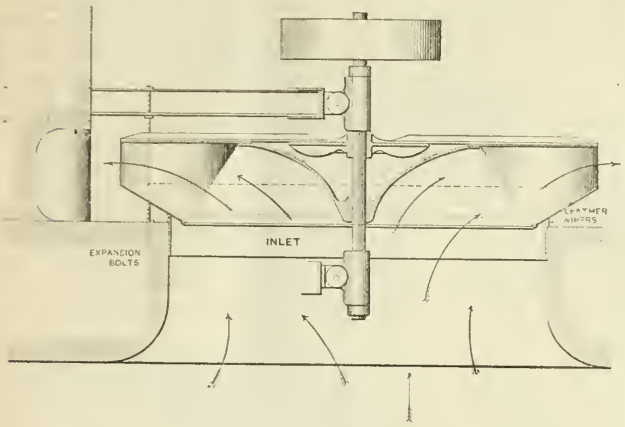


Fig. 1.—Special Cone Exhaust Fan.

Fig. 2.—Admission at Bottom of Riser.

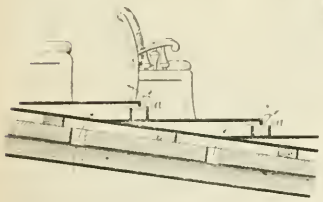


Fig. 3.—Admission Beneath Chairs.

Fig. 4.—Admission Along Balcony Rail.

THE HEATING AND VENTILATION OF HALLS AND THEATERS BY THE BLOWER SYSTEM.

PLENUM AND VACUUM COMBINED.

As the necessity of theater ventilation becomes better appreciated, the owners are ready to expend larger sums upon the introduction of the system. As a result, some of the later structures have been provided with more than one fan and a unique arrangement adopted.

While upward ventilation utilizes the heating effect of the body, yet it must be evident that the upper portion of a room must necessarily be overheated thereby, and, further, that the balconies and galleries must, to a certain extent have their air contaminated by that from below.

To avoid this, the system has been reversed, and the air supplied through properly located openings in the ceiling, sometimes reinforced by openings along walls and balcony rails. To make its downward action positive an exhaust fan or fans must be used, and the air exhausted at the floor beneath the seats in a manner similar, but opposite, to that employed in the previous schemes If the building is structurally strong enough the entire heating apparatus can be placed at the top of the building, taking its air from above the roof, without the medium of a supply duct. The exhaust fan, in turn, can be placed in the basement, whence its polluted air is discharged above the top of the building, but at the most distant point from the supply. When an exhaust fan is employed, its capacity should always be less than that of the supply fan, in order to maintain a pressure within the room or building ventilated.

OPERATION OF SYSTEM.

Although the heating of a theater may appear simple enough with a perfect apparatus, yet there is required of the engineer a clear conception of the existing conditions Radiation plays a great part in the warming of the occupants of a room. While air is a nearly perfect non-conductor of heat, yet radiation takes place through it readily. As evidence, we may enter a room having a temperature of 70°, with walls at 50°, and feel chilled, simply because heat is rapidly radiated from the body through the air to the colder walls.

It is, therefore, desirable in warming a theater to keep the temperature at about 78° to 80° during the day, the walls and all objects being thoroughly warmed somewhat above the temperature to be maintained when the building is occupied, so as to prevent at that time the radiation of heat from the bodies of those present to the walls or surrounding objects. Then in the evening, when the building is to be occupied, the temperature of air admitted may be dropped to about 70° and a large volume supplied to the house.

The arrangement of the blower system permits of the moistening of the air to any desired degree, and during the heated months of summer makes possible a very agreeable cooling of the air by means of ice. This may be exposed to the air currents at or near the fan in such a manner as to produce the most rapid melting. On a basis of supplying 2000 cubic feet of air per person per hour there would be required to cool this volume of air from 80° to 70° about 2 pounds of ice per hour. On the basis of a three hours' performance and 1500 occupants the total expenditure for ice would be in the vicinity of $25 to $40 (according to prevailing prices), not a very large amount for the manager who is shrewd enough to spend it, for he certainly can get his return in increased attendance, if people can actually be cooler indoors than out

The Ware Automatic Heat Generator & Regulator Company of Philadelphia and Chicago have arranged with a house in Worcester, Mass., for the manufacture of their hot-water heater, using gas for fuel. An order was recently placed in New York

for ten, and three are being installed at Camden, N. J., one for Charles Watson of the gas company. E. C. Ware is now in Boston attending to the interests of the company.

HEATING NOTES.

DIRIGO HEATERS for steam and hot water are being put on the market this season with a number of improvements, including cast-iron casings, instead of galvanized as heretofore. Particular attention has been given to circulation, which is positive, and a number of minor changes have been made, all in the direction of improvement. To meet a growing demand the Dirigo Heater Company have erected a new machine shop 105 x 28 feet, two stories high, on Cross street, Portland, Maine. The Boston office of this concern is at 51 Oliver street, and is in charge of W. J. Buxton, treasurer.

HART & CROUSE, Utica, N. Y., issue a neat illustrated catalogue and price-list of the Royal steam and hot-water heaters of their manufacture. The pamphlet is bound in colored covers, with the name of the firm embossed in silver letters. Beginning with an illustrated description of the Royal hot-water heaters, there follows a brief account of the principle of hot-water heating. Then a further notice of the Royal heaters, with the separate sections illustrated, and full tables giving dimensions, prices and other particulars. The Princess Royal combination hot-water and hot-air heater is next illustrated, followed by the Royal safety sectional steam heater.

A PATENT for a steam or hot-water heater has been granted to Arthur Boyce, St. Louis, Mo., the apparatus comprising a number of sectional rectangular-shaped frames, mounted upon one another and connected together, the waterways provided being vertical, as is also the course of the products of combustion.

THE LATEST POSTAL TRAVELER sent out by the United States Heater Company is a catchy invitation addressed to the trade, both East and West, to visit Detroit. The unanswerable argument is presented that in coming from the East Detroit is on the way, and every one should stop and see them, while coming from the West Detroit is but a little way from Chicago, and besides that is a city which "makes more stoves, radiators and more hot-water heaters than any other city on earth." Other attractions, such as cigars, beverages, &c., too numerous to mention are noted.

GORTON & LIDGERWOOD COMPANY, 96 Liberty street, New York, have received from the municipal authorities of Amherst, Mass., a very gratifying letter testifying to the efficiency of two of their Gorton boilers, which were installed two years ago in the new town hall of that city for heating purposes. This hall is a very handsome brick structure, erected in 1891. It is two stories in hight, 110 feet long by 60 feet wide. On the first floor there are four large office rooms, selectmen's room, town clerk's room, assessors' room, library, police court and a large corridor running nearly the entire length of the building. The second floor is mostly occupied with a large hall. It has a large stage at one end, with stage dressing rooms, &c., and seating accommodations for 700 people. The building being of considerable size, it was found expedient for the best heating results to employ two No. 5 Gorton patent side-feed steel boilers set in twin connection and so fitted that they could be run either separately or together, thus regulating the supply of heat according to requirements, and maintaining an efficient service with the least expense. The heating apparatus, which was erected by William W. Hunt, a prominent steam heating engineer of Amherst, is constructed on the double-pipe "gravity return" plan, and all pipes erected are of ample size to insure the active delivery of dry steam to the radiators and an easy flow of the water of condensation back to the boilers. The main steam pipe from the boilers is 3½ inches, and is gradually reduced to 2½ inches, 2 inches and 1½ inches. It is suspended from the ceiling of the cellar by adjustable hangers placed about 8 feet apart and extending upward therefrom are the requisite number of vertical pipes to supply the heating surface throughout the building with steam It is also provided with the necessary vertical drip pipes. The first floor is heated by 17 radiators, which in the aggregate contain 796 square feet of radiating surface, and the second by 16 radiators, which contain an aggregate amount of 1100 square feet, making a total of 1896 square feet of radiating surface in 33 radiators, heated by two No. 5 Gorton boilers. When the second floor is not in use only one boiler is run.

THE RAYMOND & CAMPBELL MFG. COMPANY, Middletown, Pa., issue an illustrated circular respecting goods of their manufacture. At the Susquehanna Iron Works, which is the plant of this firm, considerable attention is given to the manufacture of bells, several styles of which are illustrated in the circular. Other goods noticed are farm feeding troughs and a variety of grates, while among miscellaneous goods are adjustable shelving. At the close of the pamphlet attention is given to the Sun steam heater and the Sun hot-water boiler, which are illustrated with sectional views and briefly described in the text.

THE AMERICAN BOILER COMPANY of Chicago are distributing a very taking little circular inviting visitors to the World's Fair to call on them at 36 Dearborn street, and also to have mail sent in their care. The circular is printed on cardboard, with a deep border of crimson, and quaint old style lettering. The card is a folder, with a flap closing the ends. On opening it the invitation is seen in the interior in imitation of handwriting.

A CATALOGUE in the steam and hot-water heating line, notably pleasing in various ways, is issued by the Hopson & Chapin Mfg. Company, New London, Conn., in which they direct attention to their boilers and radiators for warming and ventilating by hot water. The pamphlet, of convenient size, is bound in dark-green paper, with the title of the firm printed in gold on the front cover. The printing has evidently been done in gilt and scarlet, which gives a certain irideacent effect to the lettering that is highly effective. Immediately after the title page is a plan and perspective view of the Hopson & Chapin Mfg. Company's foundry and machine shops; then follows a statement as to the business of the concern, which, as it is explained, is to do warming and ventilation. The first section which follows is given up to boilers, those illustrated and briefly described being the Hopson, the Pequot and the H. C. Monogram. Then come radiators, the Connecticut, the H. & C. Indirect and the Compound Radiator, which is a combination of a direct and a direct-indirect radiator. The D ventilating radiators are also illustrated and at the close of the pamphlet are a few pertinent tables. The publication is characterized by extreme straightforwardness and simplicity throughout. Extravagant claims are conspicuous by their absence, and what will to the ignorant seem a strange confession, the firm intimate that the efficiency of a heating plant depends rather on the way it is installed than on the particular make of boiler used. The paper, printing, illustrations and all the mechanical features of the pamphlet are in keeping with the tenor of the contents.

THE AMERICAN RADIATOR COMPANY, 111 and 113 Lake street, Chicago, send us a neat circular representing the globe on the exterior, with the grand divisions of the earth duly laid off and the depots of the company marked in their proper localities in North America. The circular is a folder, which treats of the company's radiators in the interior, stating that they are sold all over the world, and are used to heat the great World's Fair buildings in Chicago.

TRAPS AND VENTS.

THE DEATH OF ENOCH REMICK will remove a familiar face from the Plumbers' Convention this year. His burial took place on Saturday, May 27, from his home at 924 North Second street, Philadelphia.

WILLIAM H. LLOYD of Boston, Mass., is the patentee of what he calls a water-closet demonstrator. The patent refers to an advertising or exhibiting apparatus showing the course and action of the water in closets, lavatories, bowls and other receptacles, and has for its object to so truncate the fixture that a plane surface will be exposed to which a plate of glass may be attached and cemented so as to show the interior of the fixture.

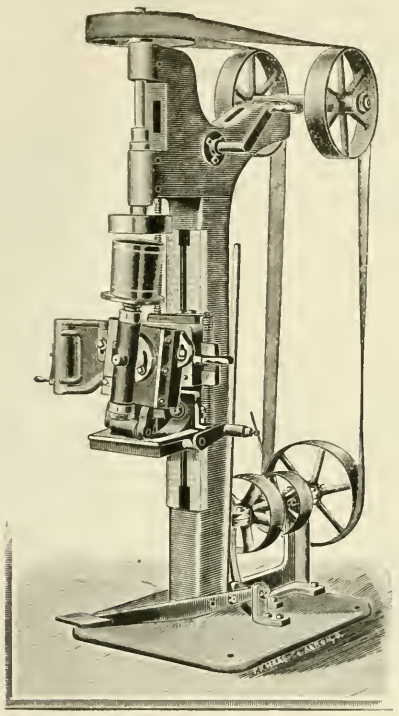
THE COLWELL LEAD COMPANY, 63 Centre street, New York, issue a notice to the trade that on account of the destruction by fire of their uptown branch store, they have opened a branch lead department in connection with William McShane & Co., 117 West Forty-second street, where they will keep a full stock of lead pipe, sheet lead, tin-lined pipe, block-tin pipe, pig and bar lead, solder, &c.

The blue book issued by Canada's Minister of Finance, after speaking of the loss of trade with the United States since the abrogation of the reciprocity treaty in 1866, refers to a standing offer on the statute books, "to make free or reduce the duties on certain named articles in case of equivalent reduction on the part of the United States," and intimates that overtures would be gladly renewed, but that an interchange of manufactured goods on a tariff basis involving discrimination against Great Britain is impracticable. On this last point all conferences held at Washington hitherto have split.

Not long ago the Canadian Pacific line shortened the time between London and Hong Kong to 21 days, and now the P. & O. steamers have cut down their record from 26 to 24 days between the same points. Still the Dominion route is one-eighth better.

Automatic Wiring and Imitation Wiring Machine.

Our engraving illustrates a new automatic machine which is designed for either genuine or imitation wiring of the edges of sheet metal packages. The machine is intended to make genuine or false wire on all kinds of cans, pails, picced tinware, measures, &c. It can be arranged to be operated on either tin, sheet iron or steel. It is capable of handling either straight or conical packages and will hem, roll, false wire or wire, as may be desired, it being only necessary to change the chucks according to the diameter of the work to be done. This machine is made by G. A. Crosby & Co., 170 South Clinton street, Chicago.



PATENT AUTOMATIC WIRING AND IMITATION WIRING MACHINE.

Discovery in Electrical Heating.

An account of what appears to be an extraordinary discovery is given in the report from Frankfort to the State Department of Consul-General Frank H. Mason. From advance sheets of the Consular reports for June we extract the following description:

A discovery so original and so wide in its practical application that it is believed to open a new and important chapter in the use of electricity for heating purposes has recently been announced from Brussels and tested at Berlin. The invention is the joint achievement of two Belgian scientists—Messrs. Lagrange and Hoho—who a few days ago applied to the Imperial German Patent Office for patents on a new method of heating, melting and refining metals by means of electrical heat. The means, as designated in their claim, were so simple and the results as therein described so incredible that the patent examiners demanded that before issuing the patent a practical demonstration of the process should be made in their presence. The matter was referred to an eminent and disinterested electrical expert at Berlin, who made the first essays in his private laboratory, and was so delighted with the result that he asked by telegraph permission of the inventors to repeat the demonstrations before the Electro-Technical Society at the German capital. Permission was readily granted, and the experiments were performed before a group of expert electricians with brilliant success. From the account given by one of the experts who was present at these demonstrations and from various other sources the following report of the new process has been derived:

The apparatus consists of a glass or porcelain vase, which may be of any size conveniently adapted to the purpose, provided with a lining of lead connected with a strong conductor of positive electricity. The vase is filled to three-fourths its capacity with acidified water. A pair of iron tongs with insulated handles is attached by a flexible conductor to the negative pole of an electrical current generated by an ordinary dynamo. With this simple and inexpensive equipment the following phenomenon is produced.

The electrical current having been switched on, a bar of wrought iron or other metal is taken up with the tongs and plunged into the water within the vase. Immediately the water begins to boil at the point of contact: the immersed portion of the iron rises quickly to a red, then to a white, heat, and emits a stream of brilliant white light. In a few moments the heat becomes so intense that the iron melts and falls off in bubbles and sparks, leaving a clear, glowing surface in perfect condition for welding. The heating process has been so rapid that neither the water nor the end of the bar held within the tongs have been more than slightly warmed, and, the current being switched off, the bar, with its submerged end glowing, may be readily held in the naked hand. If, instead of a bar of metal, a stick of carbon is used, the heat in a few minutes produces detached fragments of amorphous carbon, which proves scientifically that a temperature of 4000° Celsius has been developed. The rapidity of the heating and the limit of temperature to be reached are easily and accurately governed by the strength of the current employed, so that the whole process is under the absolute control of the operator. During the recent experiments at Berlin the measuring instruments registered a tension of 120 volts and an energy of 220 ampères. It was estimated that fully 50 per cent. of the current was directly utilized as heat, whereas the practical limit of such utility has not hitherto exceeded 20 per cent. It is stated by the inventors that by employing a still stronger current a temperature of 8000° Celsius has been developed. The mechanical importance of this fact will be apparent when it is remembered that this is a degree of heat nearly three times greater than that required to extract iron from the ores, the most refractory of which fuse at about 2700°.

Divested of all merely technical phraseology and reduced to its simplest terms, the process under consideration may be explained as follows: One of the well known effects of electricity is to separate compound fluid bodies through which it passes into their primitive elements. The current, passing through the tongs and metallic bar into the water, decomposes the latter into its two gaseous elements—oxygen and hydrogen. The oxygen is attracted and gathered on the relatively large surface of the lead lining and produces no noticeable effect. The hydrogen, on the other hand, gathers around the immersed portion of the bar; and as this has a comparatively limited surface area, it is immediately surrounded with a close envelope or jacket of hydrogen, which, being a bad conductor of electricity, creates a powerful resistance to the passage of the current and thus develops the heat which causes the bar to glow and melt. It is merely an application of the well-known law that friction or resistance to the passage of an electrical current causes heat, and the apparent paradox of a piece of cold metal plunged into cold water rising rapidly to a melting glow is as simply and clearly explained as the incandescence of a platinum coil in a vacuum bulb.

Boston, New York and Philadelphia are all agitated by rapid transit schemes, but the subject is perplexing and is slow in development. The latest plan under discussion in Boston involves an estimated expenditure of $25,000,000.

Cleveland architects are perfecting their plans for the manual training school building, which will be a handsome structure, with a stone front 100 feet wide.

THE TIN SHOP.

Pattern for Article Having 36 Sides.

From C. E., *Union City, Tenn.*—Can the pattern be obtained for an article having 36 sides, as shown in plan and elevation, Fig. 1, assuming that the top piece A′ B′ C′ D′ E′ of the elevation corresponds with A B C D E F G of the plan, and that the center piece B′ C′ D′ E′ L′ K′ J′ of the elevation also corresponds with B C D E F G H J K L M N of the plan? As will be observed from an inspection of the plan and elevation, the article is composed of 36 triangles.

Answer.—To obtain the pattern of top piece A′ B′ E′ of elevation, proceed as follows: With A′ B′ of elevation as radius, and any point as center, as *a* in Fig. 2, describe an arc indefinitely, as shown by *g z* of pattern. Draw *a g*. Set off on the arc *g z* spaces equal to G B, B C, &c., of plan, and connect the points by chords. Also from the points in the arc *g z* draw lines to the center *a*. Then *a g b c d e f z* is the pattern of part of article shown in plan by A G B C D E F, or A′ B′ E′ of elevation.

We will next obtain the pattern of triangle K′ D′ C′ of center piece, corresponding with K D C of plan. As the slant hight of this triangle is not given in the elevation, it will be obtained in the following manner. Draw the right angle S T U of Fig. 3. From T on T U set off the distance K W of plan, and from T on T S the hight of center piece, as shown by K′ X of elevation. Draw S U. Then the hypotenuse S U gives the distance between points K W of plan or K′ X of elevation. Draw the line *d c* of pattern in Fig. 4, in length equal to D′ C′ of elevation, or D C of plan. Bisect *d c* in *w* and erect the perpendicular *w k*, making it in length equal to the hypotenuse S U of Fig. 3. Draw *d k* and *k c*. Then *k d c* is the pattern of the triangle shown in plan by K D C and in elevation by K′ D′ C′.

An inspection of the plan will show that in obtaining the length of line K C of triangle K D C, as shown by *k c* of pattern, this distance is also the same as required for K C of triangle K C J and the sides of all the other triangles. Accordingly, to obtain the pattern of triangle K C J of plan, or K′ C′ J′ of elevation, proceed as follows:

With K J of plan as radius, and point *k* of pattern as center, strike a small arc (*j*), which intersect with one struck from point *c* of pattern as center and *c k* as radius, thus establishing point *j* of pattern. Connect points *k j* and *j c*, as shown. It will be observed that triangle *c b j* is a duplicate of *d c k*; that triangle *j b h* is a duplicate of *k c j*, &c. Then to obtain the pattern of center piece L′ E′ B′ J′ of elevation, it is only necessary to draw six triangles similar to *d c k*, and six triangles similar to *k c j*, alternating them as shown. To complete the article shown in Fig. 1, two pieces similar to those in Figs. 2 and 4 are required.

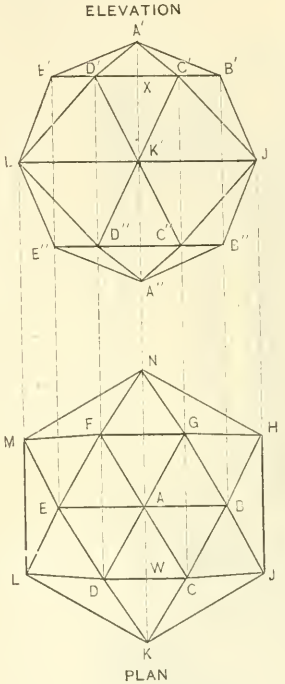


Fig. 1.—Elevation and Plan.

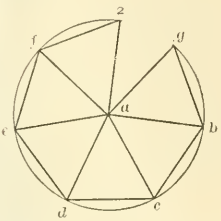


Fig. 2.—Pattern of Top Piece.

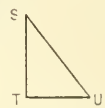


Fig. 3.—Triangle Representing Slant Hight of D C K of Plan.

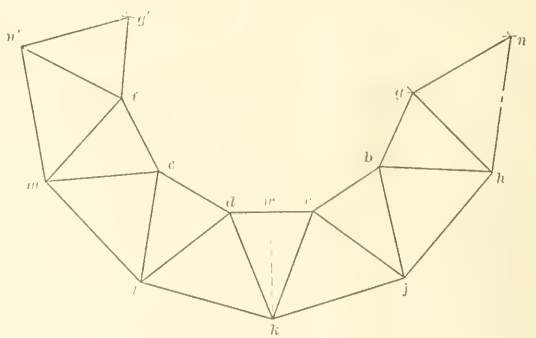


Fig. 4.—Pattern of Center Piece.

PATTERN FOR ARTICLE HAVING THIRTY-SIX SIDES.

THE RETAIL STORE.

The Crystal Valve Oil Can.

The accompanying cuts show the construction of an oil can being put upon the market by the Star Mfg. Company, Canton, Ohio. The can, Fig. 1, is described as consisting of a fine crystal glass reservoir of new and symmetrical pattern, protected with substantial metallic top and bottom bands, the bottom one having a flange extending far enough under the glass to protect it from injury, while the whole is bound together with a wire frame. It is pointed out that the handle is so adjusted as to nicely balance the can, and at the same time to admit of its being easily tipped for filling the lamp. The valves shown in Figs. 2 and 3 are referred to as especial novel features. When the can stands vertically the valves, it is stated, automatically close the vent at the top and the spout, rendering both perfectly air tight, as in Fig. 2. It is further stated that when the can is tipped to pour oil, as in Fig. 3, the valves open, thus obviating the necessity of a cap on the spout to prevent evaporation, as well as the unscrewing the can top to give the can vent.

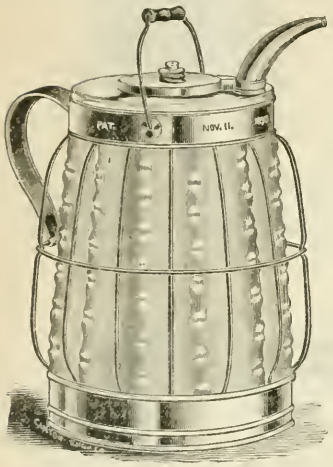


Fig. 1.—The Crystal Valve Oil Can.

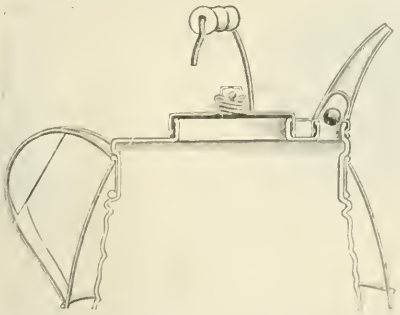


Fig. 2.—Valves Closed.

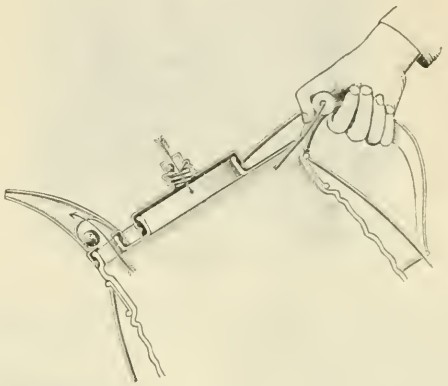


Fig. 3.—Valves Open.

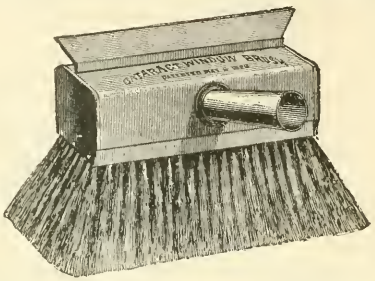
Self-Pouring Oil Can.

The Self-Pouring Oil Company, 1430 South Penn square, Philadelphia, Pa., are putting on the market the can illustrated herewith. The can is made with the breast and neck stamped from one piece, and with a curved spout, which is straight inside the can and reaches to the bottom. The lid, which closely fits inside the neck, is 5 inches long, stamped from brass, having a brass knob with a hole in its top forming an outlet to the lid. In operation the lid is raised by taking hold of the knob with the thumb and second finger; when raised sufficiently, the first finger is placed firmly over the outlet in the lid and the lid lowered until sufficient oil is poured, when the finger over the outlet is removed. Should there be too much oil in the lamp—that is, above the end of the spout in the lamp, it is explained that the surplus oil will be drawn back into the can when the finger is removed from the outlet. In pouring oil it is not necessary to lift the can. The manufacturers claim that a drop or lamp full of oil can be poured; that every drop can be poured from the can; that the spout cannot stop up, and that the oil is under control in pushing it forward into the lamp, drawing it back into the can, if desired, or stopping it instantly; also, that all the oil in a lamp can be drawn into the can. The point is made that the can is made with the finish and care so that it may be used in the dining room or library, and for handsome lamps which it is not desirable to take to the kitchen to be filled. The can is made without springs or packing, and to hold one gallon of oil.

Self-Pouring Oil Can.

Cataract Window Brush.

The window brush illustrated herewith is being introduced by the Enterprise Brush Company, 17–21 College place, New York. The wooden head of the brush is 3 x 8 inches in size, into which the horse-hair bristles are fastened. Above these is a metal reservoir, of the same size as the head and 2 inches high, to which a socket for handle is attached. On the top of the reservoir on the opposite side from the handle is a hole ⅜ inch in diameter. In the bottom of the reservoir are perforations corresponding to openings in the wooden head. When the reservoir is filled, by placing it in a bucket of water, the perforations permit a sufficient quantity of water to escape through the bristles upon the glass when washing windows. Upon the top of the reservoir is a rubber drier, which is brought into use by reversing the brush. The reservoir is finished in blue with gilt lettering.



Cataract Window Brush.

Movable Nail Bins.

The accompanying cut represents movable Nail bins, being introduced by W. J. Clark & Co., Salem, Ohio. The bins are made of sheet steel of a gauge or thickness sufficient to insure stiffness without needless weight. The top edge of the front and back ends are rolled so as to form hand holds, by which any one of a row of them can be drawn out from its place and lifted if need be to pour off its contents into scales or other receptacles.

They are made similar to bins generally used for such purposes—high at the back and low in front in order to show, and make it convenient to get at their contents. The sides are higher than the fronts, the object of which is to keep from spilling over the sides when they are lifted and tilted to pour from one corner.

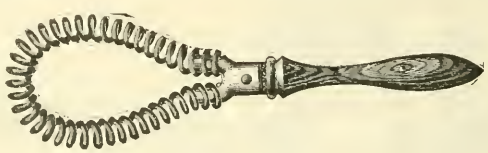
The bins are designed for Nails and other small articles of Hardware which are kept in bulk to be retailed from.

The company have recently furnished an Eastern retail Hardware store with them, the proprietors of which claim them to be an improvement on the common immovable bins.

Movable Nail Bins.

Boss Dust Beater.

The accompanying cut represents a dust beater manufactured by Peabody & Parks, Troy, N. Y. It is composed of a coil of steel wire secured in a galvanized malleable iron socket which is attached to an enameled wooden handle. The wire coil, including the socket, is 10½ inches long, the handle 11 inches in length, making the beater 21½ inches over all. It is designed to remove dust and filth from clothing, upholstered furniture, rugs and carpets. The manufacturers claim the beater will raise the nap, thus improving the appearance, also that it will not leave marks or tear the fabric.



Boss Dust Beater.

The discovery of a rich petroleum field is reported in Assam, East Indies. A company under the title of the Assam Oil Syndicate, is about to open up the oil resources of that region, which are said to be very promising.

Spray Pump and Nozzle.

The accompanying cuts represent articles being put on the market by The Deming Company, Salem, Ohio. The

Fig. 1.—Double-Acting Brass Spray Pump.

Gem Spray pump, shown in Fig. 1, is described as having all working parts of brass, galvanized air chamber, and as furnished with Mystery combination spray nozzle. As shown in the cut, the pump is used in a common wooden bucket. By detaching the foot rest and clamp the pump may be placed over the bunghole or on the end of a barrel; an additional piece of ¾ inch suction pipe only being necessary to adapt it for use this way.

The spray, Fig. 2, is referred to as an improvement in this direction, as throwing a fine spray and as being simple in construction. It is provided with a degorger and button threaded for lance, as used in their Knapsack sprayers.

Fig. 2.—Vermorel Spray Nozzle.

The experience of recent fast steamers at Queenstown shows that merchants in New York can post letters to London and receive replies thereto within the extraordinary time of 14 days. Liverpool papers still claim the superiority of Queenstown as a mail station compared with any other port.

Flexible Pot and Kettle Cleaner.

The Clauss Shear Company, Fremont, Ohio, are introducing the cleaner illustrated herewith. It consists of stamped handles hinged at one end to a flexible steel blade and fastened together at the other end by a metal clip. The blade is made of clock spring and the handles of nickel plated steel. It is designed to clean anything, whatever its

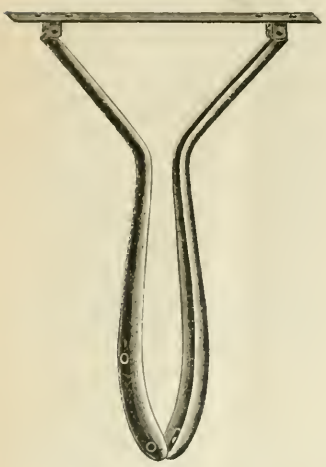


Fig. 1.—Flexible Pot and Kettle Cleaner.

shape, including corners, angles and flat and round surfaces in any kind of kettles, skillets, sinks, chopping bowls, tables, cupboards, molding boards, rolling pins, bread pans, pie pans and pudding pans. It is suggested that fish are easily cleaned by it and that it is useful in scraping the wall in house-paper-

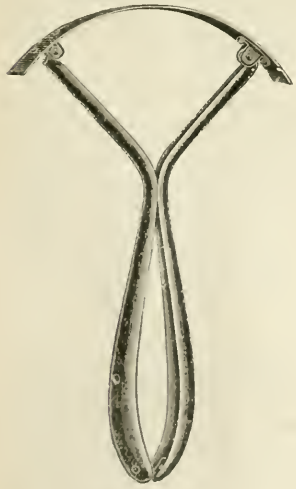
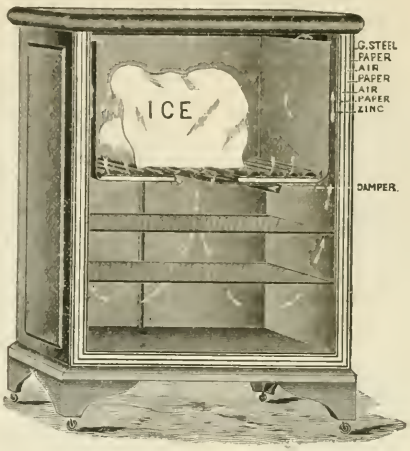


Fig. 2.—As Used for Round Surfaces.

ing time. The point is made that it is not necessary to soil the hands by putting them in hot or greasy water or other offensive contents of the vessel to be scraped, and that danger of cutting or burning the hands is avoided.

Steel Clad Air-Tight Refrigerator.

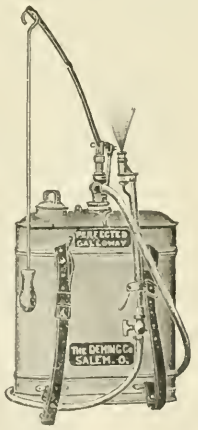
The accompanying cut represents a refrigerator being put upon the market by the Battle Creek Metallic Refrigerator Company, Battle Creek, Mich. The refrigerator is built of galvanized steel, with a removable ice box; shelves of woven steel wire galvanized, and with a trap which the manufacturers claim cannot lose off or become misplaced. The damper for controlling the consumption of ice is referred to as a new feature, by which, it is stated, the cost of ice is reduced about 25 per cent. The outside walls, bottom and top, front and doors are described as being perfectly air tight, with double dead air spaces, constructed as indicated in the cut. The manufacturers claim for the refrigerator that there can be no communication with the outside air; that it cannot be effected by changes in temperature; that there is no wood in the ice or provision chambers to decay or to become contaminated; that it is of comparative light weight, and that it has a large storage capacity in proportion to its outside measure. These refrigerators are made in five sizes, from 24 to 34 inches in width, 14 to 20 inches in depth, and from 40 to 47 inches in hight.



Steel Clad Air-Tight Refrigerator.

The Perfected Galloway Knapsack Sprayer.

The Knapsack Sprayer, herewith shown, and offered by the Deming Company, Salem, Ohio, consists of a copper tank arranged to strap on the back and a brass pump operated by a rod attached to the lever. The pump is described as being so constructed that all leakage from the stuffing box will drip back into the tank; also that, if it becomes necessary, the entire pump can be taken out for repairs without the least trouble. The pump, it is remarked, is fastened firmly in the tank, and, being placed in the center of the same, is supported by the central brass casting, admitting of its use for either right or left hand without shifting the position of the straps. A strainer is arranged at the top of the tank to prevent any deleterious material from entering the tank and pump, and the discharge is provided with six feet of ¼-inch rubber tubing; also with the Deming improved spray nozzle, with lance and degorger. This nozzle is referred to as making a fine, mist-like spray. The device is designed for use by grape growers, florists, gardeners &c., for spraying grape vines, potato



The Perfected Galloway Knapsack Sprayer.

plants and small orchards, where the work is necessarily done by one man.

O. & L. OATMAN, hardware and stove dealers at Medina, Ohio, have changed their firm name, and hereafter the business will be conducted under the style of Oatman Brothers.

Export statistics from the bureau at Washington show that there is a comparative increase in the foreign demand for Indian corn. It is important that Europe should know the value of corn as a food product.

The Argentine Government have ordered from England a floating dry-dock for the use of the Argentine navy.

Western Foundrymen's Association.

A meeting of Western foundrymen was held on May 25, in the rooms of the Detroit Foundry Equipment Company, Temple Court, Chicago, for the purpose of organizing an association. The call for the meeting had been signed by the following firms and corporations:

Fraser & Chalmers, Chicago.
The Sargent Company, Chicago.
Allen Foundry Company, Detroit.
The Lloyd Booth Company, Youngstown, Ohio.
The Globe Iron Works Company, Cleveland, Ohio. J. F. Pankhurst, General Manager.
The General Engineering Company, Harvey, Ill.
Dayton Malleable Iron Company, Dayton, Ohio.
J. N. Barr, Superintendent Motive Power, C., M. & St. P. Railway Company, Milwaukee.
Lake Shore Iron Works Company, Marquette, Mich.
Thos. D. West, Thos. D. West Foundry Company, Sharpsville, Pa.
Walburn-Swenson Company, Chicago.
F. E. Drury, Cleveland Foundry Company, Cleveland, Ohio.
Detroit Foundry Equipment Company. J. H. Whiting, President, Detroit, Mich.
Gobeille Pattern Company, Cleveland, Ohio.
Patch & Swift, Streator, Ill.
Craig-Reynolds Foundry Company, Dayton, Ohio.
Shaw, Kendall & Co., Toledo, Ohio.

Those who met in compliance with the call were as follows:

C. A. Sercomb. Schwab & Sercomb, Milwaukee, Wis.
S. H. Holley, Lake Shore Foundry Company, Marquette, Mich.
Wm. Hardee, Shaw, Kendall & Co., Toledo, Ohio.
J. Bowie, Walburn-Swenson Company, Chicago Heights, Ill.
J. L. Gobeille, Gobeille Pattern Company, Cleveland, Ohio.
C. M. Conradson, Fuller & Johnson Mfg. Company, Madison, Wis.
J. E. Griffen, South Milwaukee Malleable Iron Company, Milwaukee, Wis.
James Frake, formerly L. M. Rouse & Co., Chicago.
John M. Sweeney, General Engineering Company, Harvey, Ill.
A. L. Patch, Patch & Swift, Streator, Ill.
H. W. Hurlbut, Hurlbut Mfg. Company, Racine Junction, Wis.
C. A. Plamondon, A. Plamondon Mfg. Company, Chicago.
Theo. P. Byram, Byram & Co., Detroit, Mich.
Chas. S. Reed, Chicago Retort & Fire Brick Company, Chicago.
H. S. Vrooman, Garden City Sand Company, Chicago.
J. H. Whiting and A. T. Whiting, Detroit Foundry Equipment Company, Detroit and Chicago.
W. D. Sargent, Sargent Company, Chicago.
Franklin Moeller, Webster, Camp & Lane Machine Company, Akron, Ohio.
A. I. Findley, *Iron Trade Review*, Cleveland, Ohio.
B. M. Gardner, *Iron Trade Review*, Cleveland, Ohio.
J. A. Penton, *The Foundry*, Detroit, Mich.
Geo. W. Cope, *The Metal Worker*, Chicago.

Mr. Findley called the meeting to order, stated the purpose of the gathering and asked for nominations for chairman. C. A. Sercomb was named and unanimously elected, making a short but very practical address on taking the chair. A. T. Whiting was elected temporary secretary. Letters were read from Thos. D. West of Sharpsville, Pa.; Indiana Car & Foundry Company of Indianapolis, Ind.; R. C. McKinney, Niles Tool Works, Hamilton, Ohio; W. J. Keep, Michigan Stove Company, Detroit, Mich.; Sandusky Machine & Agricultural Works, Sandusky, Ohio; John T. Noye Mfg. Company, Buffalo, N. Y., and the Lane & Bodley Company of Cincinnati, regretting inability to attend, but expressing themselves strongly in favor of the organization of an association for mutual benefit. A communication from Francis Schumann, president of the Foundrymen's Association of Philadelphia, giving some points regarding the benefits of an association, was also read. In reply to a question Mr. Findley stated that invitations to attend the meeting had been sent to some 300 foundrymen in the central West.

General remarks having been called for by the chairman, Mr. Plamondon gave a brief statement of the Chicago local association, which had been formed some six months since to handle labor troubles. It numbered some 60 members at first, but as a disposition was evinced to deal with the molders' strike individually, interest in the association gradually subsided, and recent meetings had been very slimly attended. He welcomed the formation of an association of this character. Mr. Gobeille dwelt upon the educational advantages of an organization, giving some practical illustrations showing the necessity of foundrymen acquiring a better knowledge of their business, which could be gained to a great extent through the interchange of ideas and experiences. He advocated supporting a laboratory with an expert founder and chemist in charge, to test various brands of iron, experiment with mixtures, and report regularly for the benefit of the members so that they might have reliable data to govern them in their efforts to secure good castings. He thought that more precise technical knowledge on this subject would not only improve the work turned out, but would also enable a decided saving to be made in cost. Mr. Sweeney spoke on the subject of introducing more scientific methods in the operation of foundries, declaring that a chemist was almost an indispensable part of the working force. Mr. Penton thought that in organizing an association the question of wages and prices of castings should be avoided, leaving them for settlement by local associations. The association should be purely educational.

A desultory discussion followed, in which this view of the scope of the association was generally supported.

Motions were then made and carried declaring the organization permanent and providing for the appointment of a committee to prepare a constitution and by-laws. This committee consisted of Messrs. Sweeney, Penton, Conradson and Findley. It was resolved that all firms, corporations or persons who had agreed to attend the meeting, who have attended or written their approval of the objects of the organization, shall be entered by the secretary as members.

The draft of a constitution and by-laws was then reported by the committee, based on the plan of the Foundrymen's Association of Philadelphia, the organization to be styled the Western Foundrymen's Association, admission fee $5, dues $4 per year; monthly meetings to be held on the third Wednesday of each month at 7.30 p. m., the annual meeting on the third Wednesday in May, and headquarters to be located in Chicago. Persons, firms or corporations practically engaged as employers in the production of castings or persons whose services or knowledge is valuable toward the objects of the association are eligible to membership.

After the adoption of the constitution and by-laws a Committee on Nominations of Officers for the ensuing year was appointed, consisting of Messrs. Sargent, Patch and Conradson, who shortly afterward recommended the following list, which was unanimously elected: President, C. A. Plamondon; vice-president, J. M. Sweeney; secretary, B. M. Gardner; treasurer, A. L. Patch. Executive Committee, C. A. Sercomb, S. H. Holley, Geo. W. Cope, J. E. Griffen and J. A. Penton. A resolution of thanks to the Detroit Foundry Equipment Company for the use of their rooms was adopted. The association then adjourned to meet on June 21 at the same place.

Notes From the World's Fair.

The exhibit of the American Kaolin Works of 223 South Third street, Philadelphia, is interesting to both the stove and foundry man. It shows crude kaolin, washed kaolin, fire clay, ball clay and silica, such as is used in the manufacture of high grade linings for stoves, cupolas and retorts.

Pugh & Grovenor of Casselton, N. Dak., show their heating and ventilating drum for utilizing the products of combustion from a stove to heat a room above. The ventilating is accomplished by a tube taking the air from the floor under the drum and discharging it into the smoke pipe. The drums are finished in planished iron and copper and present a fine appearance.

An interesting feature of the exhibit of the Potters' Supply Company of East Liverpool, Ohio, is the various-sized stilts, shown in several different shapes in their natural color, pure white, in glass jars. They are used at the potteries to place between the ware in the kilns, but the genius of the gas-stove man bring them into use to cover the burner in a gas stove. The gas flame then plays through them, changing them to an incandescent mass of great radiating power, and a claim is made that combustion is improved.

We are in receipt of a copy of the catalogue of the Odd Fellows' Home of Connecticut, known as Fairview, located at Groton, New London County, Conn. The volume contains an interesting account of the institution, giving views of the house and the neighboring country, as well as a full description of the home, its origin, &c. Two interesting poems are contributed by J. H. Cloyes, one of them entitled "Fairview—A Pen Picture," and the other being a poem written for the dedication, which took place on April 26.

England, like the United States, suffers from the lessened purchases of manufactured cotton by China.

STOVE TRADE NOTES.

THE TWENTY-SECOND Annual Stove Convention

Meetings of the National Defense Association and the National Association of Stove Manufacturers.

The manufacturers of stoves were favored with a variety of weather, generally pleasant, this week while holding their annual convention in Chicago. The attendance was perhaps not so large as had been expected, in view of the attractions this year in the World's Fair city. It was, however, sufficiently large to show that interest in the National Association has by no means faded. Some familiar faces were missed, but others were seen in their places. Not a few manufacturers appeared who had for some time withdrawn from active participation in the affairs of the association. The question of expense in the maintenance of the organization had cut no little figure in this respect, and the reduction made in annual dues brought back some of the wanderers. The meetings were held in the club room of the Palmer House.

Meeting of the Defense Association.

The Stove Founders' National Defense Association met on Tuesday afternoon at 2 o'clock, with Henry Cribben, president, in the chair. About the usual number of members were in attendance. Reports were read by the president, secretary and treasurer, reviewing the work of the past year. The election of officers for the ensuing year was taken up in its regular order, and in view of the fact that reports were in circulation of widespread dissatisfaction with the secretary, a motion prevailed that an informal ballot should be taken on this office. A secret ballot was then cast and D. M. Thomas received all the votes but one. Formal nominations were then made, and the old list of officers was unanimously re-elected. The salary of the secretary was advanced 50 per cent. on the amount paid last year. This is a remarkable vindication of Secretary Thomas in view of the bitterness of some of the attacks made on him. The regular committees were then appointed to carry on the formal work of the association. There was some discussion of cupola practice, after which the meeting adjourned.

The full list of officers of the Defense Association for the ensuing year is as follows:

President, Henry Cribben of Chicago.
Vice-President, W. T. Bradberry of Pittsburgh.
Secretary, D. M. Thomas, Union Trust Building, New York.
Treasurer, A. C. Mott of Philadelphia.
Chairman of Committee for the Second District, Grange Sard of Albany, N. Y.
Chairman of Committee for the Third District, W. W. Baldwin of Cleveland, Ohio.
Chairman of Committee for the Fourth District, Chauncey H. Castle of Quincy, Ill.

Meeting of the National Stove Association.

WEDNESDAY MORNING.

At 11 o'clock, Wednesday morning, the first session of the National Association of Stove Manufacturers was opened by President Geo. D. Dana, with the following gentlemen in attendance:

W. P. Abendroth, Abendroth Bros., New York.
Lew. A. Anshutz, the Anshutz Bradberry Company, Pittsburgh.
W. J. Anderson, Richmond Stove Company, Richmond, Va.
S. R. Baldwin and John S. Graham of Baldwin & Graham, Pittsburgh.
W. W. Baldwin, Cleveland Co-operative Stove Company, Cleveland.
George H. Barbour, Michigan Stove Company, Detroit.
Joseph Bell of Joseph Bell Stove & Range Company, Muncie, Ind.
H. W. Bennett, Indianapolis Stove Company, Indianapolis, Ind.
James Boyle of James Boyle & Son, Salem, Ohio.
Wm. K. Boal, Favorite Stove & Range Company, Piqua, Ohio.
Stanhope Boal, Favorite Stove & Range Company, Piqua, Ohio.
A. M. Blakesley, Rock Island Stove Company, Rock Island, Ill.
W. T. Bradberry of Anshutz-Bradberry Company, Pittsburgh.
N. Brayer, Co operative Foundry Company, Rochester, N. Y.
August Brentano of Kiechle, Brentano & Oberderfer, Evansville, Ind
W. L. Bridgeford, Bridgeford & Co., Louisville, Ky.
W. T. Bussey, Chicago Stove Works, Chicago.
J. B. Copp, Peninsular Stove Company, Chicago.
N. L. Canfield, Danville Stove Works, Danville, Pa.
C. H. Castle, Comstock-Castle Stove Company, Quincy, Ill.
Henry Cribben, Cribben, Sexton & Co., Chicago.
G. J. Cottrell, Quincy, Ill.
James Duffy, Duffy-Trowbridge Stove Company, Hannibal, Mo.
James Dwyer, Peninsular Stove Company, Detroit.
Jeremiah Dwyer, Michigan Stove Company, Detroit.
Jeremiah J. Dwyer, Peninsular Stove Company, Detroit.
C. A. DuCharme, Michigan Stove Company, Detroit.
George D. Dana, Excelsior Mfg. Company, St. Louis.
B. W. Dobson, Detroit Stove Works, Chicago.
P. W. Elliott, Highland Foundry Company, Boston.
S. H. Emery, Jr., Bonnett & Nance Stove Company, Quincy, Ill.
John W. Evans, Bloomington Stove Company, Bloomington, Ill.
C. H. Filley, Excelsior Mfg. Company, St. Louis.
J. W. Emery. Channon-Emery Stove Company, Quincy, Ill.
Fred. W. Gardner, Michigan Stove Company, Chicago.
J. D. Graff, Graff & Co., Pittsburgh.
Arthur C. Hamilton, Co-operative Stove Company, Bloomington, Ill.
Fred. Hawkins, Fuller Warren Company, Chicago.
John E. Hunter, Culter & Proctor Stove Company, Peoria, Ill.
Geo. H. Holland, Bridge & Beach Mfg. Company, St. Louis.
Uriah Hill, Jr., Union Stove Works, Peekskill, N. Y.
J. W. Hobbs, Keokuk Stove Works, Keokuk, Iowa.
T. J. Hogan, Bridge & Beach Mfg. Company, St. Louis.
W. E. Joseph, Patton Mfg. Company, Columbus, Ohio.
Lazard Kahn of F. & L. Kahn & Brothers, Hamilton, Ohio.
E. W. Kasten and William F. Heyd of Brand Stove Company, Milwaukee.
L. W. Kingsley, Eugene Munsell & Co., New York.
Francis Keenan, Syracuse Stove Works, Syracuse, N. Y.
J. M. Kelly, Lexington Foundry Company, Lexington, Ky.
J. A. Lansing, Scranton Stove Works, Scranton, Pa.
D. G. Littlefield, Littlefield Stove Company, Albany, N. Y.
R. Liebel, South Erie Iron Works, Erie, Pa.
Wm. McAlpin, Bridge & Beach Mfg. Company, St. Louis.
Edward P. Mott, Abram Cox Stove Company, Chicago.
D. McAfee, Thomas White Stove Company, Quincy, Ill.
M. B. Mills, Michigan Stove Company, Detroit.
W. N. Moore, Joliet Stove Works, Joliet, Ill.
Albert Moffatt and J. H. Wells of Collins & Burgie Company, Chicago.

Chas. H. Myerhoff, Kahn, Myerhoff & Co., Evansville, Ind.

Abram C. Mott, Abram Cox Stove Company, Philadelphia.

J. Allison Orr, Mount Penn Stove Works, Reading, Pa.

Chas. S. Prizer, Reading Stove Works, Orr, Painter & Co., Reading, Pa.

Nathan B. Perry, Perry Stove Company, Albany, N. Y.

W. S. Patton, Patton Mfg. Company, Jeffersonville, Ind.

W. H. Peckham, Sill Stove Works, Chicago.

W. H. Pfahler, Abram Cox Stove Company, Philadelphia.

I. B. Resor, Wm. Resor & Co., Cincinnati.

R. G. Rennolds, Richmond Stove Company, Richmond, Va.

Edmund Raftery of Rathbone, Sard & Co., Chicago.

S. C. Rogers, official stenographer, Albany, N. Y.

Grange Sard, Rathbone, Sard & Co., Albany, N. Y.

W. S. Stevenson, Thomas, Roberts, Stevenson Company, Philadelphia.

Fred. Sauter, Belleville Stove Works, Belleville, Ill.

W. M. Shaddinger, Detroit Stove Works, Detroit, Mich.

C. D. Shepard, Peekskill Stove Works, Peekskill, N. Y.

W. H. Sard, Rathbone, Sard & Co., Chicago.

H. Scivard, Mount Penn Stove Works, Reading, Pa.

D. M. Thomas, secretary, New York.

George Thompson, Enterprise Stove Company, Vincennes, Ind.

Henry Terstegge, Terstegge, Gohmann & Co., Louisville, Ky.

C. H. Trowbridge, Dufly-Trowbridge Stove Company, Hannibal, Mo.

J. W. Van Cleave, Buck's Stove & Range Company, St. Louis.

De Witt Van Evera, Brand Stove Company, Chicago.

J. Van Wormer, J. Vau Wormer & Co., Albany, N. Y.

Henry Wilson, Thomas White Stove Company, Quincy, Ill.

W. E. Walker, Weir Stove Company, Taunton, Mass.

William Wewers, Gem City Stove Mfg. Company, Quincy, Ill.

George W. Willcox, the Bain Mfg. Company, Charleston, Ill.

Frederick Will, Sill Stove Works, Rochester, N. Y.

N. S. Walls, J. Van Wormer & Co., Albany, N. Y.

G. G. Wolfe, Fuller & Warren Company, Troy, N. Y.

W. H. Whitehead, Chicago & Erie Stove Company, Erie, Pa.

Arthur W. Walker, Walker & Pratt Mfg. Company, Boston.

H. Leonard Wilton, Art Stove Company, Detroit, Mich.

Auxiliaries.

Quite a number of the usual representatives of auxiliary branches of trade were also in attendance, as follows:

C. H. Matthews of the Ireland & Matthews Mfg. Company, Detroit, Mich.

E. A. Ireland of the Matthews & Willard Mtg. Company, Waterbury, Conn.

H. C. Matthews of Waterbury, Conn.

Henry Gleason of New York.

John E. Gately of Troy, N. Y.

Burton J. Mosier, with E. Reed Burns, Brooklyn, N. Y.

W. F. Greene of Troy, N. Y.

C. E. Brackett of American Stove Association, Chicago.

F. C. McDonald and Frank Baker of *Stoves and Hardware Reporter*, St. Louis.

A. O. Kittredge, James W. Nagle, W. A. Douglass and Ernest R. Kittredge of *Metal*, New York.

David Stern and Sidney P. Johnston of the *American Artisan*, Chicago.

J. C. Hendricks and W. M. Blair of the *Ironmonger*, Chicago.

David Williams, J. K. Hanes, Frank K. Chew and Geo. W. Cope of *The Metal Worker*, New York.

President Dana delivered an address, and Secretary Thomas read his report. A new departure was taken in refusing to make these public. It is thought best by the present officers that official proceedings and papers should not be published, on the ground that stove manufacturers should take enough interest in an association looking after their particular benefit to attend the meetings. By attending, they will greatly promote the objects of the association, whereas their absence diminishes the effect of the periodical meetings and retards the usefulness that an organization of this character is expected to exert. The report of Treasurer W. S. Stevenson was then read, showing a goodly balance on hand at the end of the fiscal year.

A paper on "Traveling Salesmen" was then read by C. S. Prizer of Orr, Painter & Co. of Reading, Pa. On account of the length of this paper we have to delay its publication until our next issue. A paper by C. D. Gibbons of Shiunick, Woodside & Gibbons, Zanesville, Ohio, read in his absence by Secretary Thomas, is as follows :

Co-operation.

At the meeting of the association held at Cleveland in May, 1886, I offered some resolutions, accompanied by a few remarks, bearing upon this subject. Other ideas seemed to prevail at that time, and no action was taken upon the subject.

The venerable and lamented John S. Perry also presented a plan at that meeting looking to the same object, which met the same fate. Other members discussed the subject at considerable length, but nothing was done to relieve the membership from the difficulties which all felt we were laboring under—viz., unremunerating prices.

The new organization formed at that time was good, and met one of the difficulties then confronting us, but it did not go far enough—it did not provide for the great question of remuneration. What our people wanted then, and still want, most of all, is adequate compensation for the capital, risk and labor employed in our business.

The channels of thought, and of legislation as well, at present seem to ignore all claims of capital to recognition, and yet, while this may be well, I am unable to see how the business of the country is to be conducted without the co-operation of capital, business methods and labor. It seems to me that the rights of each should be equally recognized and protected.

In all this spasmodic rush of sympathy for the toiling millions, let us not forget that business men have some claim to recognition also. Their activities transform the face of the earth. They whiten the seas of every clime with the sails of commerce, explore the hills and valleys in remote quarters of the globe to find products to meet the wants of men. They delve into the earth to bring forth its mineral wealth. Capital, which blesses the world, is a result of their applied energy. The money of the world has been created to meet the exigencies of business. The enterprise of untiring business men in every department of human activity gives employment to the toiling thousands, and makes possible the prevailing comfort.

Experience and observation have confirmed me in the opinion then expressed, and I am fully confirmed that the only plan by which our business can be placed upon a paying basis is full and complete co-operation.

The stove founders of America have within their control a business, which, if wisely managed, may be made remunerative to themselves and largely beneficial to the country generally.

An industry of whatsoever character, which is not on a paying basis, is necessarily detrimental to the general prosperity, and must sooner or later bring disaster, in proportion to its importance, to the community in which it is located. All experience has shown that the best way to build up a town or city is for its manufacturers and business men to build up their own business, and the prosperity of the town or city is assured. So in a State or nation—it is the individual prosperity of its citizens that makes the State or nation prosperous.

In order, therefore, that we, controlling one of the most important products of the nation, may contribute our share to the general prosperity, we should see to it that our business is so conducted as to yield a reasonable revenue.

Whatever may be the cause of the present condition of the stove trade, it should be removed. The difficulty, no doubt, is competition among ourselves. This cannot be remedied or regulated except by the co-operation of all those engaged in the business.

It will not do to say that, because many of us had a fair business, comparatively, last year, business is improving and we may expect success in the future. Last year was a phenomenal business year, brought about by a combination of circumstances which may not, and probably will not, occur again in many years to come. Some of us were enabled last year to dispose of some of our surplus stock and thereby humiliate the tax fiend; but these goods were generally sold at unremunerative prices. Even now we are realizing the effects of an anticipated change of national policy, in the timidity of capitalists to invest in manufacturing or other enterprises. This condition must continue and increase until it permeates the entire business of the country, and harmony and prosperity will be restored only when a settled policy is arrived at and confidence re-established.

During all this time consumption will be curtailed, competition will be-

come fiercer, and profits will be out of the question, unless an agreement can be had by which we can act together in the matter of prices. With increased production and lower prices it is not difficult to foresee the consequences.

There is scarcely a manufacturing business of importance in the country that does not have some system of co-operation excepting ours. It remains for us to devise some means, to adopt some plan by which our business may be placed upon a more secure basis.

Many different plans have been suggested to bring the stove manufacturers into closer relations to each other, none of which, so far, have been successful.

I would suggest that at this meeting a committee be appointed for the purpose of formulating a plan looking to a general co-operation of the stove manufacturers of the country, and that said committee be authorized to call a special meeting of the association when ready to report, if they deem it necessary; otherwise to report at the next regular meeting.

Let us take hold of this question with an earnestness and determination which will insure success. We owe this to our employees as well as to ourselves.

Let us put our business in such shape that we will be enabled to pay our operatives fair, liberal compensation for their services. There is no class of workmen who deserve better pay, because none perform more laborious service. None are more faithful, none bring a higher degree of skill and intelligence into their work, and none are more deserving of the confidence of their employers.

These papers led to an interesting discussion, participated in by a considerable number of the members, after which the committee on prices made their report.

WEDNESDAY AFTERNOON.

The committee on local associations made their report, which led to a discussion that disclosed a very strong sentiment in favor of the maintenance of such organizations. The committee on piracy of patterns reported that the subject was so well considered at the last meeting that no further action seemed necessary to be taken. The committee on transportation rates asked to be continued, because some changes were to be made by the transportation companies, which had prevented the committee from accomplishing what had been hoped. The committee on prices made a good report. The following paper by W. J. Keep was then read by Secretary Thomas in Mr. Keep's absence:

Cupolas—Their Construction and Management.

Many years ago we measured every cupola of any importance in Troy and Albany, and in many other cities, and learned the shape of the lining when first put in. We procured a record of charges, blast, speed of melting, &c., and tabulated the results, expecting to discover some general correct principles of construction and management, but on the contrary found nothing to show that any shape or kind of management could not be equaled by others. A cupola with a foundry full of piece workers is not a profitable thing to experiment with. If you hear of a melter that can do better than your own, it is better to borrow him for a couple of weeks to remedy your defects, and you can then imitate his management. A few years ago the Michigan Stove Company hired a melter from Mr. Smyser to increase the rapidity of their melting, and we have retained the shapes for our cupolas which we adopted at that time.

We shall confine our remarks to cupolas from which the iron is caught by the men who use it, and who carry it away as fast as it is melted.

SIZE.

Small foundries may need a cupola of small capacity, but if there is any chance of the business growing, it is better to have the outside diameter about 6 feet, and if necessary line it smaller for a few years.

A 6-foot cupola ought to deliver a constant stream without stopping during the heat that will give a line of men all that they will want to do to take care of the iron. This would fill a 40-pound ladle every six seconds, and would melt from 10 to 11 tons per hour.

As it is difficult to gauge the stream, it is more general to fill from 75 to 150 ladles in five seconds each, and then stop up for a couple of minutes. The rule should be to give the iron as fast as the men can take it away and return for another dip.

The most economical foundry is one employing enough men to take about 16 tons of iron delivered from a 6-foot cupola in from one and a half to one and three quarter hours.

SHAPE.

This is not the same for coke as for coal. The tuyeres for coal are often from 5 to 7 inches above the sand bottom, while for coke the distance should be from 14 to 18 inches. It is necessary, therefore, to determine the fuel before procuring a cupola. Equally good results are obtained with a cupola perfectly straight on the inside as with other shapes.

The rule in blast-furnace construction is to allow the lining to burn into any form that it chooses to take, and the next time to line the furnace with the same lines. This is a good rule if we wish to experiment with a cupola at all.

When the bottom is dropped it will be found that the melting point is within 2 feet of the tuyeres, and that the lining has burned away considerably at that point. The slag will be built out above the tuyeres by the chilling action of the blast. It is customary to chip away this slag and patch the sides. This does little good, as the daubing melts off in a few moments after the blast is on.

If only the deepest holes are mended and the slag is allowed to remain and is daubed with fire clay, in a few days a bosh will form and the lining will cease to burn away.

If the result is an improvement the same shape can be retained when the cupola is relined. There will be no trouble about having a clean drop. The melting point is held in the center so far away from the walls that they are not heated nearly as much as with straight sides.

A 4 inch lining above the melting point will last a long time. This gives much more room for iron than a 9-inch lining, and therefore hastens melting. The bosh is above the tuyeres, and if you began with a 9 inch lining and a straight cupola, and have let the cupola shape itself, you will have worked a bosh in 6 inches over and beyond the tuyeres, and will have worked the lining above the bosh to 4½ inches thick. The inside diameter above the bosh will be 62 inches. The bosh at the narrowest point is 42 inches, and the diameter below the tuyeres will be 56 inches. The sand bottom will be 7 inches thick, and from this to the tuyeres will be about 18 inches. The tuyere opening will be 5 inches high. From the top of the tuyere for 12 inches the lining will slope inward to the narrowest opening of the bosh. The lining will then gradually expand for 20 inches until a 4½-inch wall is reached.

The heat after leaving the melting point is absorbed by the fuel and iron above it, and the higher the charging door the better.

A charging door on each side is convenient, allowing fuel and scrap to be charged on one side and iron and sprues on the other. The hight of the stack will depend on the neighborhood. A high stack will carry the gases above the surrounding houses. It is difficult to construct a netting that will arrest the sparks or that will last.

Below the tuyeres, above the bosh and above the charging doors, flanges should be riveted to the shell, so that any section of the lining can be removed at any time without disturbing any other part.

Bricks costing from $12 to $20 last nearly as well as those costing twice as much, though they are not quite as large.

BLAST AND TUYERES.

Probably the preference would be for a positive blast. It will start off at about 10 ounces, and, as the cupola clogs up, will run up to 14 or 15 ounces. An increase of the blast above this will amount to the melting of about 1 ton additional per hour for each ounce increased, though some have had a different experience.

The piping from the blower to the cupola should be large, with very large curves, if any are necessary. The large pipe, say 18 inches diameter, acts as a reservoir, and if long, two cupolas may be driven with one positive blower, which would be expected to drive only one. A large water gauge should be attached to each cupola in such a way that the figures can be seen 25 feet away. The one that we use has a reservoir underground holding 3 gallons, and is made of 3-inch gas pipe, with a copper float. It has required no attention for eight years. The wind should enter a bustle at three sides. The bustle should be large and should extend all around the cupola, and should contain eight or ten large doors easily opened. The tuyeres should be about 4 inches high and 7 inches wide, with at least 16 in a circle, and enough to make a continuous line would be better.

Two or more rows of small tuyeres above this have found advocates, but after use for a short time they are generally abandoned, and as good results are obtained without them.

CHARGES.

The bed of coke must be deep enough to hold the pig iron about 1 foot above the tuyeres when it begins to melt. Enough fuel must be added at each charge to replenish the bed and keep the iron at the melting point. There exist various opinions regarding the size of charges. Some use large charges with as good results as others using smaller ones. It would seem, however, that small charges of fuel at short in-

tervals would replenish the bed more uniformly, and only so much iron can be added as these additions of fuel will melt. In such a cupola as we have described 1700 pounds of coke would be used as a bed. About 4000 pounds of iron would be put on, followed by 300 pounds of coke, which will occupy about 5 inches in depth. This will melt at least 3000 pounds of iron, which will occupy about 9 inches depth. Toward the end, as the cupola becomes hot, the coke charge may be decreased slightly. If a large number of charges are to be made, after the sixteenth the coke may be 275 pounds and the last two charges may be 200 pounds.

RAPID MELTING.

The smaller the amount of fuel used to keep the iron hot the faster will be the melting, for if there be more fuel than is necessary to melt the iron, it must burn away before the next iron can get down to the melting point. If it is found that it is necessary to stop up often, it may be well to try and take 10 pounds of coke from each charge. If that hastens melting and the iron is still hot enough, after a few days take off another 10 pounds, but go very cautiously with any change. The general practice is exactly the opposite. Whatever happens the melter will add more coke and thus make the melting still slower. Breaking the iron in pieces of about 25 pounds causes the iron to melt faster, and uniform charging, so as not to allow the blast to work through faster at one point than at another, is very important.

SLAGGING.

If the heats are less than 16 tons, and especially if the sprues are milled, the slag that will accumulate will be needed to properly protect from the blast the drops of iron as they pass down to the hearth. If the sprues are charged with the sand on, or if the heats are over 20 tons, a slag hole must be provided a little below the tuyeres, and after about 15 tons have been taken out the slag should be tapped.

FLUXES.

To make the slag fluid enough to run out of the slag hole, limestone or fluorspar must be added. The latter is expensive, and, to say the least, gives no better results than limestone. Our experience has led us to consider limestone the best, irrespective of cost.

About 40 pounds to the ton of iron is sufficient. It should be broken a little smaller than an egg. The limestone should be taken from the outcrop or surface of the quarry, and will be white and brittle. That further down is hard and dark colored and makes a thick black slag. When large heats are made, and the cupolas are slagged, it is quite customary to charge sprues with the sand on them.

It is a question whether it is cheaper to melt the sand off or to mill the sprues. In large foundries making from 25 to 30 tons of sprues it is quite a serious matter to mill them, and necessitates two extra handlings. It is then probably better to add lime and flux away the sand.

DULL IRON.

In charging cupolas it is usual to add a few hundred pounds more iron than the molders call for. It is not well to run too close, as when the blast gets through the last charge the iron is likely to be dull. If, unfortunately, the iron runs short, scrap plate must be thrown in at the last end without fuel, and is almost sure to come out dull. If dull iron should occur in the middle of the heat, add a little more fuel next day to the charge that runs dull, though such dull iron generally results from a mistake in charging. It must result from a mistake in weighing the fuel or the iron, or from the iron hanging up, and later on falling down below the melting point. Inferior coke may cause dull iron, but this is a very unusual cause, though the fuel invariably gets the blame.

QUALITY OF THE IRON.

It is generally supposed that the best iron comes down at the first part of the heat, but the reverse is true. As the cupola gets hotter the quality of the iron improves, and any special work, such as patterns, should be poured near the last end, or when about two-thirds through. If a little white iron comes out at first, charge a hundred or two of silvery iron on the bed next day, which will correct the evil. By regulating the mixture properly, the first and last ladle are practically as good as any other ladle of iron for any work.

Following the reading of this interesting address of Mr. Keep's a paper on "Credits and Reports" was read by R. G. Rennolds, which was discussed pretty thoroughly. A committee consisting of W. H. Pfahler, Charles S. Prizer and Grange Sard was appointed to prepare a memorial on the death of Jesse Orr, late president of the association and have it engrossed. The Committee on Stove Terminology made a report recommending a trade name for every separate piece or part of a stove. This led to a very interesting discussion, in which many disputed points were brought up for the opinions of those present. The afternoon session having been prolonged to a very late hour no evening session was held.

THURSDAY MORNING.

(*By Telegraph.*)

The morning session on Thursday surpassed in interest any previous session. It was the time which had been fixed for a presentation to the full convention of the molders' views on an advance in their wages. All manufacturers had been invited to attend, even if they were not members.

The General Executive Committee of the Iron Molders' Union of North America were present, as follows: Martin Fox of Cincinnati, president of the union and chairman of the committee; Martin F. Monahan of Albany, Joshua G. Galloway of Dayton, John Campbell of Quincy and Patrick Enright of Chicago.

They all addressed the members of the convention, presenting the molders' side of the wages question in a very calm and dispassionate manner, and making a series of very strong arguments. They reasoned that the past few years had been a period of great activity and consequent prosperity in the stove trade, but that the molders had had no share in this prosperity. Meanwhile the cost of living had advanced, especially in the West, so that the purchasing power of a dollar is less by 10 to 20 per cent. than it was two or three years since. They further stated that the body of molders whom they represent had been growing more and more dissatisfied with the disposition of the Executive Committee to settle affairs amicably with the manufacturers, claiming that an advance of wages could have been secured before this if active measures had been taken in that direction. They stated that if an advance of wages was not made now it would be impossible to satisfy the men, and that in the interest of peace and harmony the manufacturers should make the concession asked. The demand originally made for an advance of 15 per cent. was modified to 10 in the hope that this might more nearly meet the views of the manufacturers.

Replies to the arguments of the molders were made by Henry Cribben, Grange Sard, W. W. Baldwin, D. McAfee, Uriah Hill, Jr., and C. H. Castle. They deprecated an advance in wages at this time, laying great stress on the unsettled financial condition of the country, the stringency in the money market, the probability of dullness in all classes of trade for some time to come, and the necessity for curtailment of expenses at such a time, rather than making a very great increase in the cost of producing goods. The speeches of the manufacturers were in the main argumentative and conciliatory, only one of them striking a discordant note in a reflection on the motives of the officers of the Molders' Union, which at once aroused expressions of disapproval from the other manufacturers. It was further asserted, and the molders admitted it, that wages could not be raised unless the price of stoves be advanced, but at present this is impossible. The question was then deferred for further consideration to the afternoon session, after which Lazard Kahn read a paper on "Consolidation," which was well received.

THURSDAY AFTERNOON.

The afternoon session met at 3 o'clock. The demand of the molders for an advance was taken under consideration and a resolution was adopted that in the present condition of business generally it was not expedient to make an advance in wages. There was some discussion with regard to promising an advance in case trade improved, but it was considered unbusinesslike, and, therefore, no expression was made on this point.

The next business taken up was the election of officers for the ensuing year, which resulted as follows:

Geo. D. Dana, St. Louis, president.

C. S. Prizer, Reading, first vice-president.

A. M. Blakesley, Rock Island, Ill., second vice-president.

W. S. Stevenson, Philadelphia, treasurer.

An informal secret ballot was taken on the secretary, which developed no opposition to D. M. Thomas, who was then formally elected unanimously.

The Board of Managers chosen was:

H. W. Buttorff, Nashville.

Henry Cribben, Chicago.

C. A. Ducharme, Detroit.

E. W. Peck, Rochester.

W. E. Walker, Taunton.

The salary of the secretary waa increased $1000 for the coming year, A paper on "Traveling Salesmen" was then read, which had been written by Franklin L Shepard of Philadelphia; another by D. McAfee of Quincy on "Credits;" another on "The National Association," by Fred. W. Gardner of Chicago; another paper on "Costs," by D. M. Thomas, was not read, but was ordered printed in the proceedings. The Committee on Communication from Albert A. Pope on good roads reported in hearty sympathy with the movement to secure better roads.

A resolution was adopted to meet in Chicago on the first Monday of May, 1894, after which the convention adjourned.

Immediately afterward the Defense Association held a meeting and approved the action which hsd been taken by the Ntional Association.

Some Trimmings.

— "CLAIM YOUR BAGGAGE AT ROOM 40" was the invitation of the Ireland & Matthews Mfg. Company of Detroit, to inspect a fine show of art work for stove ornamentation. Tile, trimmings, urns and ornaments made a display the elegance of which would have done credit to the World's Fair. The invitation was extended by means of brass baggage checks which were distributed right and left among those in attendance at the convention. On presenting the check the baggage was found to be a souvenir clock in bronze representing a traveler's grip to which was attached a check on which was "always on time" and below this "Ireland & Matthews Mfg. Company, Detroit, Mich." In consequence all had a good "time" at the convention.

— EVERYBODY WAS INVITED to room 38 by E. A. Ireland, who displayed a profusion of the newest things in stove ornaments. Copper, bronze, gilt, nickel and venetian iron work are profusely used with an artistic ingenuity in producing beautiful designs. Some handsome lamps and tables, made from brass and onyx, with colored silk shades and lace covers, contributed further elegance to the room. A convention souvenir presented to all callers was an inkstand with a beautiful onyx base and an elegant brass case and cover for a glass ink well, which could be removed. These favors were distributed from the makers of the goods. The Matthews & Willard Mfg. Company of Waterbury, Conn., who have recently opened a salesroom at 5 Wabash avenue, Chicago, where a line line of goods is shown under the charge of Mr. Ireland.

— H C. MATTHEWS, the pioneer and patriarch of the nickel knob and stove ornament business, from Waterbury, Conn., found a cordial welcome at all hands which was only overshadowed by his own jovial geniality

— JOHN E. GATELY of Troy, N. Y., wore a miniature Alaska poker for a scarf pin and exhibited an empty pocketbook, but was happy, as the doubling of his producing capacity in the past year is only about equal to meeting the demands of the trade for the Alaska stove trimmings. It was not necessary for him to bring a roomful of samples in order to show the stove manufacturers what he makes. The Alaska goods have become almost "a household word" by this time.

— THE RAVEN STOVE POLISH COMPANY of Chicago shone out with conspicuous brilliancy before the members at the Palmer House, a display of samples being made in room 38.

— W. F. GREENE of Troy, N. Y., was very busy doing the convention and saying a few words for the Jewel and Crown stove knobs and trimmings, while spreading good fellowship by introducing the members from distant sections, as they all know him.

— HENRY GLEASON of New York made no elaborate display of art tiles or other trimmings, but was just as cordially welcomed by the members. A stove convention would hardly be a genuine stove convention without the only Gleason. He favored a number of his friends with a pictorial art tile, said to be suggestive of Chicago, but hardly accepted as such by Chicagoans.

— A FIRE on the 28th ult. burned the main facing mill building of the Chicago Foundry & Supply Company of Chicago, with the machinery. It is supposed to have been caused by a spark falling from the pipe of a miller who was dressing a millstone. No inconvenience will result to the trade, as an abundant stock of goods on hand will enable all orders to be filled promptly until new machinery is set in operation in a new building on the old site.

THE EXHIBIT of stoves at the World's Fair came in for a great deal of discussion during the week. It was considered by no means as extensive as it should have been, considering the great industry represented. Everybody appeared, however, to understand the reason, which was that not enough space had been allotted to the exhibitors of stoves. Therefore the best had been done that was possible under the circumstances. The exhibit itself was regarded as highly creditable and thoroughly representative of the wide variety, high character and fine quality of American stoves, fit for the inspection of visitors from abroad.

THE STOVE MANUFACTURERS spent as much time as they could in visiting the World's Fair. The counter attractions of the great show, however, interfered less with the attendance at the sessions than one would have naturally supposed. The members of the stove association feel that their annual mingling with one another is productive of good results in many ways, and have therefore not been inclined to permit other matters to interfere. In view of the fact that the assertion is often made by stove manufacturers and others that the National Association has outlived its usefulness and is in its declining days, it has been refreshing to observe the heartiness with which the work of this convention was conducted. The membership may not be so great as several years since, but that is apparently having no effect on the enthusiasm of those who carry on the work and assume the burden of shaping to a great extent the course of the American stove trade.

THE HOWARD FURNACE COMPANY have recently purchased a city block in the first ward of Syracuse, N. Y., on which they propose erecting in the near future a five-story brick and frame slow-burning factory building. The structure will cover an area 100 feet square. The company will also put up a steel foundry of the same dimensions. We understand it is the intention of the company to erect these buildings during the summer months, and to occupy them some time in December.

Exhibits at the World's Fair.

Heating and Cooking Apparatus.

THE WM. MILLER RANGE & FURNACE COMPANY

of Cincinnati, Ohio, have, in the next block south, a number of Monitor ranges on exhibition in various sizes, from the six-hole range for private use to the double range for hotels or restaurants. A range suitable for restaurant use is shown, having eight holes for cooking, central fire place, two large baking and warming ovens, &c. A double range for hotel use is a conspicuous feature, illustrating the manner in which two or more ranges can be connected, each having its own fire place, water back, &c. A steam table is presented which is richly ornamented with nickel-plated trimmings. This firm also make a variety of coffee and tea urns, using steam, gas, oil or gasoline for heating, as may be desired. One of these urns, handsomely finished in nickel plate, is among the exhibits, which are inclosed by an old copper railing of unique design.

THE CORTLAND HOWE VENTILATING STOVE COMPANY

of Cortland, N. Y., who come next, have an ornamented pavilion, the roof of which is covered with striped cloth, while the sides are draped in white and yellow. Nickel-plated rails with neat wooden posts surround the carpeted interior. A great variety of the ventilating stoves are shown, some having nickel-plated trimmings only, while others are entirely covered with nickel plate. One stove is mounted on a wooden base and so arranged as to show the manner in which it can be connected with the outside by means of a pipe leading under the floor, thus supplying the interior with an abundance of fresh air.

SMITH & ANTHONY STOVE COMPANY

of Boston, Mass., have their exhibit inclosed by an iron railing, painted white, with gilded stripes. The Hub heaters, for steam and hot water, are shown in various sizes, from the No. 118 to No. 130. The iron work of the heaters is painted white with gilt letters, the casings being of ribbed galvanized iron. Samples of the Hub combination heaters, for hot water and warm air and for warm air alone, are also shown. Passing across the aisle.

CRIBBEN, SEXTON & CO.

of Chicago have one of the most ornamental pavilions in the building. The supporting pillars and cornice are finished in oxidized silver and gilt, while the interior is in linerusta walton. Large French-plate mirrors cover the rear of the exhibit space. Under the central dome, which is provided with numerous electric lights, is suspended a large globe, which indicates the "universal" distribution of the firm's goods. Among the heating stoves on exhibition can be mentioned the Reliant Universal, shown in full nickel plate and in black with nickel-plated trimmings, having reflector top, duplex grate and circulating tube through the stove. The Universal Oak, for coal or wood, is made in six sizes, with ash pan and draw center grate, so arranged that the openings in grate can be opened or closed tightly as may be desired, thus affording an air-tight stove if re

quired. The Ideal Universal base heater is designed for wood, with return flue or with direct draft. Among the ranges shown are the Regal Universal of new design, made in four sizes, with draw-center grate, oval fire box, for hard or soft coal, water front or reservoir, high closet, large oven, &c.; the Pacific Universal, for wood, made in three sizes, with square top and reservoir; the Imperial Universal cook, for coal, made in three sizes, square top, reservoir and closet, and the Prize Universal cook, a square stove with reservoir or reservoir and closet.

THE FULLER-WARREN COMPANY

of Milwaukee and Chicago are preparing an attractive place for their exhibit. The floor is of polished oak, with an ornamental border, while the walls are finished in cream and gilt. No stoves were in place at the time of the writer's visit.

BUCK'S STOVE & RANGE COMPANY

of St. Louis, Mo., will have an exceedingly fine exhibit. The floor is of hard wood, and two sides of the space are inclosed with an ornamental railing. In the rear of the exhibit space are three recesses above which is an ornamental cornice. In the recess to the left is an old-fashioned smoke stained fire place provided with crane and hanging pot, illustrating the method of cooking in the bygone days of 1776. In the recess to the right is placed an ancient cooking stove and accompanying chimney, illustrating the manner of cooking in 1816, at which time the company began business. In the central recess, which has an ornamental tile floor and wainscoting, is placed a modern range of the company's manufacture in all its glory of burnished nickel, thus representing the present method of cooking. The remainder of the exhibit was not in position.

CO-OPERATIVE FOUNDRY COMPANY

of Rochester, N. Y., have a handsome booth, which is painted a light color with gilt decorations. The firm's name and location, in raised gold letters on a background of black, are placed on the cornice on the four sides. Above the cornice on two sides is the "Red Cross" in red and gold, supported by ornamental iron work, also in gold.

The floor is carpeted and the exterior is surrounded with a brass railing. A series of Red Cross ranges in three sizes is presented. A 9-23 is shown in full nickel plate and partly burnished. This range has a high warming closet and low water reservoir. An 8-21 range, for wood, is in black with nickel-plated trimmings. A copper water boiler is attached to this range, showing the manner of connecting the water front with boiler. An 8 19 of the same series is presented in full nickel plate, partly burnished. Samples of the Red Cross Talisman, for wood, are shown, with full nickel plate, and in black with nickel-plated trimmings. The Red Cross Herald, for wood or coal, is of new design, and made in 16 styles. This range has large square oven, flush reservoir, duplex grate, and water front if desired. A sample of Monroe range is also shown, which is particularly adapted for hard coal. This range is made in 30 styles and sizes. Another sample is the Standard Red Cross range, which is made in eight styles and sizes. The Red Cross Champion Cook, a sample of which is shown in black, is made in 24 styles and sizes. Among the heating stoves for coal are the Red Cross A, made in three sizes; Royal Red Cross, made in three sizes; Red Cross B, two sizes, and Red Cross Signal, made in five sizes; the Red Cross Oak for coal or wood, made in four sizes, the sample being in black with nickel-plated trimmings. A Sylvan Red Cross cottage, for wood, is shown, which is handsomely nickel plated. This stove is made in six sizes—three with direct draft and three with syphon flue. While only one box stove is on exhibition it attracts considerable attention. It is of cast iron, 26 inches long, 15 inches wide, 16½ inches high, is cast in two pieces, weight 410 pounds and was made in 1796. This stove was used by John Post, a merchant of Utica, N. Y. The

GORTON & LIDGERWOOD COMPANY

of New York, Boston and Chicago show but a single specimen of their Gorton boiler for steam and hot-water heating. It is a steel sectional tubular boiler, with automatic feed, having four openings for feeding the magazine. This boiler is decorated in white and gold and is very attractive in appearance. It is equipped with steam gauge, try cocks, draft regulator, &c. Immediately adjoining this is an interesting exhibit by the

MILWAUKEE TACK & NAIL COMPANY

of Milwaukee, Wis., showing Buzza cott's ingenious invention for camp and outdoor cookery, as used by the United States army for field and camp service. The outfit embraces ovens, boilers, kettles, stew pans, &c. A special feature of the apparatus is the arrangement for an interior fire place for burning fuel in wintry weather. The

WILCOX WATER HEATER COMPANY

of Chicago show one of their combined kitchen ranges and water heaters. The system on which this is constructed has been described in our columns. Briefly, a heavy cast range, with a circular top and the usual cooking holes, has a cylindrical top placed toward the rear, containing coils of pipe, through which heat passes from the fire box of the range, the outlet to the chimney being through the cylinder. The coils are separated by baffle plates to more completely conserve the heat from the products of combustion. The

AMERICAN HEATING COMPANY

of Rockford, Ill., exhibit a sample of their American heater and hot-water circulator. It is of rectangular form, with circulating tubes placed in a horizontal position over the fire box. These tubes are double, the return water flowing in the inside tube and the heated water passing back in the outside tube to a chamber in the rear, with outlets at the top. The

SUPERIOR FURNACE COMPANY

of Little Falls, N. Y., show a No. 62 Superior warm air furnace and a Superior wrought range. The furnace is only partly jacketed, enabling its interior construction to be inspected. The cast-iron front of this furnace is a fine piece of molding, but it has further been completely electro-bronzed, giving it a decidedly handsome finish. The range shown is a six-hole construction, with high warming closet, hot-water tank on side brackets, with trimmings in electro-bronze and nickel.

ABENDROTH BROTHERS

of New York City come next with an exceedingly handsome display of heating and cooking apparatus. Two oak mantels are arranged at a right angle in the center of the space. One is fitted with the York Grand and the other with the York Queen fire-place heater, with tiled hearth. On the mantels are a number of artistic vases. Above the mantels is placed the Abendroth trade-mark in gold, white and blue. In front is the York six-hole range, No. 70. On the left are the Uncle Sam six-hole range, with high full-nickeled shelf; the York six-hole, No. 88, with high nickeled shelf, and the Andrus water heater. In the rear are the Lynwood six-hole range and the Pride of America ten-hole range. On the right are the Norfolk six hole range; the Bridge five hole range, with its combination of stove lid and pipe collar for use over any cooking hole, and the York warm-air furnace B. The arrangement of this exhibit is worthy of high praise, both for the character of the goods and the manner in which they have been placed.

THOMAS, ROBERTS, STEVENSON COMPANY

of Philadelphia are next in order, with a number of their high class ranges, embracing the Home Fortune eight-hole double oven; the Active Fortune six-hole, with horizontal hot-water boiler; the Active Fortune five hole, with horizontal boiler; the French Fortune double oven, with horizontal boiler, and the Gauze Door range (Filley's patent), six hole, with horizontal boiler. They also show the Challenge Syphon furnace, which is so constructed that the air to be warmed is deflected by interior plates so that it is compelled to come in contact with the dome of the furnace and thus become more highly heated. The exhibit is a fine one, and it enjoys a conspicuous position at the intersection of two aisles. The horizontal boilers over the ranges attract particular attention, being rarely seen in the West.

THE FARQUHAR'S HEATING COMPANY

of Chicago show a No. 32 Low-Down Surface Burning Hot-Air furnace, a No. 6 Seamless Air-Warmer, which is also a combination hot-water heater, and a No. 5 Circulating Tube Water Heater. The Seamless furnace represents their most perfect form of combustion chamber for soft coal, a thermostat governs air valves, which permit air to enter under the grate and also through a channel in the fire-brick dome which arches over, leaving a long, narrow exit from the fire chamber for the burning gases. The admission of air through the hot bricks promotes a combustion which sends no visible smoke from the top of the chimney and keeps the brick in a continual incandescent state. Another feature claimed for this furnace is the impossibility for smoke, gas or dust to escape to the air chamber.

THE SPICER STOVE COMPANY,

Providence, R. I., show a Model Grand range with an elevated hot closet and a Prize Model range with a high shelf that has a nickel-plated art casting for a center piece. The Art Model is a round full reversible flue surface burner with a Russia iron body, making a rich contrast to the cast work and the bronze and nickeled decoration. The Model Grand has exactly the same qualities, but is square in shape, presenting a rather unique beauty. All of these stoves have an oven in the top with a cover in two parts, but so arranged that moving either open both.

F. AND L. KAHN & BROS.

of Hamilton, Ohio, make a novel and attractive exhibit in a small space. In the center is an "Old World" heating

stove, forming the pedestal for a figure which is really a suit of armor that on examination might have been cast in their foundry. From the back of this figure a smoke pipe makes its appearance and runs up to a cap that closely resembles a crown. Pipes run from the stove through the legs of the figure to a drum in the body, which connects with the smoke pipe. Surrounding and fit company for this "antique novelty" are the Floral Estate, a handsome open stove ornamented with gilt bronze trimmings and tile; the Scientific gas radiator, of nickeled castings, Russia iron columns and glass ornaments; the Peerless Estate gas range, with water back; the Real Estate coal cook, with their patent knife-sharpening edge, and the Estate oak, in three styles of finish, with one of their jointless ash pits as a conspicuous feature at the front of the exhibit.

(*To be continued.*)

Report of Gas Commission.

We have received a copy of the report to the Western Pennsylvania Exposition Society of the Natural Gas Commission appointed by them at the request of the natural gas companies of Pittsburgh. These companies wished to ascertain, for the benefit of their customers, the most economical and perfect gas appliances of those competing at their exposition in 1892. The report is a pamphlet of 28 pages in text and 13 extensive pages of test records. From the pamphlet it is learned that a first and second prize were offered for cooking stoves, for which there were seven competitors; a prize for hot-air furnaces, with three competitors; a prize for heating stoves, with ten competitors, and a sweepstake prize. The commission state: "After consideration of the character of the entries we determined that in addition to economy in the use of gas we would also take into consideration the question of ventilation by the stove, principally as to the discharge of the unhealthy vapors and gases resulting from combustion. We did not decide this latter as conservators of the public health, but because we believed that any appliance that did not provide for and would not discharge the products of combustion from the stove into the open air outside of the room did not deserve an indorsement which would commend it to the public. That some appliances which had no means of getting rid of the products of combustion were submitted to us to be tested shows that a difference of opinion exists on this point, but the science of ventilation and the laws of hygiene, as well as our own physical experience while making the tests, demonstrated satisfactorily to us that our conclusions in fixing the points were correct."

Contestants were invited to be present during all tests and all records were open to their inspection. The tests were all conducted in a building erected for the purpose in the southern corner of Machinery Hall. It was 19½ feet long, 14½ feet wide and 12 feet high, with double doors 6 feet square in one end and a window in each side 4 feet 4 inches by 2 feet 4 inches in size. It was afterward found necessary to cut a hole 2 feet in diameter in the ceiling in the center. Natural gas was the fuel used in all tests and the pressure regulated to a degree most advantageous to each particular appliance by a Stott Regulator and determined by a water gauge close to the appliance. One of the American Gas Company's meters, after being tested carefully, was used to measure the gas used, and was graduated to be read to one-hundredths of a foot. Two air meters were used for measuring the velocity of the gases as they passed to the chimney and of the air currents at stated points. Ten thermometers were hung at different places in the room besides those used directly in the stoves. A mercury column barometer registered the condition of the atmosphere, and the room was lighted by three incandescent electric lights. A long description follows of the specially-made apparatus used for various purposes, which shows that the tests were made with great care and were very exhaustive. A water-fed device was used "to see how much vapor of water could be condensed from the products of combustion resulting from the consumption of a given amount of hydrogen gas." In testing, the amount of heat units that would be absorbed by a given quantity of water was used as giving simpler and more accurate information for comparison than could be gained from roasting or similar experiments. A description of the constructive features of the apparatus tested is given and an explanation of the method of determining the velocity of currents of air and products of combustion, of the amount of heat utilized and lost, of the effect on the general temperature and the effect on the atmosphere. The tables show the record of each test and enable a comparison. The book is valuable not only for the information it contains, but also as a guide for those wishing to make similar trials, giving a clear idea of the amount of labor involved and the great care necessary to make a test sufficiently correct to be worthy of record. From the fact that the tests were so carefully made, it is unfortunate that there was so small a representation of the many gas appliances made.

E. Bement & Sons

of Lansing, Mich., have a plant covering seven acres, the floor space inclosed amounting to 200,200 square feet, or about five acres. Their stove foundry is 640 feet long by 60½ feet wide, including new buildings just finished, 119½ feet long. They have molding rooms now for 108 molders. The ground floor of the new part is used for molding, and the second and third stories for mounting, being three stories high. A new stove warehouse has also been added, which is 140 x 51 feet, four stories high. The ground floor is used for shipping and the other floors for storage. The cupola capacity of the foundry is 18 tons per day. All these buildings are of brick and are lighted by electricity. An overhead railway track is being built the full length of the foundry for carrying metal and castings. The track and carrier are of the firm's design, and it will eventually be operated by electricity. A novel device for ventilating the tumbling or scouring room, and mounting, buffing and grinding rooms has been put in. It is operated by suction, which carries the dust from the machines down below the floor, the lighter particles going up the smoke stack while the heavy portion is flushed into the river running past the works. The firm are bringing out a new line of medium-priced cooks and ranges, to be put on the market under the name of Villa; also, among new goods, two smaller sizes of the Palace oak, 10 and 12 inch, sometimes called bedroom oaks. Their line of Palace Regal and Palace Grand base-burners will be redressed and improved in ornamentation. For the purpose of getting the best results in all departments necessary to turning out high-class work, they are putting in their own nickel-plating plant with all modern improvements.

ODD PLATES.

Chas. J. Ridgway of Ridgway Furnace Company has just returned from an extended trip in the Middle and Western States in the interest of the New Ridgway revolving open fire pot furnace, which is shown to the trade with many improvements for 1893. Besides securing additional space for their exhibit at the World's Fair, Mr. Ridgway succeeded in making a number of valuable agencies for the sale of the furnace, which is, we are advised, taking very well with both trade and consumers.

The Sidney Hollow Ware Company have recently been purchased by Philip Smith, who, we understand, will at once increase the productive capacity of the plant and confine the output to the finest grade of hollow ware.

Walker & Pratt Mfg. Company, Boston, Mass., are showing a neat range called New World, and if any of the out of town trade are in the vicinity of Union street it will be well for them to drop in and hear A. W. Walker hold forth on the beauty and utility of this range. The visitor may be reminded of that most excellent old story of the panorama in which the words, "Turn the crank, Mike," appear with pertinent frequency. The auditor will go away impressed with Mr. Walker's eloquence and a more or less confused idea of new processes of manufacture, revolutions in the trade, patent dampers, improved ovens, artistic effects, low price, excellence in construction, &c. The new range has a handsome bronze plate representing the landing of Columbus, with the Indians somewhere out of sight, but the well known colloquy wherein Columbus is reported as saying "How are you, Indians?" and the Indians answering, "How are you, Columbus?" and Columbus saying, "You are discovered," and the Indians replying, "We are," is left to the imagination. Aside from the beauty of the plate there is, according to Mr. Walker, this significance, that the advent of the new range marks an epoch in stove trade history to be compared with the discovery of America. Besides the New World range, Walker & Pratt Mfg. Company are preparing two larger sizes of their line of Equator furnaces, which will make six in all. The new sizes have 28 and 32 inch pot respectively, and will be ready by the middle of the summer.

The Chicago & Erie Stove Company of Erie, Pa., have brought out a new stove which is called the Patent Modern Helper. In shape it is similar to a steel range, but much heavier than an ordinary cast range, the makers having combined many of the advantages of both the cast and steel constructions in this four-hole range. The bottom oven plate is made of steel supported by automatic adjustable patent braces, which have been so successfully employed in connection with the company's goods. The Modern Helper is provided with heavy, strong castings, large flues, end broiling door, which can also be used as a feed door, if desired, and high closet or shelf. Special reference is made to the arrangement of the oven plates and to the drop door,

which is well balanced and similar to those used on the company's steel ranges. It is said to be easily handled and when let down forms a convenient shelf. The patent bottom of the oven is so thin that it heats rapidly, thus giving a quick oven. The Peerless Helper is a comparatively new construction and embodies those features which are essential to first-class construction and operation. The company are distributing a circular which gives the selling points or reasons why dealers should secure lines of these ranges. The remarks cover numerous points, among them being the patent steel oven plate in the four-hole ranges, which is said to have more than 90 parts and pieces as braces and supports under it. The Modern Helper line is intended for using coal as a fuel and the Peerless Helper is made for wood only.

PATRICK G. BREEN, one of the best-known foundrymen in the West, died at his home in Detroit, Mich., on the evening of Friday, May 19, aged 43 years. Mr. Breen went to Detroit in 1869, and was for a time in the employ of the Detroit Stove Works in the capacity of expert molder. In 1871, when the Michigan Stove Company were organized, he was one of their first employees. A short time later he became foreman of the foundry department, and was subsequently advanced to the position of assistant general superintendent. In 1889 he took an interest in the Peninsular Stove Company and assumed the general supervision of the manufacturing department as superintendent, where he continued until about two years ago, when he was compelled to practically give up business on account of failing health.

SAMUEL V. REEVES, who for several years has been connected with the Liebrandt & McDowell Stove Company of Philadelphia, is now to be found at 45 North Second street in that city, where, under the name and style of Reeves & Horner, will be represented the March-Brownback Stove Company, for the sale of their Globe and Crown stoves. The new concern will also represent G. M. Clark & Co. of Chicago, for the sale of their Jewel gas and gasoline stoves, and the Dangler Stove & Mfg. Company, for their Excelsior gasoline stoves. In addition the firm will handle a fine line of oil stoves, refrigerators and other goods, and will carry in stock parts for repair of all kinds of stoves. A leading feature of the business will be repairs for gas, gasoline and oil stoves. With an intimate knowledge of the business and the trade, the new firm should command a good patronage.

MR. MCDOWELL of the Liebrandt & McDowell Stove Company, Philadelphia, has been confined to his house for some time through illness. He is now recovering and expects to resume business next week.

CHARLES ELLIOTT COLEMAN, representing Eugene Munsell & Co., 218 Water street, New York, has just distributed among the trade his fifth annual souvenir, consisting of a pretty folder tied with a pink silk ribbon. The front cover carries a faithful likeness of Mr. Coleman, while the second page is embellished with an ornamental design across which is printed "Season of 1893." The address to his friends is, in substance, a request not to visit the World's Fair, or complete arrangements for their fall line of stoves until Mr. Coleman has called upon them, which will be very soon. The fourth page of the folder is inscribed with the name and address of Munsell & Co. and an indication of the line of goods which they manufacture.

M. HERTENSTEIN & Co. of Columbus, Ohio, are calling the attention of the trade, by means of an illustrated card, to their Gilt Edge oak stove for 1893. This heater is mounted with high grade sheet steel, every joint being made air and gas tight. It is provided with large ash pan, heavy fire pot, draw center grate and nickel trimmings. The fire pot is sectional and can be placed in position without removing the coal grate. The Gilt Edge is made in four sizes, the numbers 12, 14, 16 and 18 indicating the diameter of the fire pot in inches.

THE MICHIGAN STOVE COMPANY send us this week a sample of the poeket mirrors which they are distributing. These mirrors have a highly polished nickel back with the Garland trademark stamped on it, making a very pretty pocket companion.

AT A SPECIAL MEETING of the directors of the Carton Furnace Company, held at Utica, N. Y., S. A. Batty was unanimously elected to fill the vacancy caused by the death of James Jones. Mr. Batty has been connected with the company for the past six years, and his promotion is an evidence of appreciation of his faithful discharge of important duties. His position in the past has been one of trust and responsibility, in which he has shown himself worthy of the confidence placed in him. The directors of the company also elected George Jones superintendent of the works, to succeed his father, James Jones, deceased. Mr. Jones has been in the employ of the company for the past ten years, filling numerous positions of trust with entire satisfaction, and having received a thorough training under the direction of his father, is well qualified to fill the position of superintendent.

THE SUPERIOR FURNACE COMPANY of Little Falls, N. Y., have issued a circular letter bearing date of June 1, to the effect that they have removed their Western branch office and salesroom from 84 to 82 West Washington street, Chicago. This has been done for the purpose of securing more favorable quarters for the proper display of their line of Superior warm-air furnaces, combination heaters and wrought-steel ranges, which it has been impossible to show in their exhibit in the Manufactures Building at the World's Fair. The company have established a bureau of information and hope to be of service and assistance to customers, friends and acquaintances in the trade who visit the World's Fair. The company also state that they now have six styles and 21 sizes of Superior furnaces and heaters, mounted in steel plate, wrought or cast iron, for brick setting or portable form, and adapted for all fuels and climates. They have distributed circulars illustrating some of their leading specialties, together with cards showing upon one side pictures of various buildings at the World's Fair and upon the other advertising matter of interest to the trade.

FAITH, BELSON & Co. of Philadelphia are doing a great business in Moon's Heat Equalizer, an oven for gas, oil or gasoline stoves. Their shipments have been running from 800 to 1000 a week. In opposite direction, the cooling business is equally good. Their orders for the Michigan refrigerator, made by the Belding Mfg. Company, are among the largest the company receive.

THE FULLER & WARREN COMPANY, Troy, N. Y., have just issued a special supplement known as No. 5, for distribution among the trade. Special attention is invited in this supplement to the company's New Splendid base burner, made in three sizes, with double-heating attachment and duplex grate. The stove is referred to as being new, original, unique, attractive and combining not only the good features that have made the Splendid popular in past years, but in addition is equipped with the modern improvements known to the trade. Sectional views show the arrangement of the flue construction, dampers, grate, &c. There is also illustrated the Art Splendid parlor, which has been improved for 1893, and also the Matchless Diamond. The latter has been entirely redressed and is presented with new legs, skirting rails, name plate, upper nickel section and top and swing cover. The two larger sizes are made with double heating attachments. Special Circular No. 6, issued by the same concern, describes the well-known P. P. Stewart heating stoves, manufactured for over half a century by the Fuller & Warren Company.

O. W. SNYDER, president of the Lexington Foundry Company, Lexington, Ky., recently made a brief trip to St. Louis, Chicago, Detroit and Cincinnati, and secured several good-sized orders for the productions of the company. He also effected the sale of shop rights to use the Kelley patent steel oven, referred to in the columns of *The Metal Worker* recently.

ABRAM COX STOVE COMPANY, Philadelphia, are distributing to consumers a neat little 12-page circular, adapted for inclosure in the usual sized commercial envelope, and calling attention to their Novelty Kitchener. The range is illustrated with its various combinations. It is made plain or with water back, with oven on either side, ventilated oven, galvanized or black boiler, oscillating dumping grate, duplex grate, horizontal (concealed) boiler, or vertical (exposed) boiler.

THE DANVILLE STOVE WORKS of Danville, Pa., with New York office at 284 Pearl street, are bringing out this season a number of new patterns, among which may be mentioned a square parlor stove, to be known as the Princess Beaver, of unique and striking design; an elaborate range called the New Queen Beaver, and a four-hole range of neat design known as the New Prince Beaver. The company will also improve their Ideal Beaver parlor stove and the Beaver Franklin for this season's trade. All the new goods, we understand, are nearly ready for shipment. Some time since the company obtained a patent on a heating attachment, the principle of which is to carry heat from the oven of a range to the floor above, this being accomplished by attaching the heating device to the rear of a Beaver range. The company intimate that there have been some infringements on this patent, and they wish it distinctly understood that they will fully protect their rights.

GRAFF & Co. of 208 Water street, New York, and 207 and 209 Lake street, Chicago, Ill., send us a copy of their price-list of furnaces, ranges and heaters. It is an interesting little volume of nearly 50 pages, printed in tinted ink and bound in flexible covers. Attention is invited to the Faultless line of furnaces, made both portable form and for brick work, also the new Hero, an all cast construction, made in several

sizes. Other goods include the company's hot blast tubular furnace, the Oregon, the Monitor, Charles Smith's hot-water boilers for the company's Faultless and Hero furnaces, the Penn Franklin, a very rich fire place stove, the Elegant, another member of this class, the Faultless brick-set range, adapted for use in French flats and small houses, the Columbian, a double oven range, made in portable form and for brick work, and the Elegant, an elevated double oven range with six 8-inch boiler holes. Several pages are devoted to tables giving capacity of pipes and registers, suggestions about setting furnaces and a list of furnaces, ranges and heaters for which repairs can be furnished.

THE DIGHTON FURNACE COMPANY of North Dighton, Mass., are vigorously pushing the sale of their leading specialties, more particularly the Royal Winthrop six-hole range, a circular of which has recently been issued. This circular is in the nature of a supplemental price-list and bears date of June 1. In it the manufacturers state that they have made a number of additions to their Winthrop line, and in the Royal Winthrop they present to the trade the most durable and artistically designed stove ever turned out. The hearth is large and deep to contain a capacious ash pan, and there are clean-out plates at both ends of the range. The direct damper is operated by a handle in front over the oven door, which obviates the necessity of reaching over a boiling kettle to open or close it. The oven door drops down in such a way as to form a large shelf flush with the bottom oven plate, while by means of the makers' patented pedal device the door can be either opened or closed by a slight touch of the foot. The oven is ventilated by introducing fresh air through a wheel in the center of the door and distributing it evenly through the oven. It escapes through the back oven plate into the smoke flue, carrying off impure air and gases. The rail or dress guard with which the Royal Winthrop is fitted is not bolted to the top, but extends along the entire front of the range, being held in place and supported by means of two brackets. These can be taken off or put on at any time by simply turning two small buttons or clasps.

THE DANGLER STOVE & MFG. COMPANY of Cleveland, Ohio, are the assignees of a patent granted May 16 to Henry Ruppel of Cleveland, Ohio, for a hydrocarbon vapor burner. The burner has a ventilated fire ring, within which is a series of cups. A supply tube placed directly above these has openings in the bottom through which the oil flows into the fire ring. The latter and the supply tube are used in connection with two perforated chimneys, a hood, two tubes, and means for holding the several parts together. The object of the improvement is to provide a burner so constructed as to produce an even combustion and an intense blue flame, which is projected upward through the top of the burner, even though the stove to which the device is attached does not stand square.

A HOT AIR FURNACE of novel construction has recently been patented by William H. Rogers of Philadelphia, Pa. The heater consists of inside and outside casings, through the space between which is a pipe which leads from the smoke chamber placed within the inside casing. There is also provided a pipe for discharging air into the top of the outside casing, where it is heated before being carried to the flues leading to the several rooms.

THE MILWAUKEE GAS STOVE COMPANY of 15 and 17 Erie street, Milwaukee, Wis., have recently issued what they call the "Columbian Edition" of their catalogue of Perfection gas stoves. The little volume is a *fac-simile* of the company's regular catalogue, but with pages reduced in size to 2¼ x 3⅝ inches. The front cover carries a picture of the Perfection gas range connected with a hot-water circulating boiler, while to the right is a view of an interior, showing a long procession of waiters bearing dishes of food, which they have apparently just brought from the kitchen. The fourth cover carries in colors a reproduction of the United States Coat of Arms, while above is the word "Columbian" and below is the word "Edition."

BUCK'S STOVE & RANGE COMPANY, St. Louis, are putting on the market a new cast-iron range, on which they have been working for some time past, and which is of handsome design and well made throughout. The high shelf is particularly attractive and will doubtless go far toward making this range a seller. The grate in this range is the same as that in the balance of the company's productions and which has always given general satisfaction. This range, made in 16 styles, is known as Buck's Peerless, for coal, and Buck's Fashion, for wood, the latter also being made in 16 styles. The company are also introducing a new steel range, made with all the latest improvements, circulars of which are being prepared and will shortly be sent to the trade.

AN ILLUSTRATED PRICE-LIST of gasoline stoves, ovens and sheet metal goods reaches us from the A. J. Lindemann & Hoverson Company of Milwaukee, Wis. Within its covers attention is invited to the Star Junior gasoline stoves, Star individual burner and single generator stoves, the Superior Process and the Game oil stove, together with plumbers' furnaces, wall torches, ovens, &c.

THE BRITISH CONSUL-GENERAL in Roumania reports an increasing demand for cooking and heating stoves in that country. One thousand of the former kind were received from Switzerland during the month of March. Such articles are of comparatively recent adoption in Roumania.

A LITTLE WHILE AGO we heralded the publication of a picture of the World's Columbian Exposition which was to bear indirect witness to the Peninsular furnaces, stoves and ranges. We are indebted to the Peninsular Stove Company of Detroit, Mich., for a copy of this artistic work, which will prove a very pretty wall decoration. It is a steel engraving presenting a perspective view of the World's Fair, mounted with a mat in an oak frame, the whole giving a very pleasing effect. The advertisement of the company is very unobtrusive, being merely their trade-mark printed in one corner of the picture.

THE MICHIGAN STOVE COMPANY are distributing to the trade match scratchers for use on walls of rooms, which are decidedly decorative in their design and finish. They were manufactured specially for the company and incidentally advertise Garland stoves and ranges.

A. WEISKITTEL & SON, Baltimore, Md., have just brought out a new and attractive line of ranges known as the Golden Rule. This name constitutes their trade-mark, which was registered in the Patent Office in January last. The Golden Rule ranges are made with three sizes of ovens, namely, 14, 16 and 18 inches, respectively, and are provided with elevated horizontal boilers. The fire boxes are furnished on the right or left hand side, and with or without water backs, as may be preferred. The other features embodied in these constructions are of the latest and most approved type, while the ornamentation is of such a character as to render the stoves pleasing to the eye. The doors of the oven and lower warming closet are embellished with nickel-plated panels carrying medallion tile in circular frames. The varieties in which the Golden Rule is made are such as to meet the usual requirements of the trade, and the company anticipate for them a large sale.

GEORGE H. DIPPO has resigned his position as superintendent of the Eclipse Stove Company of Mansfield, Ohio, to take effect on June 1. Mr. Dippo severs his connection with the company named for the purpose of taking the management of the new plant of the Dippo Mfg. Company at Chagrin Falls, a suburb of Cleveland, Ohio. The new concern will manufacture iron specialties and fine castings.

THE CENTRAL STOVE WORKS, Foster Brothers proprietors, Lehanon, Pa., have nearly completed a new foundry building 60 x 66 feet in size, which will accommodate 25 molders. Later in the season it is expected to enlarge the plant still further in order to provide for increasing business. The company have a number of the latest improved patterns, follow boards, flasks, &c., but do not now see their way clear to commence manufacturing operations before August 1. Improved machinery will be employed, and the plant will be equipped throughout in such a manner as to turn out goods with dispatch. Their stock and mounting departments are in a five-story structure 50 x 70 feet in size, which at present contains some of the machinery the company will use in their new building. The shipping facilities are said to be excellent, and as only skilled workmen will be employed the company expect to do a large business.

THE WESTERN STOVE WORKS of Peoria, Ill., have remodeled their Lake View oak stove and introduced a number of features which they are confident will be well received by the trade. The exterior has been made more ornamental, both in molding and in nickel trimming, adapting it to use in rooms in which high-grade stoves only are wanted. An adjustable damper at the back of the collar controls and regulates the heat, while the draft is governed by a slide at the side, which can be shut air tight. The slide on the base door has been removed, the change thus made having proved advantageous in keeping fire perfectly. The base is square, ash pan very large, and the fret-work jacket is removable for polishing. The New Home square stove made by this company has also been arranged so that the draft is taken in at the side, leaving only one opening at the base.

THE ART STOVE COMPANY of Detroit have just placed upon the market a new wood and coal base heater with direct and revertible flues, and combining many points not heretofore introduced into this class of stove. It has some very desirable automatic arrangements, and the design is of a high order. It is known as the Laurel base heater.

TRADE REPORT.

The Iron Market.

May closed on an exceedingly dull market in Iron and Steel, and a diligent search fails to develop many features of encouragement in the general situation. Buyers are conservative, and sellers discriminate sharply among their customers. The question of freights, the question of labor, the question of crops, the question of finance and the question of success or non-success of the World's Fair, will all have a more or less important bearing on business during the later months of the year. The convention of the Amalgamated Association opens in Pittsburgh June 6, and if arrangements now being made are carried out, the first conference in regard to labor scales between the manufacturers and the representatives of the Amalgamated Association will be held a few days after the above date. There is, however, a fair volume of business extending about 30 days ahead, besides some very important contracts covering not only this year but the year following; but these are chiefly Government work, and shipbuilding, and, therefore, not likely to influence general business, except indirectly. In the Chicago market the lessening of purchases and curtailment of credits are now almost universal. The pressure for money is increasing, and the very conservative policy of the banks here is being felt seriously.

Pig Iron.—Business is extremely dull, consumers being more inclined to secure deliveries on old contracts than to engage in new ventures. For similar reasons furnaces are kept busy in making shipments and for the present have no need to worry about orders, as their product is largely sold, covering a period of three or four months to come. Stocks are not large and the general situation appears to warrant holders in quoting firm prices, notwithstanding the fact already noted that buyers show very little disposition to increase their engagements. An advance of from 25¢ to 50¢ ₱ ton has been made on local and Central Pennsylvania deliveries, and from all appearances it will be maintained unless there is a falling off in consumption or an increase in production, the latter being somewhat of an improbability. General quotations are about as follows, and from 20¢ to 25¢ less for Southern Irons at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X	$16.00	@ $16.50
American Scotch, No. 2X	15.00	@ 15.50

At Chicago Coke Iron is in fair demand in small lots. Some consumers of Southern Coke have placed season contracts for 1000 to 4000 tons, but local Coke has been comparatively neglected. Nothing special has transpired with regard to Charcoal. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal	$16.50	@ $17.00
Local Coke Foundry, No. 1	13.75	@ 14.25
Local Coke Foundry, No. 2	13.00	@ 13.25
Local Coke Foundry, No. 3	12.75	@ 13.00

Business in Pig Iron has been only moderate during the week in Southern markets, consumers having manifested no disposition to buy for forward delivery and some who for a long time have done so are now refusing to anticipate their wants for more than a month, alleging that they can buy at least as cheap during the summer whenever they need it, and their experience for the last two years has been that they could buy the Iron cheaper when the time came for using it than they had contracted to pay for it. There are so many consumers who have for some time refused to anticipate their wants that their current purchases in the aggregate are now considerable, although none of them are large. A conspicuous feature of the trade is a general application to have deliveries delayed on current contracts. This is especially the case with stove works and car works. Prices of Southern Coke Iron remain the same as a week ago, except that Mottled Iron is scarce and commands the same price as Gray Forge. Charcoal Iron is generally quiet and lower prices prevail, but there have been fair sales of Lake Superior Charcoal Iron. We give revised quotations;

Foundry.

Southern Coke, No. 1	$13.00	@ $13.25
Southern Coke, No. 2	11.50	@ 11.75
Southern Coke, No. 3	11.00	@ 11.25
Ohio Soft Stone Coal, No. 1	16.00	@ 16.25
Ohio Soft Stone Coal, No. 2	15.00	@ 15.25
Lake Superior Coke No. 1	15.00	@ 15.25
Lake Superior Coke No. 2	14.00	@ 14.25
Hanging Rock Charcoal, No. 1	18.50	@ 19.00
Hanging Rock Charcoal, No. 2	17.50	@ 18.00
Tennessee and Alabama Charcoal, No. 1	15.00	@ 15.50
Tennessee and Alabama Charcoal, No. 2	14.00	@ 14.50

Metal Market.

Pig Tin.—There have been no signs the past week of relief from the depression in values brought about by overtrading induced by the proposed duty. To the contrary, depression is more pronounced at present than it has been at any time during the past two months. A week ago 19.30¢ was apparently a very low price. Since then round lots have been sold at 18.90¢ for prompt and near future delivery; also for delivery up to September 1, sellers' option, at the same price, while ordinary jobbing sales were made at as low as 19¢, regular terms.

Copper.—The market has not changed for the better. Prices are softer if anything than they were a week ago, and evidence is wanting of improvement in the demand, for home or export account. On Lake Superior Ingot the popular quotation is 11¢, but a shade less has been named on small lots, while speculative operators offered at as low as 10¾¢ @ 10.85¢ for delivery during the latter part of the year. Dealings have been on a very moderate scale and the demand is slow at the present time.

Pig Lead.—Prices have been gradually moving toward a higher plane under the influence of very steady purchases for consumption and comparatively light offering. Probably 500 tons have been placed at 3⅞¢ @ 3.92½¢ for round lots and 3.95¢ for single carloads. The latter price was an inside one at the close, while 4¢ was generally asked.

Spelter.—No change has taken place in the condition of the market for this metal. Prices have therefore barely held their own, at 4.20¢ @ 4¼¢, for prompt and near future shipments.

Antimony.—The demand has continued unimportant and prices remain almost stationary. Current quotations are 9.90¢ @ 10¢ for Hallett's, 10¼¢ @ 10½¢ for L.X., and 10½¢ for Cookson's, in wholesale lots.

Tin Plates.—Dealings have been on a rather small scale, and there is no improvement in the demand for prompt or future deliveries. Prices are rather soft, but without radical change.

Coal.

The Anthracite Coal trade is just now bracing up and getting into position for the season. The meeting of Wednesday this week is expected to have some bearing on the subject, but, as a matter of fact, the anticipated benefits are already realized in good measure by the excited inquiry on the part of consumers and the approach made to the actual schedule, which in any event is likely to be adhered to for the present, even though the movement be preliminary to shading at a later day. The immediate effect on the market is a relapse, at least so it may be inferred, reasoning from the usual operation of cause and effect. Operators are sure of one point gained through temporary activity and firmer prices.

The production of Coal last week by the several companies, who endeavor to act in concert so far as practicable, was 856,700 tons, which is about the same amount as shipped from the mines last year.

Chicago Report.

Scrap.—There is very little movement. Dealers quote buying prices as follows:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12.00	....
Machinery Cast	9.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	6.50	....
Burnt Iron and Grate Bars	4.00	....
Sheet Iron and Hoops	3.00	....
Plow Steel and Breaking Stock	8.00	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	7.00	....
" " (Iron)—cut in single Sheets and Rings	10.00	....
Old Gas-Pipe and Boiler Tubes	7 50	....
Cast Borings	4 00	....
Turnings	5.50	....
Horseshoes	2 00	....
Copper Bottoms	....	8 ¢
Copper Clips and Heavy	....	9 ¢
Heavy Brass	....	8 ¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	2¾¢

Anthracite.—An advance of 25¢ ₹ ton has been made, begining with June 1. Quotations on carload lots of 12 net tons are low as follows:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill	$5.60	$5.85
Milwaukee, Wis	5.60	5 85
Kansas City, Mo	8 80	9 05
Council Bluffs, Iowa	8.80	9.35
Lincoln, Neb	8.95	9 20
Sioux City, Iowa	8.80	9.05
Aberdeen, S. Dak	8.85	9.10
Dubuque, Iowa	6.90	7.15
Madison, Wis	7.10	7.35
St. Paul, Minn	8 10	8.35
Burlington, Iowa	7.10	7.35
Des Moines, Iowa	8.55	8.80
Davenport, Iowa	6.90	7.15
St. Joseph, Mo	8.80	9.05
Leavenworth, Kan	8.80	9.05
Omaha, Neb	8.80	9 05

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

WILLIAM VOGEL & BROTHERS, Brooklyn, N. Y., are about offering the trade the Henis Fruit and Vegetable Press and Potato Masher. This device, it is said, is made in such a way that it extracts every drop of moisture from fruits, and potatoes may be put in with their jackets on and with one stroke of the plunger separated into fine particles. It is pointed out that owing to the perfect fit of the plunger no particles are allowed to escape, and the leverage is such as to render the most powerful pressure without overexertion on the part of the operator. The frame is of heavily tinned iron and the plunger and body of tinned steel plate.

LYON, CONKLIN & Co., Baltimore, Md., are in receipt of some very flattering letters relating to their Tin Plates. One of recent date, which is reproduced in their announcement elsewhere, speaks in the highest terms of their Altamont Extra IC Charcoal Plate. The writer says it is the best he has "used for 50 years."

CONDITION OF THE

Hardware Trade.

THE ADVANCE of the season and the general prevalence of good weather have the effect of stimulating business somewhat, and jobbers in many parts of the country, while not doing an especially heavy business, are fairly occupied. The demand, however, is not up to their expectations. Buyers are evidently pursuing the careful policy of purchasing only for early requirements, and the difficulty which is experienced in making collections and the condition of the money market tend to diminish the volume of business, making merchants very conservative in placing orders. Retail business throughout the country is, however, in good condition and an enormous amount of goods are going constantly into consumption. Stocks in retailers' hands, and also with some of the jobbers, are regarded as exceptionally light. There is little to note in regard to the tone of the market in the matter of prices. No improvement is noticeable and in some lines there are indications of weakness. Collections are somewhat better than they have been, but there is still a good deal of complaint in regard to them.

Advices from Chicago.—The Shelf Hardware trade is steadily improving. Orders are more numerous, and jobbers are again feeling in better spirits, although they are of the opinion now that they will not make up the trade they have lost and that there will be a poor year on the whole. The demand for seasonable goods is the special feature. Staple goods are not moving very freely. Builders' Hardware is only moderately active. Very little benefit has so far been felt from the opening of the World's Fair. Visitors are coming here from further West, as was expected, and they are calling to see the jobbing houses whose goods they may have handled for years without seeing any other than traveling representatives, but when they call it is for social purposes, and not to place orders to any extent. Prices are steady, except Wire Cloth, which has been put up to 2 cents all around, with very light stocks on hand. Collections are not improving, as farmers are reported to be too busy in the fields to pay merchants what they owe them. Heavy Hardware has done well this month, but the prospects for June are not bright, as manufacturing consumers report their trade falling off in consequence of the tightness of the money market.

Notes on Prices.

Cut Nails.—The Cut-Nail market is in an unsatisfactory condition as viewed from the manufacturers' standpoint. The demand is moderate and shows no sign of increase, and at the same time there has been a weakening in prices, which are now represented in the East by the quotation of $1.05 for carload lots at mill. Rumors are current also that this figure has been slightly shaded. Some concessions in price have also been made in the West, but in that section the market is regarded as in a better condition than in the East. Small lots from store in New York are held at $1.35 to $1.40.

Advices from Chicago.—Some activity was stirred up in the Steel Cut-Nail trade by the efforts of outside manufacturers to capture business here. Their inducements may have caused concessions to be made by local manufacturers when in direct competition, but on regular business the price of $1.25 on factory lots is maintained. Generally speaking, this branch of trade is rather quiet. Jobbers quote small lots from stock $1.35.

Wire Nails.—The condition of the Wire Nail market referred to in our last issue continues, with a further weakening in tone. The price is now fairly represented by the quotation of $1.45 for carload lots at mill, but intimations are made that this figure has been more or less freely shaded. The volume of business is fair but not heavy, a good many of the large buyers having still a stock of Nails purchased at former figures on hand.

Advices from Chicago.—Inquiries for Wire Nails have improved, and some buyers ask for prices on deliveries running into the fall months. Manufacturers are, however, not generally quoting for delivery after July 1, when they expect a general shut down. Some concerns are accumulating stock in anticipation of that event, so that they can supply their trade. Others, however, are trying to move their stocks, evidently preferring to have the cash in hand rather than in goods, for which there may or may not be a demand. Regular price on factory lots is still $1.50 Chicago. Jobbers report but a moderate demand at present, with small lots quoted at $1.65 to $1.70, with concessions to best buyers, while carloads are selling at $1.55.

Barb Wire.—Barb Wire continues to be quoted at $2.45 to $2.50 for Four-Point Galvanized in carload lots at mill. The demand is moderate but prices are in general regularly maintained. Small lots delivered in New York are quoted at $2.70 for Galvanized and $2.30 for Painted.

Advices from Chicago.—Barb Wire manufacturers report their business considerably better, going so far as to characterize it as satisfactory. Buyers seem to think that prices ought to be lowered, but so far have apparently made no impression on sellers, who continue to quote carload lots of Painted at $2.20, and Galvanized at $2.60. Small lots from stock are held at $2.30 and $2.70 respectively.

The Christy Knife Company.—The following is the price-list of the Christy Knife Company, Fremont, Ohio, terms, net 30 days, 1 per cent. discount 10 days:

	Per dozen.
Christy Knives (Bread, Cake and Paring. Set. No. 1)	$6.00
Christy Knives (Bread, Cake and Paring. Set No. 2)	6.00
Christy Table Knives (set of six Knives)	6.00
Christy Bread Knife	3.00
Christy Cake Knife	2.00
Christy Carving Knife	3.00
Christy Paring Knife	1.00
Christy Meat Saw	3.00

Mrs. Potts' Sad Irons.—As announced in our last issue, the Enterprise Mfg. Company, Philadelphia, have withdrawn their former list prices, terms, conditions, &c. on Mrs. Potts' Sad Irons. The following net prices of the goods are now announced:

No.	In lots of 25 dozen sets at one shipment.	In lots of less than 25 dozen sets.
50, per set	$0.78	$0.86
55, "	.73	.81
60, "	.90	.98
65, "	.82	.90
550, (containing No. 82, 90, and Set. No. 50 Irons)	2.35	2.50
555, (containing No. 87, 95 and Set No. 55, Irons)	2.20	2.35

Handles in lots of 25 dozen are sold at $1.30, and in lots of less than 25 dozen at $1.50. The lots of 25 dozen sets of Irons may be assorted, if desired, as follows: Nos. 50, 55, 60, 65 and outfits 550 or 555, each outfit (No. 550 or 555) counting as one set.

Rivets.—The American Screw Company, Providence, R. I., and Atlas Tack Corporation, 508 Sears Building, Boston, issue circulars giving revised quotations on second quality Rivets. The American Screw Company continue to quote their Norway Iron Rivets at discount 60 and 10 per cent., but name 70 per cent. discount on Bay State Rivets if ordered in quantities to warrant their manufacture. Similar quotations are announced by the Atlas Tack Corporation, as follows:

Norway Iron Rivets.

	Per cent.
Belt, with Burrs, Bettina brand, coppered, tinned or black	50 and 5
All other kinds and Burrs	60 and 10
Second Quality Rivets.	
If ordered in quantities to warrant their manufacture — Class B brand	70

Slaw and Kraut Cutters.—Tucker & Dorsey Mfg. Company, Indianapolis, Ind., are selling their Slaw Cutters at the following net prices:

	Per gross.
1 knife	$21
2 "	30

Kraut Cutters are sold at a discount of 40 per cent. from list.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, ton lots, ℔ lb.	@	$0.03½
Rubber Shoes, ton lots ℔ lb.	@	.04
Large Hose, ℔ ton	@	9.00
Wringer Rolls, ℔ lb.	@	.04½
Wringer Wire Rolls, ℔ lb. .01	@	.02
Syringes, ℔ lb.	@	.05

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags, ℔ lb	4¢
No. 2 White Rags, ℔ lb	3¢
Mixed Rags, ℔ lb	1¼ @ 1¾
Blues and 3ds, ℔ lb	1¾ @ 2
Hard Sized White Shavings, ℔ lb	2¾ @ 3 ¢
No. 1 White Book Shavings, ℔ lb	2¼ @ 2⅝¢
No. 2 White Book Shavings, ℔ lb	1½ @ 1¾¢
Light Book Shavings, ℔ lb	½ @ 1 ¢
No. 1 Mixed Shavings, ℔ lb	1¼¢
No. 2 Mixed Shavings, ℔ lb	¾ @ ⅞¢
No. 1 Printed Books, ℔ lb	1⅝ @ 1½¢
Ordinary Mixed Books, ℔ lb	¾ @ ⅞¢
Newspapers, ℔ lb	½¢
No. 1 Manila Paper, ℔ lb	1⅜ @ 1½¢
No. 2 Manila Paper, ℔ lb	⅞ @ 1 ¢
Bogus Paper, ℔ lb	⅝ @ ¾¢
Common Paper, ℔ lb	¾ @ ⅞¢
Straw Chips, ℔ lb	½ @ ⅝¢
Binders' Clippings, ℔ lb	½ @ ⅝¢
Jute Butts, ℔ lb	1½¢
No. 1 Jute Bagging, ℔ lb	1¼ @ 1⅝¢

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper, ℔ lb	9½¢
Light and Tinned Copper, ℔ lb	8½¢
Heavy Brass, ℔ lb	7¢
Light Brass, ℔ lb	6¢
Lead, ℔ lb	3½¢
Tea Lead, ℔ lb	3½¢
Zinc, ℔ lb	2¾¢
No. 1 Pewter, ℔ lb	14¢
No. 2 Pewter, ℔ lb	7¢
Wrought Scrap Iron, ℔ gross ton,	$13.00
Heavy Cast Scrap, ℔ gross ton,	9.00
Stove Plate Scrap, ℔ gross ton,	6.00
Burnt Iron, ℔ gross ton,	4.00
Mixed Bagging, ℔ lb	1 ¢
No. 2 Bagging, ℔ lb	¾¢
Hemp Twine, ℔ lb	2½¢
Manila Rope, ℔ lb	2¼¢
Jute Rope, ℔ lb	1¾ @ 2 ¢
Mixed Rope, ℔ lb	¾ @ ⅞¢

Trade Notes.

J. VAN WORMER & Co., Albany, N. Y., in an announcement elsewhere, direct attention to the Ideal Astral, which they describe as the leader in four hole ranges. It is referred to as of the very latest style of pattern, with fire box, oven, reservoir and ash pan all extra large. Various other particulars are given in the announcement.

THE RAYMOND & CAMPBELL MFG. COMPANY, Middletown, Pa., present an entertaining dialogue in their advertisement this week. It is a conversation between themselves and the universal trade, in which they make many interesting references to the Sun Steam and Hot-Water Boilers, and refer to an exhibit which they are to have at the convention of the Master Steam and Hot Water Fitters' Association, in the Revere House, Chicago, from June 5 to 10.

AMONG recently authorized corporations in Illinois are the following: The Continental Gas Company, at Chicago; capital stock, $10,000,000; for the manufacture of gas, oxygen, oxygen gas, electricity and any and all means or agencies for the furnishing, production or distribution of light, heat, power or fuel, for any and all purposes, in the city of Chicago or such other place or places in the State of Illinois, the United States, or any foreign country as the board of directors may elect; also, to deal in and operate the plants, property, good will, rights and franchises of other corporations organized for the same purpose, and to deal in patent rights; incorporators, Charles Springer, Ernest B. Stuart and Charles S. Corning. The Underwriters' Fire Sprinkler Company, at Chicago; capital stock, $100,000; for the manufacture of automatic sprinklers and appliances; incorporators, O. Pierce, A. H. Dwight and W. E. Dwight. The Champion Flue Scraper Company, at Peoria; capital stock, $7500; for manufacturing; incorporators, Fred. Gauger, Veitus Radspinner and Charles J. Miller. The Cass Electric Company, at Chicago; capital stock, $50,000; for the manufacture of electrical supplies; incorporators, Millard Cass, A. A. Ollendorf and Carl Landau. Columbian Railway Supply Company, at Chicago; capital stock, $10,000; for the manufacture of railway and steamship supplies; incorporators, Roswell H. Mason, George M. Trowbridge and William B. McIntyre. The Progress Novelty Mfg. Company, at Chicago; capital stock, $25,000; for the manufacture of store fixtures and novelties; incorporators, Henry T. Van Denbergh, J. E. Nelson and G. W. Van Denbergh. The Deforest Bicycle & Mfg. Company, at Chicago; capital stock, $200,000; for the manufacture of bicycles, vehicles and toys; incorporators, George H. Welton, A. F. Dreutzer and Charles G. Quelton. The Chicago Flax Packing Company, at Chicago; capital stock, $25,000; for the manufacture of packing and engineers' supplies; incorporators, Harry N. Anderson, Charles R. Holden and Alfred S. Austrian. The Kunzer Smoke Preventor Company, at Chicago; capital stock, $20,000; for the manufacture of smoke preventing and consuming devices and to conduct a machine shop and foundry; incorporators, Mr. Kunzer, Louis J. Hammel and Geo. W. Warvelle.

THE PLUMBING TRADE will be interested in the announcement of the L. Wolff Mfg. Company, Chicago, who present illustrations of Doherty Self-Closing Work. The Western branch of the company is at Denver, Col.

THE CINCINNATI TIN PLATING COMPANY, organized to do a general manufacturing business in metals, tinning, galvanizing and japanning, have been incorporated by Daniel Schoonmaker, Geo. Morris, Jesse W. Kittering, S. M. Blackburn and Howard Douglass, with capital stock $10,000.

A DESIRABLE NOVELTY IN ADVERTISING is shown in the half-page announcement of the E. J. Manville Machine Company in this issue. It is a cut of a Wire-Forming Machine, surrounded by a large variety of formed Wire, showing some of the sizes and shapes the machine will turn out automatically.

THE MOORHEAD-MCCLEANE COMPANY, Pittsburgh, have shut down their Plate mill for repairs. The demand for their Galvanized Iron is said to be greater than at any time in the firm's history. Any accumulation of stock is found to be impossible at present.

MATTHAI, INGRAM & Co., New York office 42 Cliff street, have about finished refitting and arranging their new quarters recently occupied. They now have a large and attractive display room, well lighted and ventilated, and sufficient space to properly sample their large line of plain and decorated, stamped and pieced Tin and Iron Ware, and kindred goods. The walls have been painted, ceiling tinted, and the entire floor laid with linoleum. In front a space has been railed off for desk, safe, and for office purposes. The two upper lofts allow of a sufficient quantity of stock being carried to meet any demands likely to be made on it, and the situation being right in the heart of business in their line, they are likely to be much benefited by the change. We

are informed the ravages made by the recent fire in Baltimore have about been made good, a prompt adjustment and settlement of insurance having greatly facilitated matters.

MERCHANT & Co., Philadelphia, Pa., make an interesting announcement this week respecting their Spanish Tile, the general appearance of which is shown in the illustrations and its merits referred to in the descriptive text that accompanies the cuts.

IN THE ADVERTISEMENT of the Knox & Stonier Architectural Sheet Metal Ornament Company, Toulon, Ill., attention is directed to Architectural Sheet Metal Ornaments and Statuary of their manufacture. They make a varied line of articles of this sort, and invite the trade to send for catalogue and prices.

N. A. HALDEMAN & Co. of Philadelphia have just issued a 40 page catalogue of their steel and iron roofing. In an address to patrons found on the third page it is remarked that the catalogue is the sixteenth of their annual issues. Attention is also directed to the fact that their removal to the large and commodious building on North Second street was necessitated by the requirements of their business. The contents of the other pages cover the Bessemer steel roofing (N. A. Haldeman's patent), iron roofing, metallic cement, V crimp roofing, corrugated sheets, corrugated elevator sheets, curved corrugated iron, corrugated siding, beaded siding and ceiling, sheet-metal weather board, ridge, corner and hip capping, metallic paints, tarred felts, sheathing papers and Bostwick fire-proof steel lath. There is a good deal of practical information concerning the application of roofing materials to be found in the catalogue, and it will doubtless prove very acceptable to the trade.

SEALED PROPOSALS will be received at the office of the Village Clerk, Gordon, Neb., until June 15, for Pumping Machinery, Boiler and connections; also for open or driven wells of 500,000 gallons capacity, together with Pipes, Hydrants, Valves, Valve Boxes, &c.

NIAGARA STAMPING & TOOL COMPANY, Buffalo, N. Y., are sending invitations to the trade inviting them to inspect their exhibit of Machines and Tools for sheet-metal workers at the World's Fair. The exhibit is located at Machinery Hall annex, Section 28. The company issue an 1893 edition of their Tinners' catalogue of 56 pages, containing illustrations, descriptions and prices of Tools and Machines for working sheet metal. In compiling this catalogue it has been the aim to present the line of Machinery in a compact form, the various machines having been associated so as to facilitate the comparison one with another of Tools of similar nature.

AMONG newly authorized corporations in Illinois are the following: Quincy Steel Range Company, at Quincy; capital stock, $10,000; for manufacturing; incorporators, Lemuel C. Ross, Edward J. Drake and Adam H. Govert. The Dearborn Refining Company, at Chicago; capital stock, $30,000; for a general metallurgical business; incorporators, J. R. Dickinson, W. D. Millard and H. P. Smith. Sloss-Stein Electric Company, at Chicago; capital stock, $50,000; for manufacturing; incorporators, Sydney Stein, Aaron M. Sloss and Louis Stein. The Edwin S. Jackman Company, at Chicago; capital stock, $50,000; for the manufacture of railroad supplies; incorporators, Edwin S. Jackman, Albert W. Barnum and Henry C. Latsh. The Noteman Gas Generator Company, Chicago; capital stock, $100,000; incorporators, A. Noteman, Will R. Burritt and Day O. Crane. Silberhorn Refrigerator Car Company, Chicago; capital stock, $100,000; incorporators, William H. Silberhorn, John J. Silberhorn and Frank O. Weeks. Polo Electric Light Union, Polo; capital stock, $12,000; incorporators, Morton D. Swift, Horatio Wales and Daniel W. Beard.

FROM SEYMOUR & WHITLOCK, 48 Lawrence street, Newark, N. J., is received a red-covered catalogue of 64 pages of Seymour's Patent Rotary Ventilating Fans and Appendages. First comes an enumeration of their many uses, then a list of their patents. There are over 60,000 of these devices now distributed over Canada, Mexico, Central and South America. Cuts follow, showing Columnar and Ceiling Fans, as used in stores, restaurants, hotels and residences, run by belts from a power shaft. A man-power attachment is shown, to run six or eight fans for use where power is not obtainable, and another hand power for running a fan in a chamber. Next are some of the parts—idlers, pulleys, hangers, &c., and the price-list, with some instructions, and a list of the necessary particulars that should be sent with an order. There is a cut of Seymour's Patent Exhaust Fan, with a request to send for special catalogue for full particulars. Among the motors shown are the Parabolic Water Motor, the Whitlock Independent Vertical Engine, the Automatic High Speed Safety Engine, the Independent Engine, using oil for fuel, and an Electric Motor, which is shown in different sizes, and a resistance box. The last pages show an Electric Ceiling Fan, with description pointing out its special advantages over past construction.

The following table, published by the *American Manufacturer*, shows the exports of British tin plate to the United States for each month in the past five years. The figures given represent tons of 2240 pounds:

	1893.	1892.	1891.	1890.	1889.
January..	23,498	17,554	32,018	23,633	28,471
February..	20,199	22,268	28,253	18,334	27,859
March. ..	31,334	22,789	38,638	17,245	30,936
April	31,561	31,961	45,308	23,373	31,017
May..		23,799	55,569	25,019	31,929
June		28,350	67,330	30,703	29,270
July.....		24,750	4,323	37,011	24,71-
August		24,221	5,629	25,519	26,756
September		22,335	11 139	25.557	28,888
October...		14,901	12,461	30,955	25,047
November		20,054	14,831	28,590	30,415
December		23,417	13,5-6	25,709	21,755
Totals..		276.479	325,145	31-,106	336,052

The machinists and most of the other labor unions in Boston are endeavoring to introduce a nine hour day, June 5.

Canadian railway companies appear to be of the opinion that matrimony is a good thing. A Dominion journal states, as a fact not generally known, that when a settler in the northwest territories want to go back to Ontario to get married the Canadian Pacific Railway sells him a matrimonial ticket at the usual rate, and on presenting the return coupon and a marriage certificate he is entitled to free transportation for his bride.

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Metal and Miscellaneous Prices.

See Standard Lists on Following Pages

CHICAGO, JUNE 1, 1893.

Tin—

Straits pigs.....21½¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

	Per box.
IC, 10 x 14	@ $6.75
IC, 12 x 12	@ 6.75
IC, 14 x 20	@ 6.75
IC, 20 x 28	@ 13.50
IX, 10 x 14	@ 8.75
IX, 12 x 12	@ 8.75
IX, 14 x 20	@ 8.75
IX, 20 x 28	@ 17.50
DC, 12½ x 17	@ 8.50
DX, 12½ x 17	@ 6.50
IC, 12 x 12	@ 6.50
IC, 14 x 20	@ 6.50
IC, 20 x 28	@ 13.00
IX, 14 x 20	@ 8.00
IX, 20 x 28	@ 16.00

Calland and Melyn Grade

Alaway Grade, "

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14.14x20	@$6.00
IC, 14x20.90 ℔	@ 5.75
IC, 14x20,100 ℔	@ 5.85
10 x 20	@ 9.00
20 x 28	@12.00
X, 10x14, 14 x 20	@ 7.50
Grade. IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Hansel and Dean Grades.—	
IC. 14 x 20	@ $5.62½
20 x 28	@ 11.25
IX. 20 x 28	@ 14.25

Worcester Brand and equal.—

IC, 14 x 20.. 6.12½	@ .....
IC, 20 x 28..12.25	@ .....
IX, 14 x 20.. 7.62½	@ .....
20 x 28..15.25	@ .....

American Tin Plates.

Charcoal Plates.—Bright.

Ivondale, A. A.—IC, 14 x 20	$7.00
" " IX, 14 x 20	9.00
" " IXX, 14 x 20	11.00
" " IC, 20 x 28	14.00
" " IX, 20 x 28	18.00
" " IXX, 20 x 28	24 00

Florence.—

IC, 10 x 14, 12 x 12, 14 x 20	$8.75
IX, 10 x 14, 12 x 12, 14 x 20	8.75

Palma.—

IC, 10 x 14, 12 x 12, 14 x 20	$7.50
IX, 10 x 14, 12 x 12, 14 x 20	9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, Tissue Packed, IC, 14 x 20	$9.25
Royal, extra, IC, 14 x 20	7.75
Merlon, IC, 14 x 20	6.50
Almond, IC, 14 x 20	6.25
Mint, IC, 14 x 20	

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
IC, 20 x 28	12.50

Roofing Plates.

Arch (205 ℔), 20 x 28	@$12.00
Palm (205 ℔), 20 x 28	@ 12.25
Crescent, IC, 20 x 28	@ 12.50
Crescent, IX, 20 x 28	@ 15.75
Empire, IC, 20 x 28	@12 75
" IX, 20 x 28	@16.00
Hickory, IC, 20 x 28	@ 15.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20x28	@14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.00
" IX, 20 x 28	18.25
Merchant's Roofing (extra coated), IC, 20 x 28	@17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	$23.60
Irondale A:	
IC, 14 x 20	$6.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Westmoreland:	
IC, 14 x 20	$8.25
IC, 20 x 28	12.50
Juno:	
IC, 14 x 20	$5.75
IC, 20 x 28	11.50
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20	$9.50
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20	11.00
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28	19.00
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28	22.00
Neville, Stamped, IC, 14 x 20	6.25
" " IX, 14 x 20	7.50
" " IC, 20 x 28	12.50
" " IX, 20 x 28	15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	13.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.50
" IC, 20 x 28	13.00
Kuoxall, IC, 14 x 20	6.25
" IC, 20 x 28	12.50
Globe, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
Miami, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
" IX, 20 x 28	15.00
" (Redipped), IC, 20 x 28	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	10.50	17.50
X, 11 x 56	29.50	16.50
XX, 14 x 56	32.50	18.20
X, 14 x 60	31.50	17.65
XX, 14 x 60	35.50	20.90

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 16	℔ ⅁ 2 7-10¢	3 3-10¢
17 to 20	℔ ⅁ 2 8-10¢	3 4-10¢
21 to 24	℔ ⅁ 2 9-10¢	3 5-10¢
25 and 26	℔ ⅁ 3¢	3 6-10¢
27	℔ ⅁ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ ⅁ A, 10½¢; B, 9½¢ dis. 5%

Galvanized.

List on following page.
Juniata or first quality.....dis. 70&2½%

Copper—

Ingot.

Lake.....12¢ @ 12½¢
Casting Brands.....11¢ @ 11½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 ℔.
Above 5-16 inch to 3 inch inclu....35¢
Plain, above 3 inch.....45¢
Plain, 5-16 inch.....60¢
Plain, ¼ inch.....$1.00
Plain, 3-16 inch.....$1.50
Fancy Tubing, Brass, to No. 20
Bronze Tubing, 3¢ ℔ more than Brass.

Roll and Sheet Brass.

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 ℔ casks.....6¼¢
Less than Casks, ℔.....6½¢

Lead—

Soft Pig Lead.....4½¢
Bar.....4.60¢@5¢
Sheet.....5½¢, dis. 10%
Block Tin Pipe.....6¢, dis. 10%

Solder—

½@½.....13¼¢@13⅞¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....12½¢@13½¢
Hallett's.....11½¢@12½¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain	60&10%
1¼ and under, Galv	53½&10%
1½ and over, Plain	70&10%
1½ and over, Galv	60&10%

Boiler Tubes, list Oct. 24, 1892...65@67½%
Casing, list Nov. 16, 1892.....52½%
Inserted Joint Casing, list Nov. 16, 1892.....47½%
Steel Boiler Tubes.....27½%
Cold Drawn Seamless Steel Tubing...50%

Cast-Iron Soil Pipe—

Cast-Iron Soil Pipe, Tarred; sizes 2 to 6 inches inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted.....55%
Austin's Corrugated.....60%
Gordon & Gilbert's Corrugated.....55%
Ritchie's (Galv. Iron only) Cor'd.....55%
Ritchie's Spiral Lock Seam, Galv'd.....50%
Austin's Spiral Ribbed Pipe.....55%
Plain Adjustable Elbows.....55%
James A. Miller Bros. (Galv'd Iron only) Corrugated.....55%

Furnace Fittings—

Discount from Excelsior Steel Furnace Co.'s list.....50%

Steel Roofing—

Perfection.....$3.75 square
Climax.....$3.50 square
The Lloyd Spanish Tiling.....$4.50 square

Metallic Shingles

Cushman's.....$1.25 square

Merchant & Co.'s Spanish Tiles:

Copper, 14 oz	$30.00 square
Steel, painted	$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	℔ ⅁ 2 ¢
" " Brown	℔ ⅁ 1¾¢
" " Purple	℔ ⅁ 2¾¢
" " Ground in Oil, B. Red	℔ ⅁ 6½¢
" " Ground in oil, Red	℔ ⅁ 6½¢
" " Ground in Oil, Brown	℔ ⅁ 6½¢
" " Ground in Oil, Purple	℔ ⅁ 6 ¢
Linseed Oil, Boiled, in bbls	53¢
Linseed Oil, Raw, in bbls	50¢
Mineral Paints	1@4¢
Orange Mineral	10¾¢
Paris White Lead in Oil	6¾@7¼¢
Dry White Lead in bbls	6¾@6¾¢
Red Lead, American	7@7½¢
Red Venetian, English, dry	$1.05@$1.70
Red Venetian in oil; asst'd cans, 8½ ℔ kegs	7½¢
Sipe's Japan Oil, in bbls, ℔ gal	34¢
Spirits Turpentine, in bbls., ℔ gal	34½¢
Asphaltum, Trinidad Refined, ℔ ton	$43
Tarred Felt, 1 Ply, ℔ 100 ℔	$1.65
Tarred Felt, 2 Ply, ℔ roll 108 sq. feet	$1.50
Tarred Felt, 3 Ply, ℔ roll of 108 sq. feet	$2.00
Roofing Pitch, ℔ bbl. of 300 ℔	$3.20

NEW YORK, JUNE 2, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots, ℔ ⅁, $0.75
No. 1 (guaranteed to be 98 ⅞ pure and over), in ton lots ..... ℔ ⅁ .90
Less than 1 ton, 10¢ ℔ ⅁ additional.

Antimony—

Cookson ..... ℔ ⅁, 11½¢
Hallett's..... ℔ ⅁, 10¾@11¢

Brass—

Planished ..... net
Roll and Sheet ..... 35@40%

Brass and Copper Tubes
Brazed Brass Tubing—

List May 20, 1889. Per ℔.

Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above 3 inch	45
Plain, 5-16 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu	43

35&40%

Copper and Bronze Tubing—

3¢ ℔ ⅁ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¼ to 3½ inches inclusive....17¢ ℔ ⅁
Over 3½ to 5 inches inclusive....18¢ ℔ ⅁

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ ⅁
Over 3½ to 5 inches inclusive....19¢ ℔ ⅁

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $2.50 per doz.....10&10%

Conductors—

Corrugated. *Round or Square—*

Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—

Galvanized.....50%

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.....15@25%

Ingot.

Lake.....12¢
Anaconda Grade Arizona.....11¾¢
Ansonia Grade Casting.....11¢

Planished.....net

Sheet and Bolt.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering*, in Current Hardware Prices.

Damper Clips Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

Lap or Slip Joint.....list, net

Elbows—
Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four Piece—				
4½	5	6	7 inch,	
$0.78	.87	.90	1.20 per doz.	20%

Elbows and Shoes—
Flat Crimp.

Tin.....35%
Galvanized.....35%

Corruxated.
Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—

Black.

	Common American.	R. G. Cleaned American.
Nos. 10 to 16	℔ ⅁, 2¾@...	3¼¢
Nos. 17 to 20	℔ ⅁, 3 @...	3¼¢
Nos. 21 to 24	℔ ⅁, 3¼@...	3¾¢
Nos. 25 and 26	℔ ⅁, 3⅜@...	3¾¢
No. 27	℔ ⅁, 3½@...	3¾¢
No. 28	℔ ⅁, 3⅝@...	3¾¢
American B. B.	℔ ⅁, 4@4½¢	

Russia, Planished, &c.

Genuine Russia, assorted..... ℔ ⅁, 12@13¢
Patent Planished....℔ ⅁, A, 10¢; B, 9¢, 5%
Craig Polished Sheet..... ℔ ⅁, 8½¢

Galvanized.

	B. B.
Nos. 10 to 16	℔ ⅁, 4¢
Nos. 17 to 22	℔ ⅁, 4½¢
Nos. 23 to 24	℔ ⅁, 4¾¢
Nos. 25 to 26	℔ ⅁, 5¢
No. 27	℔ ⅁, 5¼¢
No. 28	℔ ⅁, 6¼¢
Nos. 29 and 30	

Filter Joints—

Lee's.....33⅓%

Lead—

American Pig.....4¾¢
Bar.....4¾¢

New York Prices.

Pipe.....6½¢, 20%
Tin Lined Pipe.....7½¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¾¢ ℔ ⅁.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ ⅁, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ⅁, .05¢, 10&5%

Metal, Expanded—
Manufacturers' list No. 5.

Lathing	10¢
Fencing, Painted Sheets	20¢
Netting, Painted Sheets	20¢
Door Mats, Galvanized	25¢
Window Guards, Panelled	15¢
Tree Guards, Panelled	15¢

Mitres Eave-Trough—See *Eave-Trough Mitres.*

Paints Oils &c.—

Lead, Amn. White, Dry or in oil:

Kegs, lots less than 500 ℔	7 @ 7¼
Kegs, lots 500 ℔ to 5 tons	6¾ @ 6¾
Kegs, lots 5 tons to 12 tons	6¾ @ 6¾
Kegs, lots 12 tons and over	6¾ @ 6¾
Lead, White, in oil, 25 ℔ tin pails, add to keg price	... @ ¼
Lead, White, in oil, 12½ ℔ tin pails, add to keg price	... @ 1
Lead, Red, bbls. and ½ bbls	6 @ 7
Lead, Red, kegs	6¼ @ 7¼
Ochre, American	½ @ 1¾
Red, Venetian, American	℔ 100 lb...1.00 @ 1.10

Linseed Oil:

City, raw, ℔ gal	.@ .50
City, boiled	.@ .53
Western, raw	.@ .50

Spirits Turpentine:

In regular bbls	31¼ @ .31¾
In machine bbls	31¾ @ .32

Putty:

In barrels and ½ bbls	.01¾ @ .01¾
In tubs	.01⅝ @ .01¾
In tin cans	.01¾ @ .02¼
In bladders	.01¾ @ .02¾

Roofing Material, &c.:

Asphaltum, Trinidad Refined, ℔ ton	$30.00@$35.00
Asphaltum, Rock, ℔ ton	$14.00
Coal Tar Felt, 1 Ply, ℔	2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft	$1.85
Roofing Pitch, ℔ bbl	$2.24

Pipe, Drain 50%

Pipe and Fittings, Cast Iron Soil—

Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 Inches, inclusive.....60@60&10%
Other sizes.....55@55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 Inches.....60@60&10%
Other sizes.....55@55&10%

Pipe, Spiral—

Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

For discounts see Current Hardware Prices.

Rivets and Burrs—

For discounts see Current Hardware Prices.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, June 10, 1893.

DAVID WILLIAMS, - PUBLISHER

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CINCINNATI..... Rooms 22-24 Pickering Building.
ST. LOUIS .....Bank of Commerce Building.
CLEVELAND.....312 The Cuyahoga.

BRITISH AGENCY: The Ironmonger, 42 Cannon street, London, England.

Ventilation of Basements and Cellars.

In all our large cities many basements and cellars are occupied as shops and stores, or as saloons of some sort, and the ventilation in them is proverbially bad. When a basement is entirely above ground, and has an ample cellar below it, it presents no greater difficulty in the matter of ventilation than rooms situated higher up in the building; but when, as is very often the case it is about half way under ground, or is substantially or actually a cellar, perhaps extending out under the sidewalk from 14 to 16 feet, and has no means of admitting daylight except through thick glass set in iron frames in the sidewalk itself, ventilation becomes extremely difficult in many cases, especially if there be not an ample subcellar below. A plan by which a cellar may be thoroughly ventilated has recently been worked out by a heating engineer in a neighboring city. The design was made for a billiard saloon in a large cellar situated beneath a restaurant. In this scheme air is taken in through areas in the rear of the cellar, and is to be forced through galvanized iron ducts extending entirely around the bottom of the basement room under the row of chairs provided for spectators, which are ranged around the apartment. The lower part of this duct—that is to say, that part which lies on the floor of the basement—is provided with openings that deliver the air forced in through corresponding openings through the floor into the cellar below, where, in winter, it is moderately warmed by passing it through box coils, whence it passes through distributing ducts arranged under the floor to numerous registers, also arranged around the room, and opening just above the platform for chairs that entirely conceals the main duct. The plenum is obtained by the use of a blower driven by a gas engine placed in the cellar below: but this may possibly be supplanted by an electric engine, when the installment is erected.

A Dull Tin-Plate Market.

"Flat, stale and uprofitable," describes the existing condition of the tin-plate market. For weeks and months dealers have been hoping against hope for the advent of a change for the better, and earlier in the year it was expected that, with the advance of the season, which was an unusually backward one, trade would brighten up. The result has been entirely disappointing, and it is unfortunately the case that except for a limited demand for ternes—which the domestic output is amply sufficient to meet—the general market for tin plates is now about as dull as it can well be, although many good judges believe it will be still worse before it becomes better. The reason is not far to seek. It is the same cause which has produced the general depression in business—an unsettled financial condition, with uncertainty as to future currency and tariff legislation. Money is tight, and although there is no lack of it, or of inclination to do business, there is a hesitancy in investment until it is known what September will bring forth. Advices from the other side describe similar depression in the Welsh trade. Although the tin-plate works are fairly well employed, the demand for all kinds of tin and terne is reported to have fallen off, and prices are lower than ever. The only business being done is of a "hand-to-mouth" description. Orders from the United States, which constitute the large bulk of the trade, are light and seem likely to continue so for some time. It is, therefore, improbable that the shipments of the next four months will come up to the average of those in the first four months of the year. Stocks in the warehouses at shipping ports are nearly double the amounts carried at this season of last year; and although the outlook for Welsh material is said over there to be hopeful, that view is not shared by importers on this side, who are perhaps even better able to judge.

Situation of Domestic Plates.

Meanwhile, in the United States, although there is a moderate running demand for roofing ternes throughout the country, and particularly for those of domestic make, the sanguine expectations entertained earlier in the year have not been realized to any satisfactory extent, mainly owing to the abandonment or postponement of proposed building operations in various quarters, incidental to the present financial uncertainty. A good deal of business was done earlier in coke brights for canners' uses, but canners generally are now well supplied; and, having placed their orders some weeks ago for June, July and August deliveries, few requests for spot supplies come now from this class of consumers. Other users of bright plates are buying only in small quantities to supply current needs, and dealers are not anxious to make sales at the present low prices, except on cash orders. The prospect of a possibility of tariff changes in the fall disinclines buyers to carry any unnecessary stocks of plates. Stocks throughout the country are very light, and, for similar reasons to the above, importers are sending over very small orders for Welsh plates. On the other hand, nearly all of the domestic works are reported as quite busy and piling up little or no stock, so that there must be some demand for American plates, although they are probably being sold on a narrow margin of profit. Prices are low and inclined to weaken still further in both the domestic and foreign article.

Uneasiness Among Stove Molders.

The prospect of a stove molders' strike is now looming up as another disturbing element in industrial circles. Protracted conferences have been held between representatives of the manufacturers and the workmen, covering a period of several months. The gravity of the situation is shown by the consideration of this question at two general meetings of the stove manufacturers, both held in Chicago, one in March and the other last week. At both of these meetings the sentiment of manufacturers was practically unanimous against granting an advance. The recent meeting was marked by a very unusual occurrence, not only in the stove trade but in any branch of industry. The General Executive Committee of the Iron Molders' Union of North America had been invited to attend and to state their case to the assembled manufacturers. They did so in a series of speeches which won hearty tributes to their ability from the manufacturers, who were, however, not to be convinced by mere eloquence against the dictates of prudence and commercial sagacity. While the molders had originally made a demand for an advance of 15 per cent., it developed that they were not determined to adhere tenaciously to this rate, but would have been willing to accept 10 per cent. They argued that the past two or three years had been very good years for the stove trade: that business had been unsually active and presumably prosperous, but that the molders had received no share of the prosperity save regular employment, while, especially in the West, the cost of living had advanced, thus really reducing their net earnings.

The Manufacturers' Position.

The answer of the manufacturers to the plea of the workmen was precisely what might have been expected in the present condition of general business. With banks failing, money growing scarce, collections hard to make, and other indications of trouble in the business world, they could but reply that an advance in wages was out of the question. Molders' wages are not low, taking a general view of the labor field, and the men should be well satisfied that no attempt is being made to reduce them. It was conceded by the molders that an advance in wages could not be made without a corresponding advance in the selling price of stoves. Animated by the usual confidence of non-business men, they asserted very cheeringly that this was an easy matter to do if all the manufacturers stood together. They lost sight of the fact that an attempt to advance stove prices would be deeply resented by merchants and consumers at a time when all other goods are becoming cheaper. As wheat is now selling at a lower rate than for over 30 years, farmers could not be asked to pay more for stoves.

No Time to Increase Wages.

With the hopefulness abounding in the breasts of those who are always sure of their wages at the end of the week, the molders refuse to attach much importance to the unsettled financial conditions of the country. They have no notes falling due which must be paid or otherwise taken care of, they have no heavy bills for material and little cash in sight to meet them, they have no employees expecting their regular pay on Saturday night, and they spend no anxious moments waiting to hear from shaky customers who must be carried a little longer. And yet some of them are in a position to know how difficult it is to raise money for enterprises which in ordinary times readily command capital. A molder of great prominence and influence in the trade can be cited who has but recently had an experience of this kind. It is claimed, however, that the rank and file and not the leaders are clamorous for an advance in wages, and that they will not listen to further excuses, but will insist upon fighting out the issue according to the usages of organized labor if their wishes are wholly ignored. This may be strictly true, but on the other hand there is some ground for the belief that the persistent effort of the molders to secure an advance in wages, notwithstanding repeated refusals by the manufacturers, is to head off any movement in the direction of a reduction. If there ever was a juncture in business affairs when it seemed necessary to prune costs in every direction and prepare for hard times it is with us now, and the molders know it. The agitation for an advance was begun when times were good, and may now be continued for defense when times are bad.

Prospects of a Strike.

As the second great assemblage of the stove trade has again emphatically pronounced against an advance in molders' wages, the relations of the manufacturers and their employees are now strained. The representatives of the union may have a lingering hope of a concession to be obtained in some way which will appease their followers, but the outlook is now very much in favor of a strike in the union stove foundries. How far such a strike may affect mixed and non-union foundries it is, of course, difficult to tell. The probabilities are that in most of these there will also be a strike. It was the case with the machinery and jobbing foundries in Chicago this spring. Union and non-union molders then acted together, and they will probably do so in the stove foundries. The stove manufacturers appear to be quite unconcerned over the prospect of a strike. In fact, the opinion is freely expressed among them that the stove trade this year would be benefited and not injured if all the foundries were to be shut down for 60 days or more. Some of the manufacturers may not have as much stock made up as they would like to see in their warehouses at this time of the year, but arrangements could doubtless be made by which regular trade would be provided for. The molders are deplorably deceiving themselves if they think that the manufacturers will weaken merely because this is usually the time of the year when they push work in the stove foundries to their utmost capacity.

Ways and Means of the Fair.

An innocent in Chicago sends us this letter:

If never another stroke was done to complete the exhibits which have been delayed, a good pair of glasses could be worn out in looking at all there is to be seen. The Midway Plaisance is like the pie to a dinner, an indispensable treat, but unless treated with prudence is likely to prove costly. On this avenue are transplanted enough of the natives of different countries for them to live exactly as they do at home, enabling a visitor to see why they do not use tin roofs in China and enameled bathtubs in Turkey, or sad irons in Africa, or washing machines in Hungary. If your curiosity is not too deep your quarters and halves have no need to be spent to see the many little shows all along this place. A good idea of the location of the various buildings can be secured by getting a 10-cent Rand & McNally map of the city and grounds. A 10-cent ride on the "Intramural" (don't be alarmed, the name is rather "too too," but it simply means that an electric elevated railway runs around inside of the grounds) will enable you to locate everything as it is on the map and only takes a short time. Another way to get this same information, though not so completely, is to take a 25-cent trip on one of the electric launches on the lagoon, and skim around by the buildings, between the ducks, swans and geese, and past the more lazy and luxurious gondoliers, under the bridges and arches, making a pleasant as well as profitable trip. Everybody will visit their own State building, but do not put it off until Sunday, for Sunday is traveling slowly, having not yet quite reached here, consequently the 26 States east of Chicago close their houses, while the 18 States west of it show at least a Christian hospitality. Uncle Sam has his building closed, too, but the main show is open and the band plays, though some exhibits are covered. If you get tired a chap will roll you around in a wheel chair for 75 cents an hour, or a pair of swarthy Turks, wearing condemned army Zouave breeches, will carry you about in a sedan chair for the best bargain you can drive, or about the same as a wheel chair.

An official guide book, in a dark red cover, costs a quarter, and may be of use to find some special thing, but the guards are very civil and generous in giving information, even if they are required to wear a strap to their caps, which must torment them by tickling their chins needlessly. Now that you have got your bearings, you start out to what interests you most, but do not forget the art galleries, for the most of us study art in money-making only and a sprinkling of another sort will not be amiss. The Manufactures and Liberal Arts Building is the biggest, and between it and Agriculture, Mines, Machinery and Electricity you will discriminate to suit your taste, if you are not going to stay and do all of them.

When you get hungry the Catering Company will fix you up with roast beef for a half dollar, but if you want to buy a sample of their entire stock it will cost you—a trifle more. Good drinking water is found all around the grounds, with sometimes an American tin cup and sometimes with one of enameled ware fastened to a chain, as they are not souvenirs. This fixes you up to do the inside properly at a figure to suit yourself, but on the outside, if the man from the windy West can get away with the calculating "wall I want to know" man from the East, they will have to settle the difference. It is enough to say that if you are willing to put up with a Western lack of luxury that is not exactly agreeable to the fastidious East, you will not have to spend all you have saved up in a life time to pay your board and lodging. There are some hotels here which are doing business just the same as if Columbus had never been born; no, not just that, but surely the same as if he had not been rediscovered and set up in Lake Front Park.

Come out and see the fair, it is worth all it costs, but just recollect that they burn soft coal here and the air is full of soot, so that if you wear a shirt a week it will look as well as the fellow's who put his on in the morning. Do not forget that and dress accordingly, for if you get your wedding suit ruined by a coat of black soot you may have to stay at home for the want of something stylish when your wife goes to a church sociable.

The proposed East River bridge will probably cost between $25,000,000 and $30,000,000, according to the testimony given before the Commissioners by George B. Cornell, the engineer of the company.

A model workshop for the manual training school at Brookline, Mass., is about to be erected at a cost of $30,000. The building will be 150 x 170 feet in size, modeled after an old English schoolhouse and be equipped with a 15-horse motor, foundry, forge room, machine tool room and lathes.

THE LETTER BOX.

Warming a Church.

From C. F. S., *Louisville, Ky.*—In *The Metal Worker* of April 15, page 40, I notice a diagram showing the furnace and connecting pipes of a church job. It is a difficult matter to determine the trouble in such cases without a personal examination of the faulty jobs, as sometimes adjacent buildings or fences prevent a free flow of air into the cold-air opening. It is supposed the furnace is of sufficient capacity to heat the building under favorable circumstances, has a pit under the furnace of not less than 15 inches in depth, the hot-air pipes have an elevation of at least 1 foot in 10 and the opening of cold-air duct is either on north or west side of building. After a careful examination of the diagram and the remarks regarding it, the following is offered as a solution of the difficulty. It will be necessary to place the opening of the cold-air box forward until a proper exposure from the north or west is obtained. The conflicting of cold-air currents is avoided, the action from inside and outside being positive, as the currents are controlled by dampers placed at the month of the air-supply box and near the point where the exhaust boxes connect with it. The hot-air pipes leading from furnace to registers in the corners of the building should be covered with asbestos paper. The two 12-inch cold-air boxes from the front and rear of the church should enter the sides of the cold-air duct underground and connect with an elbow inside of the air-supply box, with the opening toward the furnace. A better way of heating the church would have been to use two 20-inch pipes and 20 x 20 register faces with borders, taking the cold air from the church from the side aisles.

Protecting Stove Pipes.

From E. F. B, *Greenville, Pa.*—If your correspondent "A. H.," Shelbyville, Ind., whose letter appears in *The Metal Worker* of April 1, and also your correspondent "C. H. H.," Valparaiso, Neb., whose communication was presented in the issue for April 22, will cover their smoke pipe and smoke stack with a good coat of asphaltum varnish, inside, before putting them up, they will find that they will last much longer.

Air Chamber on Force Pump.

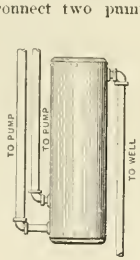
From I. R., *Norwich, N. Y.*—What is the advantage or object of using an air chamber in connection with a force pump?

Answer.—In a common force pump, or one that is not provided with an air chamber, the liquid is discharged at each stroke of the piston, the result being that at each stroke the pipes, valves and other parts are liable to receive a sudden shock. The air chamber, which usually consists of a dome-shaped vessel, is placed in the discharge pipe near the pump. In case the discharge pipe has a small opening, or there is some resistance to the flow of water, as in filling a steam boiler, the entrance of water into the chamber will cause the air to be compressed, which thus exerts a continuous pressure upon the surface of the water. Providing the supply of water is sufficient to maintain this pressure, the air by its alternate expansion and contraction secures a steady flow of liquid through the discharge pipe.

Charging Chamber for Pumps.

From S. G. E., *Fremont.*—Can you tell me if I can connect several pumps with the same supply pipe and have them all work properly, and, if it can be done, how to do it? I remember seeing a similar question and the answer in *The Metal Worker* some time in 1890, where by the use of a charging chamber a number of pumps could be used on one supply pipe. Who makes such a chamber, and where can I get one?

Answer.—In *The Metal Worker* of May 31, 1890, a correspondent asked how to connect two pumps on one



Charging Chamber for Pumps.

pipe, one pump being in the basement and the other on the floor above. The answer suggested that a Y-branch be made on the main pipe, to run off a short distance before connecting with the lower pump, letting the main pipe run to the other pump, and it was stated that if the valves were perfectly tight the pumps would work all right and independently. If, however, when pumping on the first floor an air leak existed in the basement pump the operation would fail, and as it is not probable that the valves would always continue tight, the use of a stop cock was advised in both the branch and main. A sketch, as shown, appeared June 21, 1890, from a correspondent, "S. R.," Philadelphia, who stated that two or a dozen pumps could be attached to one supply pipe by the use of such a charging chamber. The successful operation of the pumps connected with it, however, would depend entirely on the absolute and continued tightness of their valves. Opinions vary as to the advisability of its use and the saving effected. The chamber could be easily made by a tinner of galvanized iron sufficiently thick to prevent collapse under the action of the pump. A depth of two to four times its diameter is desirable. The supply pipe should be provided with a check valve at the bottom, and connect with the chamber at the highest point on the side. The pipes to supply the pump should connect with the chamber on the side at the bottom and be located an equal distance apart. As a precaution against the charging chamber making trouble by becoming empty from any cause, an opening in the top should be made and provided with a screw cap that would enable it to be filled with water, should necessity occur.

Warping of Sheet-Iron Pans.

From W. B., *Boston.*—In answer to "F. J. H.," Rochester, N. Y., who has had difficulty with the warping of sheet-iron pans for a bakery, it may be possible to take out the "twist" by placing the pans on a level surface, with the wire down, and tapping the corners with a mallet. When making pans of this description, the edges can be turned up and over in a brake, then the corners turned over on a stake. The wire or rod should be formed to the required size, and welded at the corner, care being taken that the rod is level and free from twist. After the rod has been placed in position and the edges turned over, the pan should not warp when in or out of the oven. If the rods are not level before being placed in the pans it will be difficult to take out the twist or warp.

White Lead Paint for Tin.

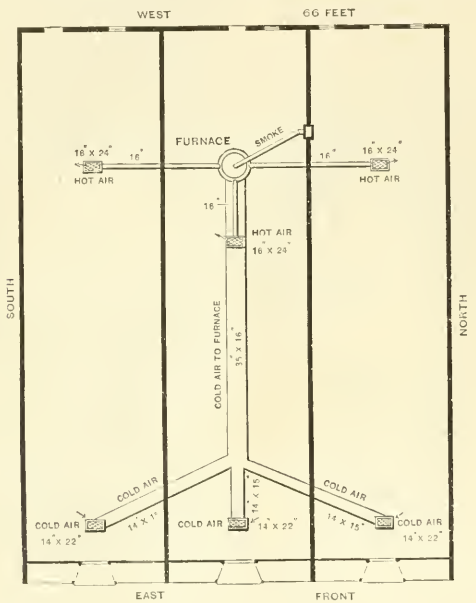
From J. C. R., *Charlottesville, Va.*—I would like to hear from my brother tinners regarding the painting of tin spouting and gutters with white lead paint, and if it is considered injurious to tin work that is exposed to the weather. I have repaired tin work that was put up years ago, on which white lead paint was used, and found the work well protected, but have thought that, perhaps, it was owing to the good quality of tin used in those days. I have heard experienced painters discuss the question. Some would contend that white lead paint was injurious to tin, while others would maintain the opposite to be the case.

Note.—It is supposed our correspondent refers to white lead combined with linseed oil, and not to any mixture in which linseed oil is not used. It is generally considered that the efficiency of a paint for coating metals depends upon the oil which, when drying, leaves a hard skin or surface. It would appear that a proper pigment to use would be one that contains nothing that would injure the surface upon which it was placed, and would carry the most oil. In this respect white lead is well adapted to the purpose, providing the exposed surface is

kept covered with the paint. A correspondent writes regarding this subject: "I doubt if anything will beat a good coat or two of white lead and linseed oil, which you can color to suit yourself." So much said, we should be pleased to have our readers express their opinions on the subject.

Furnace to Heat Three Stores.

From E. E. W., *Veedersburg, Ind.*—Will you kindly examine the sketch shown and give me an opinion as to whether my plan is likely to heat the building satisfactorily. I also submit it for comments of other readers. The building is brick, fronting east, two stories high, but only the first story is to be heated. It is 66 x 80 feet and divided into three stores, each about 22 x 80 feet. The cellar is 7 feet in the clear, and an extra large portable furnace will set over an air pit. Air is to be taken from each room through 14 x 22 exhaust registers, located at the front and connecting by air ducts, as shown in the sketch, with the air pit under the furnace. A 16-inch hot-air pipe runs from the furnace to a 16 x 24 floor register in each of the stores.



Furnace to Heat Three Stores

Note.—The proposed plan seems to need only care in arranging the details to prove satisfactory. If the building is exposed on all sides, the north store will be the most difficult to heat, and to insure its getting a full supply of hot air it would be well to divide the space in the furnace top above the heating surface by sheet-iron partitions, giving the north store the greater space. A similar arrangement at the juncture of the air ducts will tend to make the exhaust from each store more nearly equal. The length of the pipe to the south store in ordinary weather will not be a disadvantage, but as it will be about 20 feet to both of the outside stores particular care and extra work if necessary should be given to providing a sharp rise of the pipes from the furnace to the registers, particularly favoring the north store, which requires the most heat. This caution will be specially applicable, as the cellar is only 7 feet deep, and an extra large portable furnace is likely to stand 6 feet high or over, which only leaves 12 inches of rise for the hot-air pipe in a run of 20 feet, which is not enough for the best results, and more should be secured even at some expense. The air ducts will aid the general efficiency if they are air tight, and nothing surpasses galvanized iron in attaining this end.

Galvanizing Corrugated Iron.

From C. M. T., *Illinois.*—In *The Metal Worker* of May 13 is a letter from "W. J.," Bay City, Mich., who wishes to be informed how to galvanize pieces of common black iron, corrugated, about 15 x 30 inches in size and of about No. 26 gauge, which are made up in the shape of shelves, &c. In answer to his inquiry allow me to suggest that he use commercial galvanized iron for the shelves, as it will be much cheaper for him than to attempt to do his own galvanizing. Or, if it is necessary that the work should be galvanized after it is formed, have the operation performed by those in the business. A galvanizing plant is somewhat expensive to create and maintain, besides, considerable experience is required in order to produce satisfactory results. The zinc or "spelter" should be kept at a certain temperature when in use, and to do this requires a "knack" that is only acquired by practice.

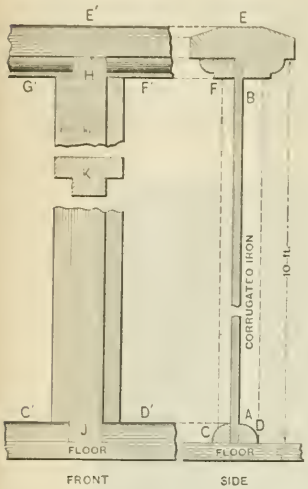
To galvanize iron the first step is to clean the sheets of all oxide, which is done by standing them on edge for six or eight hours in water containing 1 per cent. or over of sulphuric acid. While in this pickle, which should be kept hot by means of steam pipes, the sheets should be agitated so that the acid can reach the entire surface. The acid should be renewed occasionally, according to the quantity of iron pickled. After pickling the sheets are rinsed in water and scoured with sand and water, and a piece of cork or piece of the husk of the cocoanut, the ends of the fibers serving as a brush. Or, slight spots of oxide can be removed by means of a sharp scraper. It must be understood that any particles of oxide on the iron will prevent the zinc from adhering. This part of the operation is regarded by galvanizers as one of the most important in the whole process. The sheets are then rinsed again and dipped for a short time into commercial hydro-chloric acid, and finally placed on an iron car and shoved into an oven to dry. When the sheets are taken from the oven they are ready for the zinc bath.

The wrought iron pans containing the zinc bath are from ½ to 1 inch in thickness, depending on the size, which would depend upon the kind of work done. The pans, on account of their great weight, usually rest on a solid brick foundation and are surrounded at a distance of 6 or 8 inches by walls of fire brick. A coke fire is maintained in the intervening space, the necessary openings being provided for the admission of air, and a smoke stack provided to remove the products of combustion. The openings between brick walls and pan can be covered with iron plates. A wide flat-iron bar runs lengthwise through the middle of the bath so as to extend about 3 inches into the zinc. On one side of the bar the metal is covered with sal-ammoniac and on the other with coke breeze so as to cool off and clean the sheets as they are drawn from the melted zinc. A clean sheet is passed into the bath on the side covered by sal-ammoniac and allowed to rest for a short time on the bottom, then tilted so as to be taken out on the other side through the coke breeze, a pair of tongs being used for the purpose. When the sheet is removed from the bath, care is taken that the surface of the metal is kept covered with the coke to prevent oxide from forming. The sheet is then laid on a table and wiped or whipped with a piece of canvas to remove any surplus metal. While one sheet is being finished another is put in the bath, and thus the operation is continued. For galvanizing commercial sheet iron the wrought-iron pans are made from 1 inch iron, from 8 feet to 11 feet long, about 2 feet wide, and from 42 to 50 inches deep, and hold from 18 to 25 tons of zinc. On account of this great weight it will be seen that a strong foundation is required. The crystalline appearance of the finished plates is produced by adding a small quantity of tin to the melted zinc. In case it is not convenient to finish the black sheets when taken from the pickle, storage tanks are used in galvanizing works for holding the cleaned sheets until they are to be galvanized. These storage tanks are made of 2-inch pine plank (as are the pickling tanks), and simply filled with clean water into which the sheets are placed, which prevents the formation of oxide on the surface of the iron.

Philadelphia's output of gas for the year 1892 amounted to 3,585,158,000 cubic feet, the greatest consumption in one day being 16,328,000 feet. The receipts of gas companies reached the sum of $3,845,835, being an increase of $71,753 over those of 1891. The city has over 1,100 miles of gas mains and 20,000 street lamps, which consumed last year 501,160,281 cubic feet of gas.

A Corrugated Iron Partition.

A number of store buildings in Chicago are being changed into hotels for use during the World's Fair, after which they will be again used for commercial purposes. Among the problems presented in thus changing the interiors is how to construct the numerous partitions in such a manner



A Corrugated Iron Partition.—Fig. 1.—Front and Side View.

that they can be taken down without injury to the building and at the same time be cheap and to a certain extent fire proof. In over ten of these buildings corrugated iron is used for the partitions. Light studding is placed in the usual manner, or if it is desired to have a circulation of air through the building, the studding does not reach the ceiling—a top plate being used to hold the parts in position. Corrugated iron is then nailed on the studding, the sheets being placed perpendicular or horizontal to their length, as is most convenient. In either case it has been necessary to drive nails through the iron in order to fasten it securely to the studding, thus injuring the iron in case it should be desirable to sell it after the partitions are taken down.

Boddie Bros. own a six-story building that extends 146 feet on Jackson street and 100 on Franklin. This building has been occupied as a wholesale house, and was unobstructed with partitions. As the building was to be unoccupied until December, it was resolved to convert it into a hotel for the accommodation of World's Fair visitors. For this purpose five of the upper stories were to be divided into rooms, the first being retained for restaurant, barber shop, office, &c. Lath and plaster partitions would be too expensive, besides there was not sufficient time for their erection. Board partitions were out of the question, not being sufficiently fire proof. It was decided to use corrugated iron in the construction of the partitions, providing they could be made in such a manner as to use commercial iron and not injure it in any way, so that when the partitions were taken down the iron would be in a condition to be sold at a slight discount on the original cost.

The matter was placed in the hands of Architect Chas. C. Scott, who devised a method for constructing the partitions without injury to the iron, as shown in the following illustrations. In Fig. 1, side view, A B represents a sheet of corrugated iron 10 feet in length. The iron is secured at the floor by quarter round pieces, C and D, which are nailed to the floor. The dotted lines indicate the studding which supports the cap mold E. The iron is held in position at the top by means of the molding F, which is nailed to the cap mold E. In the front view J' H' represents a stud, the profile of which is indicated by K'. The cap mold is indicated by E', the top mold by F' G' and the quarter round by C' D'. In the plan, Fig. 2, two of the studs are shown at M and N. The quarter round molds are placed inside the partition, as indicated by O P. The studs are notched to receive the chair rail S T, and the molds C and F of Fig. 1 can be placed in the same manner. As will be seen in Fig. 1, the iron is secured at the floor by the molds C D, and at the top by the mold F, without driving nails through the iron.

Fig. 2.—Plan of Partition.

In Fig. 2 the method of securing the iron is shown at Q and R. Brads are driven over the edges of iron and into the studs, thus holding the iron in position. The method used in hanging door to stud is shown in Fig. 3. For the construction of the partitions in this hotel, which is to be named the Great Western, 1400 squares of corrugated iron and 85,000 feet of molding will be required.

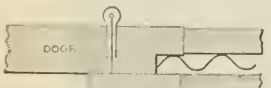


Fig. 3.—Method of Hanging Door.

Owing to increasing trade between Canada and China and Japan, via the Canadian Pacific route, Canada is about to appoint resident corresponding agents at Yokohama, Hong Kong and Shanghai.

The production of gold in British Guiana during the first quarter of the present year amounted to 24,470 ounces, as compared with 21,770 ounces in the corresponding period of 1892.

Glimpses of the Fair.

S. J. Meeker, Newark, N. J., Malleable and Gray Iron and Brass Foundries, Newark, N. J., U. S. A., has an exhibit that tells its own story, the letters being placed on a white wood background and formed of castings of the different materials and various articles made by him.

Alan Wood Company, Philadelphia, have a house made of their sheet iron, roof, cornice, walls and ceiling displaying some fine designs and workmanship, as well as the uses to which their goods may be put. Samples of many of their galvanized and black iron and steel plain and corrugated goods are used to wainscot the lower and upper parts of the side walls, enabling the sightseer to get a good idea of their lighter goods.

Randolph & Clowes, Waterbury, Conn., show an enterprise that is reflected in their exhibits, as they have two. That in the Liberal Arts Building is made up of copper circulating boilers of different sizes and beautiful finish. One boiler is cut in half, vertically, showing their spiral reinforcement to prevent collapsing and the way all seams and joints are made to insure strength. The exhibit in the Mines Building is the more extensive and handsome. The space is inclosed with alternate brass and copper tubes and roofed with a similar effect. At each side of the door at the front and at each corner is a copper torpedo shell. Inside a display is made of ingots, kettles, coils, boilers and many articles, showing the manner in which brass and copper can be worked and used.

The American Tripoli Company, Carthage, Mo., make a fine display of tripoli in all of its various forms, with samples of the raw material; also an elaborate showing of its uses for filtering purposes.

The Carborundum Company of Monongahela, Pa., show their product, which, it is claimed, has all of the properties of emery, is harder, cuts more rapidly, does not draw the temper and can be used wet or dry.

Phœnix Crucible Company, Taunton, Mass., have arranged an attractive display of their crucibles varying in size from a miniature to the extra large.

The Tanite Company, Stroudsburg, Pa., make an interesting exhibit of emery goods, showing in glass jars and cases the different grades of the raw material and the various ways it is manufactured for use, from the fine powder to the large wheel. An interesting comparison between the cutting of the best file and an old emery wheel is made in both steel and cast iron.

Jos. Dixon Crucible Company make a fine display of their goods. A hardwood finish incloses their space, which has an elegant carpet on the floor. Glass cases on one side make a complete display of kilns and crucibles. Another case contains jars with samples of plumbago from Ceylon, Bavaria, Mexico and Ticonderoga, N. Y., as well as pulverized plumbago for a great variety of uses. In another case is a display of pencil leads and crayons and many articles used for electrical resistance. The use of lead in electrotyping is shown, from the wax sheet to the finished electrotype. On a pedestal is a fine lump of Ceylon lead weighing 269 pounds, and on another is a monster retort for refining silver.

ROOFING AND CORNICE.

The Skylight Competition.

We take much pleasure in publishing this week the result of the Skylight Competition that was announced last January in *The Metal Worker*, and which closed the first of April. As we stated at the time, the responses were numerous and the general character of the work displayed in the essays was of a high order. The number of the contributions made it necessary to spend not a little time in reviewing them that the decision should be perfectly just. Several experts were consulted in the task of rendering judgment and the decisions given independently by them coincided in a remarkable degree.

The first prize of $75 is awarded to Henry M. Sanders, 1016 Tenth street, N.W., Washington, D. C., whose essay was submitted under the *nom de plume* "Kappa."

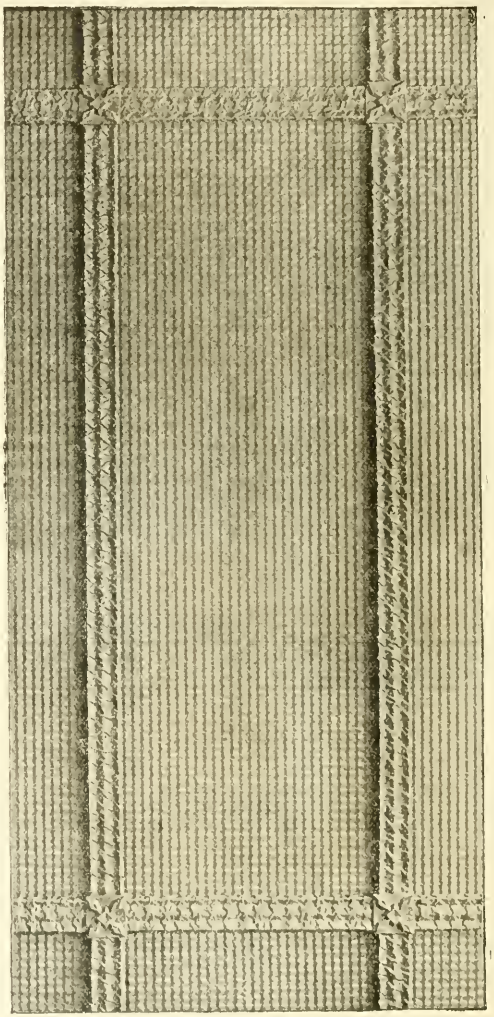
The second prize of $50 is awarded to John C. Dressel, 1645 Inyo street, Fresno, Cal., whose essay was submitted under the *nom de plume* "By one of the craft."

In addition to the prize winners, there were also several essays which on study proved to have many excellent points. The three which it was decided particularly deserve mention are the essay submitted by "Nemo;" the essay submitted by "T. H. V.," and the essay submitted by "Argus."

We take this occasion to congratulate those who are prize winners in the competition, and at the same time express our thanks to the many other contestants who took part. It is our purpose to publish some of the essays in the columns of *The Metal Worker*, and we believe that they will be read and studied with much interest.

Tufted Metal Ceiling.

The accompanying illustration shows a design of a metal ceiling brought out by the Garry Iron & Steel Roofing Company of Cleveland, Ohio. It is a curious style and one that will attract attention, as it has the very desirable feature of being a new ceiling, has a substantial appearance and at the same time a pleasing effect. A special application to which metal ceilings are put is in large public buildings, banks, hotels, business offices and such structures where durability is the main object and where there will be no danger from falling plaster.



Tufted Metal Ceiling.

Paint for Exposed Iron Surfaces.

The question of the best paint for use on iron surfaces exposed to extreme atmospheric influences is one of great interest, especially to roofers. The following extract from the letter of a correspondent in *Painting and Decorating* gives some hints on the subject which may be worth attention: "Seeing nearly every month that some attention is being given to the painting of iron work exposed to severe atmospheric influence, I would also give my experience of 40 years. It was about 30 years ago that I first began to take any interest in the causes of decay in paint on iron surfaces, and then I began to think and inspect work I had done ten years previously. About 35 years ago I had to do some iron rods, which were string bolts for holding a large roof together in a flax-spinning factory. These rods

had been psinted with oxide of iron and had rusted. They were cleaned to the iron, and so thoroughly that the iron was made bright with rubbing. I had to paint them with red lead mixed with half oil snd half turps and some liquid dryer of my own make. This dryer was composed of black wad, red lead and oil boiled to a pulp and then thinned with turps. The second coat was about the same as the first. The third contained less turps, and the fourth and last hardly any turps. This work has not been done since, and is to-day as perfect a protection to the iron as then. Four years ago I visited the place and was allowed to examine these bolts, and when I scraped off the paint the iron was as bright as when I painted them. Another case is a water wheel which has been built 75 years. Twenty-five years ago I had a contract to paint this wheel. The owner thought that he would have it cleaned and painted. I employed men to clean it thoroughly, and to my surprise I found no rust. When I called the attention of the owner to the fact he informed me that his father had had it painted 50 years before, when it was built, and the red lead was made from ore got in a bill just by and smelted in the village. However, I gave it two coats of red lead, mixed as I have stated. This wheel is still running, has not been painted since and is in good condition. Now, in regard to work rusted on a smooth surface, I have done work of this kind also which has been exposed to the sea air. My first step is to clean thoroughly, and then, if badly rusted, to mix a thin mixture of lampblack with plenty of turps and dryers and little oil, and when dry apply the red lead as above. This will give a lasting job, as the lampblack arrests and prevents the rusting. In conclusion, I would say that if any of your readers want a good, permanent job of iron painting let them try the above plan, and I am sure that they will be repaid for the trouble and extra cost as compared with the customary wash of metallic paint and oil."

A Trade-Mark in Sheet Metal.

A Trade-Mark in Sheet Metal.

We lay before our readers this week a half-tone engraving of a sheet-metal statute recently completed by W. H. Mullins of Salem, Ohio, for the Moline Plow Company, as a part of their exhibit at the World's Columbian Exposition. The statute, which represents the Flying Dutchman, the copyrighted trade-mark of the company named, is of heavy copper, mounted on a copper pedestal 6 feet in hight. The whole figure, including the pedestal upon which it rests, is 18 feet in hight. The ear of corn shown is perforated and so arranged that an electric light inclosed within it will shed its rays through the openings. The engraving which we present herewith is an exact representation of the statute and shows it in every detail. Some may, perhaps, be inclined to criticise the proportions of the figure, but we would state in this connection that the idea is to represent a burlesque rather than a figure of strictly accurate outline. How successful Mr. Mullins has been in carrying out this idea may be inferred from an examination of the picture.

FLASHINGS.

John Galt & Son, 52 John street, dealers in roofing slate, confess to a good volume of business, which is quite in contrast with many New York interests. It should be remembered, however, that little or no stock was manufactured during the winter, and the present demand keeps them actively employed.

A large and growing market for galvanized sheets, both plain and corrugated, for roofing purposes, is reported from Cuba. This material is said to be coming into extensive use in the island. Sheets of a smaller size than those generally used in this country are chiefly in request. A well-known New York export firm have lately shipped some large orders in that direction.

Last week a seizure of smuggled tin plates was made by the customs officials at Eastport, Maine. The material had been brought over in a schooner from New Brunswick, across the St. Croix River, and was intended for the use of some manufacturers of sardine boxes in Eastport. Two hundred boxes of tin plates, on which no revenue had been paid, were confiscated. It is believed that a scheme for defrauding the Government of revenue in this manner has long been in operation in those parts.

STEAM AND HOT WATER.

Fifth Annual Convention of the Master Steam and Hot Water Fitters' Association.

The fifth annual convention of the Master Steam and Hot Water Fitters' Association of the United States held their first session at the Revere House, Chicago, on the 6th inst. President P. S. Hudson called the convention to order at 10.45 a.m., and proceeded to business by appointing John B. Hughes of St. Louis sergeant-at-arms in the absence of D. F. Morgan. Next followed the designation of a Committe on Credentials, consisting of Messrs Kenrick of Boston, Barron of New York, Simmons and Lamb of Chicago and W. B. Thompson of Philadelphia. The reading of the minutes having been dispensed with, President Hudson proceeded to read his message, as follows:

Address of President P. S. Hudson.

Friends and Fellow Members.—I am pleased to congratulate you upon the favorable promises of this, our fifth annual meeting. The gates of our city are open to-day to the inhabitants of the world. This certainly includes all of you. It is an incident that cannot in a like manner occur again in the lifetime of any of us. At this moment you are adjacent to, or, from your seats, within 30 minutes of the greatest preparation for and the grandest display that ever graced the face of the earth.

Then why should I not congratulate you, when we are privileged in this, the most important event of our business year, to lay our plans in the shadow of the first stupendous celebration of the most astounding, the boldest as well as the most gloriously beneficial event that ever befell mankind. Would that some intrepid, firm and sagacious commercial mariner, like Columbus, could sail into the business world in these our fiercest days of competition and classify and regulate trade as it should be done.

In behalf of the members of the Chicago Local I extend you a most hearty welcome, and hope that your visit to us on this occasion will be of so pleasant and useful a nature that it will prove one of the eventful milestones in your lives.

The Executive Committee have covered the special business features in their report, which has my approval, leaving it unnecessary for me to refer to them. There are a few matters, however, which I consider it important to touch upon, and I beg your patience while I do so.

PLUMBERS AND STEAM FITTERS.

A sentiment seems to prevail with some firms, both in the heating and plumbing business, that there should be an amalgamation of the National Associations of Master Fitters and Master Plumbers. I see how readily this view can be taken in cities where the plumbing firms all do steam and water heating, but how would such an arrangement work here in Chicago, which is fairly illustrative of all the large cities?

We have some 38 members in our local, which includes nearly all firms that can be classed as steam and water fitters in the city. You can allow for ten more, which would certainly cover the field. In this I do not include those who have signs up but have practically never done any work.

I am not posted as to how many plumbing firms there are in Chicago, but there must be over 500, and possibly 1000. I cannot conceive of such a thing as 500 plumbers considering and acting upon a business that not more than ten of them are engaged in, either locally or nationally, in the same ratio.

Several stove firms are doing water heating at the present time. Certainly we could not entertain a thought of our order amalgamating with the Stove Association, and there can be but little difference in the two propositions.

I should look upon such an arrangement with the latter as taking steps to invite more stove men into steam and water heating, which I would certainly hesitate to do, and they could thank me for impressing upon them this view, for there are more in the business now than is any way beneficial to their financial health.

I can truly say that if I were to add a plumbing department to my business today, I should be just as unalterably opposed to the amalgamation of the two associations as I am now, for surely when I discuss the commercial features of our line (which associations are formed for), I want my conferences to be with those regularly in the heating business, always recognizing a plumbing firm who has a steam or water heating department as one of us. There has been so much discussion upon this subject outside the association that I fear many plumbing houses having a heating business as well have withheld their memberships from our organization believing that ultimately such a union would be effected. At all events, I can see no other good reason why more of them have not joined with us, for in many localities they have been suffering from abuses of every description. In the State of Nebraska, for instance, where, at this writing, we have not a single member, I do not believe any great amount of money has been made within the last three years on the total heating, and until such a time as they take steps to act more in harmony and look after daily transactions with greater care, I do not think very much success will be met with.

I do believe, however, that the Executive Committees of the two organizations should work together for mutual advantage. Frequently both are badly treated by firms who sell steam heating and plumbing supplies combined, and undoubtedly by a united and fraternal action of the two committees much good could many times be accomplished. I feel that the question of amalgamation is one which should be settled at this convention, and while I do not recommend it, I would suggest that a committee might be appointed to consider this matter.

THE HOT WATER TRADE.

On account of some recent business changes, I believe our interests have some assurance of more rational treatment in the future from hot-water boilermen. However, we can never tell when fresh capital will be found to support some enthusiast over a new discovery in the way of a boiler for heating. Such parties could be of great benefit to our commercial interests, to the public and to themselves if they would refrain from inducing tinsmiths, hardwaremen and others who have had no experience in the fitting business attempting to install plants that not one of you or I would undertake at the prices they make.

I would only be too willing for a boilerman in whose goods I had confidence to bring me work where the soliciting and preliminary labor had been performed, provided they could show a safe and reasonable profit in it, but because they cannot do this they do not come to you nor to me. They seek some one without experience, whom with paper and pencil they convince that there is open to him through their instrumentality a new and wonderfully lucrative field.

It is not necessary to comment. You men cannot have forgotten your early experiences. You know what the awkwardness and result must of necessity be with those who have it all to learn.

Many business men have been materially injured by this method in the past three years, and the miserable success that has been met with on account of it has offered an almost unanswerable argument for furnace heating, and has caused much of the latter where hot water or steam would have been used if the faith of owners had not been entirely shattered by the miserable success their friends and neighbors had met with, which is chargeable wholly to the want of experience on the part of the man who lost money doing a wretchedly poor job.

The sum of it all is, capital has been wasted in large quantities, contractors have been crippled; the public has been injured and imposed upon, and our line of business has received a set back that it will take a long time to recover from.

As said before, I believe we have seen and felt the worst of this condition and am looking forward with the hope of a marked improvement.

CHARGES AGAINST THE ASSOCIATION.

No doubt all of you are familiar with the recent attack made upon our association by the St. Louis *Republic*. The issuing of our inquiry to sellers of steam and water fitting supplies, and its publication, together with the replies received, called forth the fiery criticisms.

We are charged by the *Republic* with being a trust, that and other papers calling us blackmailers, &c., adding the claim that we are trying to prevent open competition to the consumer.

While it is not necessary for me to say to you, gentlemen, that not one of these accusations is true, it may be my duty to make a statement that the public may not be misled by any such sensational articles.

Has the retailing business any fixed rights? If so, has one firm a right to confer with his neighbor as to what such rights are? Custom makes law. In the memory of all of us there have been three fixed classifications of trade: 1, the manufacturer; 2, the jobber, and 3, the retailer. If custom has made and can make law, then the principles of this one in the classification of trade are as firmly fixed and accepted as those that appear on any statute.

Are statutory laws ever broken? Are laws of custom ever broken? To both questions we must answer yes. Can we as master fitters show that we have been damaged because of the want of proper respect for the latter law? With much feeling we can claim that we have been materially handicapped in our business by the disregard of it. For the past ten years, chiefly on account of the bitter competition in the supply trade, our people, who are the retailers, have not received full justice at their hands.

Unlike other laws, those of custom are left to take care of themselves.

Under such circumstances have retailers in any line a right to ask jointly that the latter laws be lived up to? This is all our association has done and all it is formed to do. In fact, we have never asked nationally that the wholesalers live to the letter of the law. To do that we would have to request them not to sell to the consumer at all, which if we had done long ago I think would have caused less friction than the course that has been followed, for it does appear that the moment a consumer has the privilege to purchase of the jobber he expects all the discounts that are given to the trade, and if he fails to get them he is a sorely injured individual, although he may be a retailer in some other class of goods that pays four times the margin that what we sell to him would. And I presume if this same party should learn of a manufacturer in his own line retailing his goods he would not only refuse to buy of him, but would request that in the future he stay out of his place of business.

It does seem that a few, in the face of all this, would stop and consider that they are only a part of mankind, filling one department in life that goes to make up the masses, and that what deference they would like to have shown the trade they are engaged in, they ought to be willing to grant to those in other lines. Self interest should suggest this to them, for when men all around them in other departments fail

to succeed, where is support for their own business coming from? I would ask, too, if any class is more sensitively affected by the success or non-success of the masses than the newspapers themselves?

When the charge is made that the consumer is robbed of the benefits of competition in our line by means of our association, it must cause a smile to pass over the countenances of all of you. I advise the reporters to interview a few men on that subject who have gone out of the business.

The legitimate place for the consumer to look for competition is with us, and in many instances I am sure they have in the past found it so severe that it has proved anything but beneficial to them.

You all know that we are invariably straining to get below our competitors' figures. This has been, and is being, carried to such an extent that the situation is truly an alarming one. The country today stands more in need of laws to modify competition in all classes of trade than it does for any that will invite it.

It could be said, and was years ago, that competition was the life of trade. It can truthfully be said to day that competition, as indulged in, practically forbids success and de-troys thousands whose prosperity the masses must be dependent upon.

There is a great and useful field here for honest newspaper work, but it cannot be done by young men who are without experience, no matter how bright they may be; neither can it be done by an older man who has devoted his life to the literary and publishing line. He has not come in touch with the special bitter of this sweet, except in his own department, which is so emphatically separated from other affairs that he has not the slightest conception of the struggle that the business masses, from the least to the greatest, are at this moment overwhelmed with.

From the standpoint of most newspaper articles, as they are written to day, with a view of influencing commercial legislation, they are doing untold mischief to business. An editor who is conscientious, just reasonably conscientious, will be very careful what principles he undertakes to have woven into legislation by professional politicians, whose only experience is how to secure votes. Surely he ought not to forget his own interest in the morrow.

I will close this subject by making the claim that while our association has been thus far a great benefit to ourselves, it has been a still greater benefit to our patrons, for in proportion as the art advances they are profited.

In the office of prosideut of this association, which honor you conferred upon me at the last convention, I am moved to thank you deeply. I desire to thank each member individually for the support he has rendered during the year. Our growth has been such as to be quite encouraging, and I hope that the labor performed at tuis meeting will be of so judicious and wise a character that all who should be enrolled with us will deem it to their benefit to become members, and that they will take steps to do so.

The Executive Committee, and others concerned, have rendered me all the aid I could possibly have desired. They have responded cheerfully to many calls for meetings, as the miuutes kept will show, and I desire to heartily thank them for the support they have contributed.

In passing this office to the hands of my successor, I can truly say that I do so with the conviction that having been brought into closer contact with the association's affairs has made me a much better member than I ever was before. And I can assure the member who takes upon himself the duties that I lay down that he will receive my hearty support, and I bespeak for him the same courtesies that have been extended to me.

Let us all adopt the motto that we will not criticise until we have thoroughly investigated, remembering that fore knowledge frequently saves us the embarrassment of changing our minds.

I will again affirm that our association is formed that the greatest justice may accrue to the greatest number.

Applause greeted the conclusion of the reading of the president's message, which had been very closely followed by the members of the convention. They were in hearty accord with the sentiments expressed. Secretary Geo. H. Reynolds next read his report, which is in part as follows:

Report of National Secretary George H. Reynolds.

After the Boston convention adjourned our attention was first directed to preparing association effects for removal to Chicago. Upon arrival here headquarters were secured at 628 Rialto Building. By June 9 we were regularly installed in our new offices, and had begun our labors for the year, our immediate efforts being turned toward disposing of work mapped out by the convention, such as issuing the usual amount of printed matter, &c.

The resolution regarding the purchase of radiators, as per the instructions of the Boston meeting, was circulated among the different locals for signatures. Having but one copy to work with, we adopted the plan of making two duplicates, with sheets so arranged that they could be detached and affixed to the original, thus hastening the results.

We have the three articles as they were returned, so far as this matter was proceeded with, and they are on the file for examination if any choose to look them over.

Prior to the return of the papers, a representative of one of the largest houses in the United States in the fitting supply line called at the national headquarters with reference to the radiator resolution. He said he thought it was bad policy; that it was in every sense objectionable to a seller of goods to make different rates between two buyers regularly in the contracting business whose trade was equally as desirable. After an extended discussion of the matter the party stated that neither he nor his house were going to antagonize our association, or its members, but sooner than make such a discrimination as asked for, the firm he represented would cease to handle radiators at all.

I will add that this came from one of the strongest houses in the United States, and from a firm which is considered very friendly toward our association.

The substance of the conversation was reported to the Executive Committee, and it caused them to give the situation very thorough consideration, and led to their inviting before them the principal man of one of the largest radiator manufacturing firms in the United States, to whom prior to this a form of contract had been presented for his opinion.

While he did not seem disposed to say much against the proposition, he requested permission to lav the paper before his attorney, the question arising with him as to the legality of such methods. His request was granted, he promising that as soon as he could procure the information he would report same to the committee.

A few days later he submitted the opinion of his attorney, copies of which were forwarded to all our members, thereby making it unnecessary to reproduce it here. We have duplicates, however, if any desire to examine them.

It is hardly necessary for me to state that the legal opinion was of such a nature as to cause the Executive Committee to drop this matter entirely.

During the time the radiator question was under consideration the Osborne matter was taken up, as per the direction of the Boston convention, pamphlets containing a copy of the discussion upon this subject being printed and placed in the hands of each of our members. The bills for the first assessment were sent out on July 15. No more money was called for as none appeared to be required, until in April our treasurer received a letter from E. P. Bates indicating that a suit would be brought to trial. In such an event manifestly more money than was on hand would be needed, hence on April 10 the members were billed for their second assessment. . . .

As to complaints, except in a few instances, nothing has been brought before the committee that was explicit. The air is always charged with rumors, but vague complaints, while they signify a great deal, do not furnish anything tangible for a committee to follow up or investigate. We have had some specific charges which have been explained to the best of the ability of the respondent, and while they have not been entirely satisfactory to the committee, through assurance of their not occurring again, they have been overlooked. . . .

The committee have arranged for the publication of the proceedings of this convention in souvenir form, similar to that issued in 1892. . . . .

At our Boston annual meeting our membership list was increased to the number of 300. During the year the various locals have shown losses and gains as follows:

	1892.	1893	Gain.	Loss.
Number of Members.				
Albany and Troy	14	..	..	10
Buffalo	7	9	2	..
Chicago	17	38	21	..
Cincinnati	..	5	5	..
Cleveland	7	6	..	1
Denver	8	9	1	..
Joliet	..	6	6	..
Massachusetts	63	35	..	28
Michigan	..	30	30	..
Milwaukee	7	8	1	..
New York City	17	18	1	..
New Hampshire	14	10	..	4
Philadelphia	10	8	..	2
Rhode Island	..	7	7	..
St. Louis	10	9	..	1
Twin City	23	20	..	3
Spokane	..	5	5	..
Miscellaneous	29	31	2	..
Totals	..	..	81	49

Of the 28 names missing from the Massachusetts Local, four are still members of the National, having been transferred to the Rhode Island Local, which had not been formed at our last convention. Of the four less in the New Hampshire Local, one has been numbered among the dead, J. E. Noyes of Whitefield, N. H.

Five of the names taken from the miscellaneous members will now be found in the new locals formed this year, and eight have withdrawn entirely, showing 14 new miscellaneous members, and a gain of one in the present list over last year, remembering that eight have withdrawn entirely and five were transferred to new locals. Since our list was printed we have a new miscellaneous membership, that of Thomas W. Gannon of Cairo, Ill. Also three new names to add to our Chicago Local—viz.: Kehm & Mertz, J. M. Hogan & Co., Chicago, and A. J. West of Fernwood, Ill

We certainly have had much encouragement this year in the formation of new locals, some of them having promised to add still more names.

First on the list is the Cincinnati branch, formed through the instrumentality of one of our vice-presidents, H. D. Crane. The reports from him at this writing hold the promise of additional members later on. This action took Mr. Crane's name from our miscellaneous list.

The next in alphabetical order is the Joliet Local, which took the names of the Barrett Hardware Company and Messrs. Strong, Bush and Handwork from our isolated list.

In Michigan, largely through the instrumentality of Charles W. Light of the Eureka Heating & Ventilating Company of Saginaw, we have a new State local numbering 30 members. Mr. Light's name will now be found in this local instead of among the isolated members, as formerly.

The Rhode Island Local, through the influence of four former members of the Massachusetts Local, formed an organization, taking the name of the State. Their numbers consist of seven firms, three of them being new members.

Next in order is the Spokane Local consisting of five members, formed through correspondence with J. H. Griffith of the Griffith Heating & Ventilating Company.

. . . . .

As a personal privilege I desire you to indulge me a moment while I refer to my connection with this organization.

If I intend to be honest in the interests of the associations it is just as truly my duty to study my relation to it, and with it, as anything else I can or may do. It is now one month over four years since I began to organize it. In that time I have had occasion to be firm in giving directions that I believe to be right, and dispute with members, with non-members and with some sellers of goods. And even later on if these same parties changed their minds and became of my way of thinking, which if I proved to be right they would ultimately do, they have not forgotten, neither do I expect they will forget, the differences we had, even though they were slight.

I will confess that if one manufacturer hangs up a sign in his office, "Goods Sold Only to the Trade," I have been more inclined to tell him to hang up two than I have to urge that he take the one down. By following this course, however, I might be charged by those opposing such a policy with seeing but one man.

I do not care to dwell upon this subject, but refer to it with the suggestion (which is something of a chestnut) that new timber, against whom no one is prejudiced, could do more for the association perhaps than can be achieved by me under the circum-

stances. You need an efficient secretary, and in order that he may meet with success he must have the hearty support of each and every member.

The secretary's report was well received by the convention, who then listened to the reading of the Executive Committee's report, which is as follows :

Report of the Executive Committee.

Two reports having preceded ours, there is but little room or necessity for us to undertake any pleasant expressions of congratulation. Of course, even when omitted, such civilities are understood and accepted, at least in this case they are intended in the fullest and broadest sense. The Osborne cases, as reported by the secretary, contain all the knowledge that the Executive Committee have of the situation excepting as to the moneys received and disbursed, and they are looking forward to the report of the Committee on Legal Questions with the same interest as the balance of you.

We are pleased to notice that nearly all our locals have increased in number. The growth of our own local (Chicago) this year has been unprecedented and unlooked for. We believe, however, we are safe in making the claim that our members are very firm in their present attitude, and we are convinced that anything that may arise will have a tendency to increase their determination to remain united, rather than to swerve them from the paths they are now traveling in. The new locals taken in (five in number), already mentioned in the secretary's report, is an encouragement that is fully warranted. When one or two years more of a similar increase have accrued to us, we can begin to feel that we are maturing into what will eventually effect all that those who are in any way conservative can desire. We have an encouraging increase this year of 31 new members, many of them being firms whose names have appeared upon our books before. This is especially gratifying and leads us to the belief that some who have permitted their memberships to lapse in 1892-93, will return to us again later on.

The explanation by the secretary of the meeting of the manufacturers and sellers and a committee of master fitters of Chicago, at the national headquarters last fall, to better the trade relations as to classification, &c., suggests to us that there is room in this line for some good thought and work at this meeting. Is it imperative that our trade should be divided like all others into the proper classification of wholesalers and retailers ?

A committee should be appointed to consider this question. The radiator man's remark to the secretary, that if he had sold goods to the consumer at cut rates he would have done it so well as to insure his not being caught, should be something of a pointer to the above committee. What would be the result if every master fitter would, where practicable, buy his goods of the jobber instead of the manufacturer ?

Such a proposition at first thought to the large buyers, whose purchases run up into the hundreds of thousands of dollars, would be objectionable. The jobbing fraternity in our line now are strong and have large capital behind them and many dollars in view that they do not intend to neglect to try and get. Would buying our goods of the latter eventually bring every consumer to our doors for his supply ? Would such a policy extend our acquaintance and augment our business ? Would the jobber thus increase our opportunities by referring the consumer to us.

The committee have not had many irregularities to deal with this year, and have had but slight trouble with what has been brought before them, parties seeming to be willing to do what is right in each and every instance, which we account for from the fact (as said by the secretary) that they are learning that maintaining a consistent discount is just as healthy for them as for us. Our contract with the Henry O. Shepard Company to issue our souvenir we consider very reasonable, and we have the assurance from them that it shall be equal in every respect to the very handsome one issued last year by the Boston Executive Committee. We notice that from year to year our membership has had a steady and promising growth, 1892 and 1893 being even more encouraging than the former years, and the committee, we can assure you, feel exceedingly satisfied over the situation. So far as any information has been received, we have lost but one member by death during the past year, Mr. J. B. Noyes of Whitefield, N. H. In order that this sad event may be suitably remembered, we recommend that a committee be appointed to draft a resolution expressing the sorrow and sympathy of the association. Undoubtedly individual members have questions of importance in mind that should be offered here for consideration. We hope they will be prompt in presenting their beliefs or conviction, that they may be duly deliberated upon, and referred to a committee if necessary. It is well to remember that the postponement of any question until nearly time for adjournment is dangerous.

While we find from past experience that it is almost unnecessary to call the attention of any of the various committees to matters that may be referred to them, it might be well to suggest at this time that the Committee on Constitution and By-laws be appointed early in the session, and that they consider carefully the revision thereof. We desire to remind those present that this convention is held under peculiar conditions, the World's Fair attractions being a great incentive to neglect the work necessary to be attended to. We earnestly hope all will urge the most careful attention to business interests first, remembering that the consciousness of labors well performed will add greatly to the zest of the pleasures to come later. Another long year must intervene before we can again come together in a body, and we should not allow any important matter to suffer for lack of adequate attention, however much we may desire to hasten our deliberation. Hoping that not a single important feature will be overlooked, and that not one injudicious or unwise step will be taken, and thanking you for the honors conferred, we leave in your hands the situation.

Committee on Standard Flanges.

Chairman Edward P. Bates (Syracuse) of the Committee on Standard Flanges made his report. The committee had been working in harmony with a committee appointed for the same purpose by the American Society of Mechanical Engineers. Mr. Bates complimented the latter committee on their efficiency. Enlarged copies of tables and diagrams, used for the purpose of illustrating the subject by the Committee of Mechanical Engineers, were tacked upon the wall. The schedules adopted were the work of the two committees. A sketch of a 4 inch flange, full size, was shown. The schedule of sizes, strength, number of bolts, &c., given in connection with this sketch, is believed by the committee to cover all sizes and strengths used in ordinary construction. The committee suggested that, if a standard is adopted, the manufacturers should drill valves when putting them on the market. It would be an advantage to everybody and particularly to the steam fitter.

Mr. Walworth of Boston supported Chairman Bates, and set forth additional arguments for the adoption of standard flanges. He uses the Davis & Farnum formula in the absence of a general standard, preferring to send out work ready drilled rather than to have it finished by hand on the ground.

Mr. Bates then read the report of the Committee of Mechanical Engineers on Flange Standardization, made through its chairman, C. W. Nason, at the meeting of November 29 to December 2, 1892.

A discussion followed, in which practical questions were asked and answers were given by Chairman Bates.

The report of the committee was accepted and the suggestions were adopted by a unanimous vote.

Mr. Bates urged all members to get copies of the standard and live up to it, specifying it so that manufacturers will comply with the measure thus approved by the association.

Mr. Crane of Cincinnati moved that the Executive Committee be instructed to have schedules printed and copies sent to all manufacturers, which was unanimously adopted.

List of Members.

The Committee on Credentials reported that 84 persons were present or reporting to the committee, as follows :

NEW YORK.

J. Leland Wells, Wells & Newton Company.
Chas. J. Gillis, Gillis & Geoghegan.
H. J. Barron, Barron Steam Heating Company.
A. C. Mercer, H. B. Smith Company.
E. D Smith, Boker, Smith & Co.
W. S. Phillips, Phillips, Doup & Co.

SYRACUSE, N. Y.

E. P. Bates.

CAIRO, ILL.

Thomas W. Gannon.

WILKESBARRE, PA.

Peter Forve & Bro.

BUFFALO, N. Y.

J. Irlbacher, Irlbacher & Davis.
Chas. Geiger, Barud & Geiger.
Chas Geiger, proxy for Clark & Co.
John W. Danforth.
Lewis W. Gay, proxy for J. H. Ruckel & Co.
E L. Cook, Whitte, Barrett & Co.

MASSACHUSETTS.

John F. Buerkel, Buerkel & Co, proxy for Ingalls & Kendricken, Daniel Russell, Bosworth & French, Le Bosquet Bros., Smith & Anthony Stove Company, A. A. Sanborn, Nutter & Seabury, W. A. Folsom & Co., John B. Farnsworth.
A. F. Kenrick, Kenrick Bros., proxy for Koehler Furnace & Steam Heater Company, Anthony Adams, Wm. Costello, G. M. Parks, H. E. Jennison, S. C. Higgins, J. R. Morrison, P. W. Swan & Son, W. H. Gallison, F. W. Foster, Lynch & Woodward, Richardson & Clement.
Albert B. Franklin, proxy for Thayer Heater Company, A. Descalzo, W. W. Heath, and Wm. E. Bartlett.
A. C. Walworth, Walworth Construction & Supply Company.

CHICAGO.

L. S. Daniels, Boynton Furnace Company.
George D. Hoffman
C. H. Simmons, Theodore Jaoobs Company.
F. W. Lamb, F. W. Lamb & Co.
G. E. Dixon, Goulds & Coldwell Company.
John Woodman.
John Davis, John Davis Company.
H. A. Kroeschell, Kroeschell Bros.
C. C. Finkler, Illinois Heating Company.
E. J. Yunker, D. F. Morgan Boiler Company.
P. S. Hudson, Baker & Smith Company.
Samuel I. Pope, Samuel I. Pope Company.
L. H. Prentice, L. H. Prentice Company.
James L. Cook, Cook & Chick.
D. M. Quay, Wells & Newton Company.
W. D. O'Brien.
E. McDonough.
W. A. Leach.
M. Cragin.
Kelly & Jones Company.
F. W. Herendeen of Herendeen Mfg. Company, Chicago.

CINCINNATI.

H. D. Crane, M. H. Crane estate.

ST. LOUIS.

John B. Hughes, St. Louis Steam Heating and Ventilating Company.
W. X. Sweeney, Missouri Steam Heating Company.
John J. Collins.
E. M. Bosley, Globe Heating Company.
Mepham Heating Company.
J. H. Davis, American Heating Company.

CLEVELAND.

John Becker, Chafer & Becker.

DENVER.

C. J. Reilly, proxy for H. W. Michaels.
J. T. Bradley.

TWIN CITY.

Wm. Rodger & Co.

MILWAUKEE.

A. J. Lindeman, Lindeman, Hoverson & Co.
M. Coogan, M. Coogan & Co.
Chas. B. Kruse, Kruse Steam Heating Company.
J. Grassler, Grassler & Gezelschap.
J. Cordes, Cordes & Treis.
W. Lowman, Davis & Lowman.
W. K. Downey, H. Moore & Co.
W. K. Downey, proxy for Henry G. Sohns.

MICHIGAN.

Chas. W. Light, Eureka Heating & Ventilating Company.
Julian S. Leet, Michigan Heating Company.
Robert Sproul, Sproul & McGurrin.
John A. Wheeler, Wheeler & Pitkin.
J. O. Galloop.

BURLINGTON, IOWA.

W. O. Ewinger, Henry Ewinger.

PHILADELPHIA, PA.

W. P. Thompson, Thompson Bros.

APPLETON, WIS.

W. S. Patterson, W. S. Patterson & Co.

PITTSBURGH, PA.

Wm. J. Kelly.

JOLIET, ILL.

Geo. Poehner of Poehner & Dillman.
Geo. W. Strong of Strong, Bush & Handwerk.
H. Ford of Ford & Kelly.
E. C. Barrett of Barrett Hardware Company.

CLEVELAND.

Mr. Dewstoe of Dewstoe & Schneider.
J. McWilliams, Louisville, Ky.
W. C. Weatherly of Macaulay Bros, Grand Rapids, Mich.
Wm. J. Kelley, Pittsburgh.

Proxy sent to P. S. Hudson for E. D. Hornbrook, Kansas City.
H. A. ft. Dietrich, Bethlehem, Pa.

Treasurer's Report.

The treasurer's report was presented by F. W. Lamb, a summary of which is as follows:

Receipts for the year	$9,555.30
Disbursements	8,309.84
Leaving a balance of	$1,245.46

TUESDAY AFTERNOON SESSION.

An adjournment was taken to Uhlich's Hall, Clark and Kinzie streets, to secure more room than was afforded by the hotel parlors.

The first business taken up was the appointment of special committees. The president appointed the following:

Committee on Constitution.—Messrs Wells of New York, Franklin of Boston, Prentice of Chicago, Crane of Cincinnati and Walworth of Boston.

Committee on Appeals and Grievances.—Messrs. Simmons of Chicago, Kenrick of Boston and Bradley of Denver.

Committee on Good of the Order.—Messrs. Thompson of Philadelphia, Smith of New York and Woodman of Chicago.

Committee on Ways and Means.—Messrs. Buerkle of Boston, Hoffman of Chicago and Gillis of New York.

Committee on Amalgamation with Plumbers.—Messrs. Giessner of Milwaukee, Sproul of Grand Rapids and Quay of Chicago.

Committee on Death of G. E. Noyes — Messrs. Franklin of Boston, Barron of New York and McDonough of Chicago.

Committee on Wholesale and Retail.—Messrs. Woodman of Chicago, Light of Saginaw and Becker of Cleveland.

The roll was then called by States for reports from members having resolutions to offer or changes to recommend in by-laws. At this juncture a motion prevailed to go into executive session, at the conclusion of which an adjournment was taken until Wednesday morning.

WEDNESDAY MORNING'S SESSION.

After a brief executive session, during which some of the special work of the convention was laid out for consideration and future report, the doors were thrown open for the reading of papers. Charles J. Gillis was first called on, who read a very interesting paper on

Trade Schools and Charity.

"Knowledge is power" is an axiom which has been heard around the world since the dawn of civilization, and is as true now as it ever was, only that by the lights of modern times, it may be added that knowledge and money united make the greatest power wielded by man, an Archimedes' Lever, by the use of which the world can be moved, mountains leveled, great rivers spanned by mighty bridges and railroads and electric wires laid down all over the world.

Thothmes III, the great king of Egypt, who reigned thousands of years ago and elevated Egypt to the highest pinnacle of glory, whose immense statues and monuments may still be seen scattered all over that country, conquered the then known world, because he had knowledge of the art of war and a vast treasure to call upon.

I propose in this paper to suggest how knowledge may best be obtained, treasure accumulated, and some suggestions as to what is best to do with the latter when people have a superabundance.

PUBLIC SCHOOLS.

The public school systems of this and some other countries are admirable, and there is nothing for which the public pay taxes more readily. In the city of New York there are over 100 school buildings, many of them large and splendid specimens of architecture, with all modern appliances for making easy the paths to knowledge. There are always near 150,000 children attending these schools. I think there should be added to the public school systems all over the country two methods of teaching: The kindergarten for little children under six—now largely done in Boston, Chicago and San Francisco; and trade schools; but until instruction, both theoretical and practical, is given in various trades in public schools, dependence must be had upon the munificence of individuals for their establishment and largely for their maintenance. This has been done in the city of New York by Col. Richard T. Auchmuty in the schools established by him 12 years ago, which have been in successful operation ever since. Mrs. Auchmuty gave the grounds on which the school buildings are erected at First avenue and Sixty-seventh and Sixty-eighth streets, valued at $500,000, and last year J. Pierrepont Morgan added to the fund $500,000 more. The institution is not a self-sustaining one, the expenses last year having been $10,000 more than the receipts; nor is a profit sought by the promoters, their aim being to help young men learn good trades. The closing exercises of the school took place April 7; the course began October 1; the trades taught having been bricklaying, plastering, plumbing, carpentering, house painting, fresco painting and blacksmithing.

Total attendance has been 475; cost of tuition, from $12 to $30 per course. The day schools have been attended during the past season by young men from 32 States of our Union, from the District of Columbia, New Brunswick, Prince Edward's Island, Nova Scotia, and the Provinces of Ontario and Quebec in the Dominion of Canada.

NEW YORK TRADE SCHOOLS.

The promoter of these schools says: "Instruction in the mechanical arts other than that which could be had in a workshop, was regarded in this country as of little promise when the New York Trade Schools were established. The value of such instruction has now been proved, and there has hardly been a convention of master mechanics during the past four years at which the necessity of more systematic instruction in the trades than can be given in a workshop has not been admitted. This result has been brought about by the thoroughness of the instruction, both manual and scientific, which the New York Trade Schools have shown a trade school can give."

The New York Trade Schools are conducted on the principle of teaching thoroughly how work shall be done and leaving the quickness which is required of a first-class mechanic to be acquired at real work after leaving the schools. Progress at a trade school is necessarily rapid, as it is constantly sought to ascertain not only what the pupil knows, but in what he is deficient. Such a system can rarely be pursued in a workshop, where such employee is necessarily employed upon the work he can do best. Full wages have usually been obtained in from six months to two years after leaving the New York Trade Schools, according to the nature of the trade and the age of the pupil. Young men who were exceptionally quick at learning have obtained full wages at once; but it is the opinion of the management that steady work is more profitable in the end than high wages.

Trade schools are not a new thing. They have been established a long time in Europe, and partially for some years in this country in many colleges and institutes, but generally combined with general education, which does not meet the wants of young men who must support themselves and contribute to the family support.

It is expected that during the coming season an annex to the New York Trade Schools will be provided and a course of instruction, scientific and practical, will be given in the principles and practices of heating by steam or hot water in all its branches. Such a course of instruction cannot fail to be of incalculable importance to the master steam fitters, as well as to the steam fitters and helpers. Steam fitting business is of comparatively recent date, the writer having seen the first steam heating coil soon after it was erected in this country in 1835 by the late Joseph Nason; now there are millions of dollars invested in the business and hundreds of establishments whose sole business is the erection of steam and hot-water apparatus. The establishment of better methods for teaching steam heating seems to be a necessity.

ACCUMULATIONS OF WEALTH.

The possession of large accumulations of property in the hands of bad men is a menace to the State and should be prevented by due process of law, such a law as has existed in France since the time of Napoleon I, by which a man when he makes a will must divide his property, with some exceptions, among all his children, share and

share alike. In consequence of this law there are now in France 5,500,000 land holders, making the people of France, considered as individuals, the richest people on earth, and enabled the Government to astonish the financiers of Europe by paying at once the $2,000,000,000 of indemnity demanded by the Germans at the close of the war of 1870.

There are in this country, according to the latest statistics, 4047 millionaires, many of whom count their possessions at $50,000,000 or $100,000,000 each, and some have discovered, apparently, of late years, first, that sooner or later they are going to die; and second, that if they make a will it is more than likely to be broken and their money go in the directions they had not contemplated and do not wish. Therefore, we now oftener see men following the advice of Andrew Carnegie, giving away their surplus while they are living in order that they may have personal supervision over the spending of it. These give largely to charity, with the result seen everywhere in Christian countries of noble institutions for the poor, the blind, the helpless and the sick. Charity is great, good, noble, Godlike, for it is taught by the great Master Himself, and everywhere his followers are largely governed by these teachings.

There is in the city of New York an institution called the Woman's Mission, where poor women can come at any time, night or day, and be furnished, free of cost, with a hot meal and a bed and given every assistance and help.

The institution is supported by some of the wealthy ladies of the city. One of them, known as Sister Augusta, was often there evenings entertaining the women by her fine musical talent, speaking to them, cheering and encouraging them in every way that could be thought of. Little did these poor women know that this sister Augusta was the wife of the richest man in America.

Another of the grand ladies of our city built an annex at large expense to a public hospital where ladies of refinement and delicately reared could have the services of the best surgical aid if necessary. One of the first to avail herself of this privilege was a young girl. The lady who built the hospital saw much of her and they became tenderly attached. By one of those extraordinary coincidences which sometimes take place, the lady herself had to have the services of a surgeon, and instead of being attended to in her own luxurious home, she went to the hospital, saw the young lady, who threw her arms around her, and said: "We will have these operations done in different rooms at the same time and if we do not survive will go together." It was done. The younger passed away, but the elder survived. It is not difficult to understand that the angels of heaven looking down from above should say, "There is no occasion for us to come on earth, for they and such as they are doing our work there."

OPPORTUNITY NOT CHARITY.

In a far-off country I lately stood near an ancient palace at Delbi, India, on the banks of the river Ganges. A native was lying there on the sand in the agonies of death, the hot sun pouring down on his uncovered head. They told us he would soon die and his body be thrown into the river. There was no hospital there, no Sister of Charity.

But the stalwart sons of America will have no charity. What they want and should have is an opportunity to work and gain a knowledge of some business or trade which will give them an adequate return for their labor. This can but be done by the establishment of trade schools, and I hope that the attention of the wealthy men of the country may be called to the importance of establishing them; for certainly the good that can be accomplished by them is second only to the public-school system. I hope the time is not far distant when the mechanics themselves shall demand that no one be allowed to work at their trades unless he can show a certificate of graduation from a trade school, same as is now required of doctors and lawyers, as in most countries they cannot practice their professions unless they can show the previous preparation of education in medical or legal schools. Great as would be the results of the establishment of trade schools, if men will not avail themselves of their privileges and attend them, there will be no good results. As a poet has written about a great country:

"Fair Greece! sad relic of departed worth;
Immortal though no more; though fallen, great!
Who now shall lead thy scattered children forth?
Know ye not
Who would be free themselves must strike the blow?
By their right arms the conquest be wrought!"

Yes; by their right arms, by their own exertions, men must win their way.

Let us, therefore, men and brethren, implore the young men who come within our influence to be equal to their opportunities; to be first of all patriots, to swear by the flag of their country; for all who stand beneath its folds are entitled to "Life, liberty and the pursuit of happiness;" to gain a knowledge of their business; to be sober and attentive, and then they will be an honor to their kindred and their country, and when the time comes for them to join the numberless hosts who have passed away, they may have engraved on their tombstones: "He was a scholar, a Christian and a gentleman."

A discussion on this paper arose on the subject of the recognition of training schools by trade unions, in which statements were made that the opposition once existing is giving way gradually in numerous trades. The matter thus far has caused no trouble in the steam heating trade.

A. C. Walworth of Boston next read an exceedingly entertaining historical paper written by his father, J. J. Walworth, on

The Early Days of Steam Heating.

At the convention last year a vote was passed asking James J. Walworth of Boston to read an historical paper at the convention of 1893. Owing to various circumstances Mr. Walworth is not able to be present, but I am glad to read this paper in response to your kind invitation, and you will please to consider it collated by James J. Walworth, and simply edited by myself. For the benefit of those who were not at the convention last year, and in order to make this paper complete in itself, some facts given last year may be herein repeated.

There is no question that the store 36 Ann street, New York, was the birthplace of the steam-fitting business in this country. It was in that store that James Boyce, an Englishman, placed on sale a small stock of butt-welded pipe, 2-inch diameter and under, in addition to some other articles which he had brought over from the Old Country, no pipe being then made in this country. This stock was bought by Mr. Walworth in June, 1841, after correspondence with Joseph Nason, who was then in England, with the idea of both dealing in pipe and constructing the Perkins hot-water apparatus. Mr. Boyce then left for home, but Gardner D. Hiscox, his clerk, remained at the New York store for some time. Mr. Walworth carried on the business until 1842, when Mr. Nason returned, and the firm of Walworth & Nason, so well known to the last generation, commenced its active existence. Both Mr. Walworth and Mr. Nason belonged in Boston, and they naturally considered that city a good field for putting in heating apparatus, so they arranged to rent the store 18 Devonshire street, built especially for them, and in June, 1842, began business.

FIRST PIPE MAKING.

It may be remarked that at this time no pipe was made in America. Mr. Walworth was told by Joseph McCully, who was superintendent of Morris, Tasker & Morris' Tube Works, and by John Russell, who claimed that he drew the first tube ever made, that these tubes were not made until 1842, or later, and the Exeter, N. H., mill was not started until 1847.

To return to the New York business: This was moved from 36 Ann street to 149 Platt street, May 1, 1844, two days after the birth of the reader of this paper, and just three years later to 79 John street, the identical store now occupied by Felix Campbell in the same business. In this store Mr Campbell will be glad to show any caller a space about 15 feet long on the wall near the door where he says was kept all the pipe then in New York City, he himself having been an apprentice in the shop at about that date.

In the autumn of 1842 Walworth & Nason put in their first heating apparatus of the Perkins hot-water type, at the counting room of the Chiddlesex Company of Lowell, Mass. The boiler of this and subsequent apparatus was simply a circular coil of one continuous tube, such as Mr. Baker afterward adopted in his car heater, which is nothing more nor less than a Perkins apparatus adapted to a railway car. Although Mr. Perkins' practice was to use no valves, Mr. Nason found that in dwelling house apparatus it was better to divide the radiation into several sections for the various rooms to be warmed. He consequently devised a stop cock of a peculiar construction, with a stuffing box, not intended to make a perfectly tight closing of the circulation, but tight enough to reduce it to a minimum, so that the temperature of each room could be regulated independently. This arrangement thoroughly effected this, but both Mr. Walworth and Mr. Nason thought it not quite safe to construct an apparatus in which all the surface might be shut off at once, so they decided to discontinue that type of apparatus and place all the heating surface in a chamber or chambers in the basement, with the warm-air pipes leading to the several rooms, or precisely the indirect apparatus of to-day.

Such an apparatus was placed in the house of the late Ebenezer Milliken, 15 Ashburton Place, Boston, probably in 1845, where it is still in successful operation.

SMALL PIPES FOR STEAM.

At about this time Mr. Nason conceived the idea of using small pipes of ¾ or 1 inch diameter for heating by steam, in place of the large cast-iron pipes then in use in England and in a few mills in this country. About March 15, 1845, W. & N. contracted to put into the Eastern Exchange Hotel, near the East Boston Ferry, the first steam apparatus in the world using small wrought-iron pipe. On April 7, 1845, Mr. Walworth went to Burlington, Vt., to plan the warming and other steam apparatus for the Burlington Woolen Mills, the first large apparatus of this kind. On September 9 he started a similar apparatus in the Manchester Mills. Two days later, on September 11, the apparatus in the hotel above mentioned was tested and worked perfectly. On September 12 a similar apparatus was begun at the Eagle Screw Company's building at Providence, R. I., and during the same year Fletcher & Bro.'s cotton mill was piped in that city.

The year 1845 also saw the first globe valve devised and made by Mr. Nason, substantially as made by the million to-day.

The next year, 1846, saw the construction of steam apparatus, among others, for the Naumberg Mills, Salem; a five-story mill in Providence, for the Portsmouth Mills, six stores, for the Fall River Iron Company's cotton mill, the Lowell Company's mill, Blackburn & Co.'s mill in Ashburnham, for Stephen Fitch's mill near Norwich, Conn., for the Manchester Print Works, for the American Tract Society's building in New York, and for the Boston Custom House.

This last apparatus deserves special mention as being the first to use a fan blower in connection with an indirect coil. The apparatus was entirely successful and afforded an ample supply of fresh air and heat. In it the exhaust steam for the engine was used for heating the entering air as well as direct steam.

This apparatus was used nearly 30 years ago. At the end of this time, since small pipe was used in the coils and mineral oils for engines had not come into use, some of the coils became clogged with the gum from the oil, and under the administration of Mullet it was easy to have the whole apparatus condemned in order to give an opportunity for a new "job." This was done, and the apparatus was replaced by another without a fan, and, as I am told by experts, one very inferior to the old one, and one which is soon to be removed on account of its defections and bad condition.

FORMATIVE PERIOD.

The formation period of this business, including the first ten years, from 1841 to 1851, was the one which required and actually developed more skill and wise foresight, more energy, genius and creative power, than has ever been exhibited or called for since.

For them at the beginning there were no precedents, no examples of work, no experienced workmen in this new system, no tools adapted to the work. There were literally no fittings suitable for the new work. But after ten years of patient study and energetic work, among other things a complete set of cast-iron fittings had been designed and made; also a complete set of malleable-iron fittings (no fittings of either

cast iron or malleable had ever been made before). Special tools had been made, workmen had been trained, hundreds of factories and other buildings had been fitted up with steam heating apparatus. The first horizontal tubular boiler had been designed and brought into use. The fan blower for ventilation had been introduced. The finest tube works in the country had been built, and a great variety of special articles had been invented and brought into use, and more than all, reputation and public recognition had been gained.

After all this the growth of the business should have been comparatively easy.

The momentum gained in these ten years of energetic push became a chief factor in the future growth of the business. Only poor management or unavoidable misfortune could prevent prosperity.

It should be noted that cast-iron fittings were used from the first by Walworth & Nason, who discarded the wrought-iron fittings from England ten years before Mr. Kendricken thought he saw them being made at 18 Devonshire street in 1852. Mr. Walworth states that no wrought-iron fittings, except R and L couplings, were ever made in that shop, and as early as 1845 that firm were paying $5000 a year for castings to one foundry. At this time all the patterns for tees, elbows, branch tees, hook plates, return bends, &c., had to be devised, proportioned and made, and this work was done by Joseph Nason.

THE PIONEER OF STEAM HEATING.

Of the original work of Mr. Nason in this direction, the late Robert Briggs, C.E., in one of his reports says truly, "The steam heating apparatus in all its details, as used in America, especially the apparatus of small wrought-iron tubes, which had its origin at the hands of the late Joseph Nason between 1840 and 1850, has now become one of the established industries of the land, employing a whole class of workmen known as steam fitters and supporting large establishments devoted entirely to the manufacture of and trade in tubes and fittings. The little step in mechanism which is the foundation of this art is found in the use of the tapering thread on the end of the pipes wherewith a perfectly stanch joint is provided and made. It was not only in this particular but in many others of detail that Mr. Nason's ability as an inventor and adapter was shown in the apparatus; while supereminent above this he was at once the best informed man of his day on the theory and the most able in the practice of steam heating. Under his tuition the whole trade originated; not many years since it was possible to trace the descent or pedigree of any concern in the business to the original source. At this time the growth of the business going to a third or fourth race of firms or of workmen, precludes the following out of the continuity, although it certainly exists. The business, however, has been and is dependent upon the development of mechanical ingenuity, mainly from Joseph Nason, who gave form to the globe valve and derived or adapted from the practice of hot-water heating apparatus in England all the essential details which now form parts of usual every-day construction in the United States. Curiously, steam heating as practiced here is not yet fully known or used in England or France and but little more known in Germany.

FOREIGN MANUFACTURE.

In 1847 Mr. Walworth sailed for Europe to obtain information about two mills, returning in September, bringing plans and working details for a plant for manufacturing pipes and tubes. The Waualancet Tube & Iron Company were incorporated, with a capital of $150,000; a pipe mill was built at Edgeworth, near Boston, which was at that time the largest and best appointed in the United States. During 1850 and 1851 pipe was made in considerable quantities, but at the end of that year financial embarrassments, owing to insufficient capital and stringency in the money market, compelled their suspension. This involved the firm of Walworth & Nason, and resulted in the separation of the Boston and New York houses—Mr. Nason going to New York, and the Boston firm became J. J. Walworth & Co. It was not long after this that the White House at Washington was furnished with a hot-water apparatus by Mr. Walworth. It seems that Col. Chas. G. Greene, editor of the Boston *Post*, was in Washington when the White House was being put in order for the newly elected President Franklin Pierce. The heating of the house had always been execrable; there was one cold corner in particular which General Jackson graphically declared that hell itself could not heat; the question of what should be done was under discussion in the presence of Colonel Greene. He told the commissioners, of whom Capt. T. J. Lee was chairman, that he knew a man in Boston who was ahead of the rest of creation on that subject, and Captain Lee said: "send for him." Mr. Walworth was summoned to Washington at once, going on March 23, 1853, and a contract was made and closed June 1; amount, $7000. A large indirect hot water apparatus was put in before fall, and gave perfect satisfaction.

A paper of this kind should not omit, even at the risk of repetition, to recapitulate what great steps in advance were made between 1840 and 1852, through the inventive energy of Joseph Nason and the business energy of James J. Walworth, who also added mechanical genius competent to design and carry out large and successful heating contracts after he was deprived of Mr. Nason, collaborative with the removal of the latter to New York, including in this category many large insane asylums, like that at Augusta, Maine, and the City Hospital, Boston, which in all their designs and details were engineered by Mr. Walworth.

SOME STEAM SPECIALTIES.

Before 1852 Walworth & Nason had invented and placed on the market the steam trap, the globe and angle valve, the check valve, the back-pressure valve, the scroll die plate; also, the use first of cast-iron and later of malleable-iron fittings instead of forgings, and the horizontal tubular boiler with small tubes. Beginning with almost no capital in 1841 and working without appreciable profit for several years, after 1846 the business had so increased as to show annual profits of $25,000 for several years, the sale of pipe alone being $100,000 per annum, while before 1850 they were running 15 lathes on cocks and valves, five on valves alone, which they had been making since 1845, although one gentleman thought last year that he saw Mr. Barrett "shaping" the first one in 1852. Before 1850 Walworth & Nason had completed contracts aggregating hundreds of thousands of dollars, sold millions of feet of pipe and many tons of fittings, both cast iron and malleable, and placed the whole business of steam fitting on a standard basis, so that their employees were able to go out and start in the business for themselves with all the necessary devices, valves, fittings, pipe and tools ready at hand for purchase.

The reading of this paper was prefaced by explanatory remarks, in which Mr. Walworth gave some historical facts regarding the evolution of approved methods of pipe threading and coupling, as well as other points in steam-fitting practice now in general use.

T. J. Barron of New York followed next with a paper, partly reminiscent and partly prophetic, entitled "A Look Ahead," which we hope to present to our readers in an early issue. Mr. Barron's paper was received with enthusiastic applause.

L. H. Prentice of Chicago then read a paper, which was well received, entitled

Brotherly Love.

When invitations were sent out to the members to prepare papers to be read at this convention it did not occur to me that I could say anything that would interest you, but at the earnest solicitation of Brother Reynolds I consented to try, and will take my text from the fifteenth chapter of the Gospel according to St. John, and the seventeenth verse, which reads, "These things I command you, that ye love one another."

This commandment may seem rather difficult for some of you to obey, you who have always considered your competitor your enemy instead of your friend, but let me tell you that it will be dollars in your pocket if you will get this idea out of your heads, disabuse your minds of the error that it is necessary to ruin everybody in the same business by underbidding them in trying to get all the contracts in sight, and by criticising their work, their credit or their character.

My connection with associations of steam fitters dates back 10 or 12 years, and I think I was one of the first of a small band of "conspirators" (as they call them in St. Louis) who got together to see if something could not be done to better the situation. At that time we scarcely knew one another when we met in the street, nor did we care to, for we considered that we were natural enemies. This condition of mind made us easy prey for ingenious patrons. If an architect or owner mentioned one of our competitor's names we would slash off another 10 per cent. from our bid.

Well, as I was about to say, we got together once or twice and found that, after all, we were pretty nice people, and that our supposed friends were deceiving us, so we formed an association for mutual protection, and resolved in the future to "love one another," instead of trying to break up each other's business.

I think if you will ask any of our old members they will tell you that a fraternal commercial policy pays. And what business is there to-day that does not have its associations? I do not mean trusts or combinations to put up prices; but organizations where you can meet, become acquainted, and so regulate trade that you will not be a constant menace and injury to each other or subjects of the business guile so frequently met with. This principle of co-operation, the formation of locals, and the holding of national conventions which brings us together, is worth thousand of dollars to you, and the beggarly sum you are called upon to contribute is money well spent. This idea that we are enemies should be gotten rid of, by assisting each other in every honorable way to get that which belongs to us—viz., a legitimate profit for our labor.

One of my oldest competitors and friends (now present at this convention), a man who is at the head of one of our largest firms in this business, also an officer of the National association, once said that he would never join an organization that would lift up his weak competitors, or small firms. But he has changed his mind, and you know Bob Ingersoll once said that a man who never changed his mind is a d——d fool. Now, my brethren, if any of you are of the same opinion, that by working together and helping each other you are injuring yourself, it is time to change your mind, and I hope you will resolve to do so before leaving this city.

I wish, in conclusion, to say publicly that I entertain the sincerest regard for every one of my competitors, and they cannot make any reasonable request of me that I will not cheerfully grant.

Furthermore, I wish to thank you all, especially each individual member of the Chicago Local, for their uniform kindness to me since we became better acquainted, and for your patience in listening to my first public effusion, which I hope will in a measure cause you to mentally resolve that in the future you will try to obey the words of the Apostle by loving one another, and by so doing benefit yourselves and do justice to your families as well as your patrons.

Geo. D. Hoffman of Chicago, followed with a very able paper on

Combination Heating.

In selecting the matter of combination heating as the subject of my discourse, I am free to confess that I did so with some misgivings. It is such a common fault, not only among heating engineers, but also among the other learned professions, to condemn that method or system which is foreign in its teachings from that particular system from which they derive their knowledge. Thus, the allopathic doctor condemns every move or treatment of the homœopathic doctor, and the Methodist minister claims that the Baptist minister is all wrong; that their particular plan is the only one that will insure salvation to the world-weary sinner, and yet the objective point with each differing school is the same; each doctor strives to cure his patient and each minister to save the soul intrusted to his teachings. It is only natural, therefore, with these precedents, that heating engineers should condemn almost unheard systems of heating which are outside of their particular line.

You, gentlemen, call yourself master steam and hot-water fitters, and there is hardly a man among you who will not take a contract for either steam or hot-water

fitting, and who will not acknowledge that each system has its particular merits, and each in its way is worthy of the careful consideration of any prospective buyer; and yet it is within my short recollection in this business when steam men declared war to the knife against hot-water heating, and the advocates of hot water were equally strong in their condemnation of steam. To-day there is hardly a man among you who does not and will talk against and condemn from every point the system of furnace heating. It is said that furnaces are dirty, dusty and unhealthy, because they admit smoke and gas into the living rooms. It is also said that a furnace burns the air, and that one side of a furnace-heated house is always cold, while the other side is too hot. Inasmuch as a combination heater is a combination of a furnace and a steam or hot-water boiler, it is necessary for me to defend the system of furnace heating against the calumny of its opponents. Taking the accusations—dirty, dusty and unhealthy—in their order:

SO-CALLED BURNT AIR.

It is a well-known fact that all systems of heating are dirty, and all systems of indirect heating are particularly so. The reason for this, as we all know, lies in the fact that dust is an ever-present quantity in air, although it may be imperceptible to the naked eye. Even in a darkened room, which is hermetically sealed to the influence of the outside air, the presence of dust is made discernible even to the naked eye by the admission of a ray of sunlight. This is the evidence of the unceasing changes which the material world is continually undergoing—the irrefragable proofs that the visible matter of the universe is slowly and almost imperceptibly passing through a series of transmutations which affect both organic and inorganic nature.

In all systems of heating, both direct and indirect, where air is brought in contact with heated surfaces, these minute atoms of animal and vegetable matter, which are carried suspended in the air, are charred or burned by contact with the heated surface of the furnace or radiator, as the case may be, and this gives rise very frequently to the opinion (more particularly so in furnace work than in steam or hot water) that we burn the air. Now, the air itself is not burned, as it is impossible to burn air without combustion.

I remember reading an interesting article several years ago in the *Scientific American*, in which an elaborate test was made of this very subject. Air was taken from one receptacle and passed through, between and over wrought-iron plates, which were heated to an intensity of 2000° F., and then passed into another receptacle; and after the air had sufficiently cooled it was subjected to a chemical test and found to contain all the life giving qualities that it had previous to its passage over these plates.

INDIRECT HEATING SYSTEM.

The theory of furnace, or any other system of indirect heating, is one of displacement—*i. e.*, all the air in a room or building to be heated by this method must be displaced by the warmer air from the furnace, and, as this air cools from contact with the cold walls and other surfaces in the room, it must in its turn be driven from the room by a further introduction of warm air from the furnace. With a sufficient number of open fire places, or other means of drawing off the cold air from the rooms, the flow of the air from the furnace or indirect radiator is continuous and natural, and if the supply of air to the furnace or indirect stack is from the outside, there is a continual flow of fresh dust as well as fresh air. As cheap, poorly constructed furnaces are not considered "in it" in this article, and as well-constructed furnaces do not leak gas, smoke or dust from their combustion chambers, the above argument against the furnace on account of its being dirty is the only one that will stand the search light of unprejudiced investigation. Very few blessings are unmixed with evil, and in my opinion the blessing of an abundance of fresh air more than offsets the evil of the accompanying dust.

DRY AIR.

The main argument advanced to uphold the statement that the furnace is unhealthy is that it drys the air, thereby inferring that the original moisture contained in the air before its entrance into the heating chamber of the furnace was lost by contact with the heating surfaces of the furnace. We also very often hear this same argument advanced against steam heating, but nothing can be further from the truth. Air when saturated with moisture contains, at 32° F., one-one hundred and sixtieth of its weight in water, at 50° it contains one-eightieth and at 86° one-fortieth, doubling its capacity for moisture with each increase of 27° F.

We can readily see by the foregoing that instead of losing the moisture, we have simply increased the capacity of the air for moisture with increase of temperature. If allowed to remain in this condition the effect would not only be deleterious to persons occupying the room so heated, but the effects would be disastrous on the furniture and the wood work of the room. It is a well-known scientific fact that rapid evaporation has a cooling effect, which enables one to withstand a much higher temperature without discomfort than would be possible in an atmosphere heavily charged with moisture. Thus we read every summer of numerous heat prostrations in New York, where the atmosphere is extremely humid with a temperature of not over 90° F., while in the high dry altitudes of some of our Western States a temperature of 100° to 110° in the shade is successfully withstood. In artificial heating a happy medium is the desideratum, and in all well-constructed furnaces ample provisions are made for supplying the extra moisture made necessary by raising the temperature of the air.

As to whether I have in the foregoing made a successful defense of the subject of furnace heating is a question which you, gentlemen, must decide upon. In any event I shall drop this subject at this point from now on, and simply treat of the main subject of my discourse.

THE COMBINATION SYSTEM.

The word "combination" may be defined as the result of combining or joining together two or more different elements or systems into one harmonious whole. There are several distinct and different systems of heating, and the combining of any two of these systems into one would naturally result in a combination system. The specific form of combination heating which I wish to treat of is obtained by a combination of steam or hot water and air, or, as it is commonly called, furnace heat. The advantage of the combination system in buildings suitable to its use are manifold, but in order that these advantages may be made apparent, it may be necessary to diverge a little. Heat is supposed by many to be an actual and discernible substance, and until within a very few years even the more advanced students of natural physics were of the same opinion. Later investigation has shown that heat is nothing more nor less than molecular motion, consisting in case of air of nearly uniform rectilinear motions, with sudden changes in direction and velocity when the molecules come too near one another; in case of a liquid of irregular wandering of its molecules, and in case of a solid of orbital or oscillatory motions. By the foregoing definitions it will be readily seen that air will absorb heat much more rapidly than either liquids or solids, and as in combination heating we are depending for fully 50 per cent. of our heat on air heat, the natural conclusion is that a combination heater will give results in the rooms to be heated much quicker than either straight steam or straight hot water.

Heat is communicated from one body to another in three ways, viz.: Radiation, convection and conduction. Radiant heat passes from one body to another at a distance through the air in straight lines and with great velocity, but it does not, to any appreciable extent, warm the air through which it passes. Conducted heat passes from one particle of matter to another at insensible distances, as an iron bar with one end in the fire becomes gradually heated at the other end. Convected heat is the movement of the heated body itself from one point to another, as the circulation of hot air or hot water. In combination heating we again have an advantage over straight steam or hot water, as we utilize in the rooms to be heated two of the three processes of heat distribution—*i. e.*, radiant and convected heat—while in steam or hot water only the radiant heat is utilized.

VENTILATION.

One of the most important features of combination heating is the fact that where the air supply is taken from the outside, as it always should be, it insures a perfect ventilation throughout the building, as well as heat. The necessity for ventilation is very little appreciated by the general public, but as heating and ventilation have always seemed to me to be inseparable, and as the people naturally turn to our profession for their knowledge of these matters, it might be well for me to ask, What is ventilation, and why is it necessary? Ventilation is the act of replacing foul, impure air, in a confined space, with pure air. Please note that word "replacing." Times without number have I had people assure me that they had looked out for the ventilation of their house, as they had fire places in all the principal rooms. When asked if they did not know that "Nature abhorred a vacuum," and that their fire places would not exhaust unless there was some means provided for replacing the air thus removed, would reply, "They had not thought about that, but guessed there would be enough leaks in the doors and windows, anyway." I could cite any number of leading authorities and read whole chapters showing the necessities of ventilation and the vast consequences of the result of continued breathing of impure air, but a mere statement of the component elements of air will suffice for this article. If we divide air into 10,000 parts, its composition would be as follows: Oxygen, 2096; nitrogen, 7900 and carbonic acid 4 parts. When the proportion of carbonic acid in a room is increased from the normal amount of 4 parts in 10,000 to between 6 and 7 in 10,000, a faint, unpleasant odor is usually perceptible to one entering from the fresh air; if the proportion reaches 8 parts the room is said to be close. According to some authorities, a full-grown man at rest will exhale through the pores of the skin and from his lungs nearly ⅘ cubic foot of carbonic acid per hour. Taking a room containing 2500 cubic feet of air in its normal condition, we find that the air contains 1 cubic foot of carbonic acid. Now, let us suppose this room to be a sleeping room, not ventilated, occupied by two persons eight hours each night. If the windows and doors of the room were closed during the eight hours, the natural portion of carbonic acid would be increased to about 13 cubic feet (or 1 part to 200), and the occupants would arise in the morning with depressing headache. A person coming into the room from the outside would declare the air to be "foul," and a man does not need to be a crank on ventilation to reach the conclusion that such a situation would be anything but healthful. This condition could be obviated, to a certain extent, by raising the windows, but that practice is dangerous in results, is a prolific source of colds and sickness, and as a means of ventilation totally unreliable, not to mention the morning's discomfort of arising in a cold room. Accurate ventilation will replace the air in a given room every 20 or 30 minutes without dratt.

FINAL ADVANTAGES.

I wish to call attention here to the reason why the combination heater will from natural causes give more perfect and greater results in ventilation than it is possible to obtain from indirect steam or hot water, more particularly hot water. The force which we use to crowd the fresh air into the room and drive the foul air out is due to the expansion of the fresh air by heat. Air expands one-four-hundred and ninety-first of its bulk for every degree it is heated above 32° F.

Thus it will be seen if we heat the air 50° warmer than the surrounding air we have increased its bulk very nearly one-tenth. The greater the difference in temperature the greater the expansion, and, as a natural consequence, the more rapid the movement of the warmer air. On a moderate winter day the indirect radiator in a hot-water job is rarely heated over 130° to 140° F., and as it is not possible for the air in passing through the stack to absorb more than from one-half to two-thirds of its heat, the temperature of the air flowing into the room under such conditions will rarely exceed 75° to 80° F. As the force with which the air comes into the room depends upon the difference in temperature of the air in the stack and the air in the room, it will be readily seen that the movement must be very sluggish. With the combination heater, the air coming in contact with the fire and smoke surfaces only, the temperature is raised much higher, with the result of a rapid flow of a large volume of air into the room in question.

Now, one more point, then I am through. In installing a combination job great care should be taken to place the heater as near the center of the work as possible, locating all air registers as near the heater as practical, so as to insure short connecting pipes in the basement. Always locate registers away from windows or cold walls, selecting, if possible, the warmest side of the

room. Cold and warm air are always antagonistic, and you should give the warm air all the advantage possible if you wish for the best results.

Lastly, the combination system of air and water heating particularly is in the market to stay, and to you who are interested in residence or school heating the subject is worthy of your most careful consideration.

Mr. Thompson of Philadelphia asked whether any experiments had been made in sterilizing air by subjecting it to a very high temperature, for the prevention of disease, to which Mr. Hoffman replied that he was not aware that anything had been done in that direction. The association then went into executive session.

The executive session was devoted to a discussion of the report of the Committeee on Constitution and By-laws. Some changes were made, one of the most important being the formation of an Advisory Council of past presidents for a term of five years hereafter, the past presidents now in existence to serve so much of five years as yet remains from the time they finished their terms as presidents. Thus John Davis of Chicago, the first president of the association, would serve for one year; Charles J. Gillis of New York, for two years; Samuel I. Pope of Chicago, three years; Albert B Franklin of Boston, four years, and P. S. Hudson of Chicago, five years. The Advisory Council is not to supersede the Executive Committee in any way, but is only to be called together whenever the president may deem it advisable for the settlement of important questions.

WEDNESDAY AFTERNOON.

The labors of the convention were resumed in executive session at 3 o'clock. Shortly afterward the doors were thrown open. On motion of Mr. Kenrick of Boston, a resolution was adopted that it is the sense of this convention that the use of standard flanges should be put in force on January 1, 1894, and that no other flanges should be specified after that time. Discussion of the report of the committee on permanent headquarters was the next thing in order. They had reported in favor of continuing the existing arrangement of establishing headquarters in the city in which the president resides. After an expression of opinion on the part of several members the report was adopted and the committee continued for another year. A paper by H. W. Heath of Lynn, Mass., was then read on "Amount of Heat Lost after Passing through Boilers and Utilization of Products of Combustion," which we hope to print in an early issue.

Albert B. Franklin of Boston then read a paper on "The Paul Air-Removing System," which will likewise be printed later.

The reading of these papers was attentively listened to by the members, but no discussion was evolved. An adjournment was then taken to Thursday morning.

THURSDAY MORNING.

(By Telegraph.)

Thursday morning session began with the announcement of the receipt of $200 from St. Paul to be added to the funds in the treasurer's hands. Mr. Kenrick stated that an error had been made in the *Daily Bulletin's* copy of the treasurer's report. Massachusetts was credited with but $680, but it should have been $1340.

R. T. Crane of Chicago then read a paper on the early history of the manufacture of wrought-iron pipe. He stated that the demand for wrought-iron pipe began with the invention of illuminating gas in the latter part of the last century. The first gas pipes used were gun barrels, as at that time no other method was known for the manufacture of wrought-iron pipe. The invention of butt welding was first introduced at Wednesbury, England, in 1825 by James Russell. The Whitehouse method, brought out afterward, was described in detail, as it is the one which is still in use. Steam engineering then began to be recognized, with the building of railroads, and with the more extensive use of steam engines lap welding became necessary for greater strength. About 1830 to 1835 Russell experimented in this line, spending large sums of money. Martin Jones then took it up, using four welding rolls, while Russell used only two. The Jones method was successful, and lap-welded tubes were then made in a commercial way. The development of the industry in America was briefly touched upon merely to show its magnitude to-day.

Messrs. Simmons, Franklin and Thompson were appointed a committee to draft resolutions of thanks to manufacturers and jobbers for the entertainment provided for members.

Election of officers was then taken up.

Enoch Rutzler was unanimously elected president.

Harry D. Crane of Cincinnati was elected first vice-president.

Edward P. Bates of Syracuse second vice-president.

A. C. Walworth of Boston third vice-president, without opposition.

E. D. Smith of New York was unanimously elected treasurer.

John B. Hughes of St. Louis was elected sergeant-at arms.

The president then appointed Messrs. Franklin, Smith, Hughes, Crane and Prentice a Committee on Nominations for Executive Committee, who, after a brief recess, reported the following list:

J. L. Wells, James Curran, Andrew Mercer, Geo. H. Morris, J. D. Clarke, all of New York, who were unanimously elected.

It was then decided to meet next year in New York. The printing of a souvenir volume of proceedings of this convention was left to the old Executive Committee. The Committee on Resolutions of Thanks to Manufacturers and Jobbers for entertaining the convention then reported very complimentary resolutions, which were unanimously adopted. Announcement was made that the paper entitled "A Successful Heating Plant" would be read by S. I. Pope of Chicago at the banquet in the evening at the World's Fair.

Installation of officers was next in order, and President Hudson introduced the new president in a very complimentary speech, which was replied to by Mr. Rutzler. Other officers were then formally installed. P. S. Hudson of Chicago moved a resolution of thanks to Secretary Reynolds for his services to the association during the past five years and recommending to the new Executive Committee that they re-employ him if they see their way clear. A standing vote was taken on this motion, and it was carried with no opposition. The compliment was acknowledged by the secretary in a speech counseling harmony and the cultivation of good feeling among the members.

Mr. Franklin of Boston then magnificently eulogized Chicago, and ended with proposing a vote of thanks to the Chicago members for the manner in which they had entertained the visiting delegates. On motion of Mr. Kenrick, a vote of thanks was also extended to the retiring officers. Mr. Geiger of Buffalo moved a vote of thanks to the press for the interest taken in the work of the association and for what they had done to promote the welfare of the organization.

The convention then adjourned to meet next year in New York.

SIDE ISSUES.

— THERE was less of a display of goods than has been the rule at previous conventions, due to a reaction from the splendid display made at Boston last year, and the fact that a few blocks away the sample rooms of many of the manufacturers gave a complete line of goods for inspection.

— ONE HOT-WATER MAN illustrated the cause and effect of successful hot-water heating by stating that if you had a spring of hot water at the top of a hill that was running 50 gallons out of it down a ditch, and you wanted 2 gallons of it 70 feet over to the right and 10 gallons over to the left, you would simply take a shovel and dig ditches of the right size to get the desired quantity there, and the same common sense must be used in hot-water heating.

— THE D. F. MORGAN BOILER COMPANY, Akron, Ohio, had one of their new hot-water boilers on exhibition painted and gilded to make a parlor ornament instead of a cellar necessity. Rapid vertical passage of water through the boiler and long indirect passage of the products of combustion over the water chambers, so that the smoke pipe is cooler than the flow pipe, is the special claim for this boiler. Their claim for the steam goods is equally strong. Colored pictures of the World's Fair buildings were presented in an envelope with the compliments of the company by E. J. Yunker, manager of the Chicago House.

— THE SIMPLEX SYSTEM of mains for hot-water heating, invented by Curt J. Balthasar of St. Louis, was exhibited by J. W. Fryer of 1906 Cora Place, St. Louis, Mo. It consists of a cast-iron pipe with a diaphragm in the center to divide the flow and return, and has openings in the top and side for the flow and return branches Its use saves the return pipe and the use of ties, and received the favorable comment of the visitors. During the past winter it has been thoroughly tested in St. Louis with, we understand, excellent results.

— H. S. VAN VOLKENBURGH kept in rapid circulation the literature of the Mount Heater Company of Detroit, Mich., and having just returned from a trip from the West had plenty of facts at hand to show that this hot-water heater furnished all the heat units desired when the cold units came in avalanches and cyclones on the outside. In mild weather, early fall and late spring the thin vertical water, ways enable prompt heating with a wood fire. Another feature of this boiler is the ease of draining it.

— S. W. ENTRIKEN, representing the Entriken-Elder Electric Company of Harrisburg, Pa., the general Eastern agents of the Electric Thermostat Company of Minneapolis, exhibited the automatic electric heat regulator. It was shown by a model in connection with a valve on a street steam supply and a steam heater, and was also shown connected with a Sun boiler. It is adapted for controlling the fire to produce a stationary temperature at the degree at which it is set. A fall in temperature of 2° will start the thermostat, which opens or closes the circuit, causing the motor to open or close the drafts. The motor is operated by a spring, which is provided with a crank for winding it up when it runs down. An ordinary open circuit battery of two cells is all that is required to release the spring. Their experience is that it works equally well with any sort of a heating apparatus, and is so sensitive to temperature that the breath will release the motor.

— C. YINGLING displayed the Equator steam and the Gulf Stream for hot water for the Nason Mfg. Company of New York. Polished brass models of both set on a table covered with red cloth surrounded by the literature of the company. Conspicuous among this was their bevel edge black card with gold and silver bronze letters "10 to 1 we sell the Equator for steam and the Gulf Stream for hot water and guarantee that these boilers will evaporate 10 pounds of water at 212° to steam at 212° with each pound of coal burned in them."

— THE HOLLAND RADIATOR & MFG. COMPANY of Chicago made an attractive display of radiators, 20, 26, 32, 38 and 45 inches in hight, exposing a heating surface of 2, 2⅝, 3⅜, 4 and 5 square feet to the loop respectively. They were finished in different colors and gold bronze.

— JOHN MILLAR, winner of one of *The Metal Worker* heating prizes, represented the Boynton Furnace Company, New York and Chicago. The goods shown were a No. 18 Niagara water heater, a No. 23 and 37 Boynton's water heater for hard coal, and a No. 208 specially constructed for soft coal. The walls were decorated with a collection of photographs of some handsome residences and buildings which were heated by their goods.

— PRESIDENT GEO. P. STEEL of the George P. Steel Iron Company of Camden, N. J., manufacturers of steam and hot-water heating apparatus, renewed his friendship with the trade at the Revere House.

— AS CHAIRMAN of the Entertainment Committee, E. J. Yunker kept the boys out of hot water and showed them a general good time.

— PRESIDENT JOSEPH BOND of the American Radiator Company was ably assisted in dispensing the best wishes of the company by Manager J. A. Goodrich of the New York office and Chas. K. Foster, Wm. Hill and Samuel Hopper of the home office. Their office and wareroom at 111 and 113 Lake street, Chicago, being so near, they made no display at the Revere House. The exhibit of radiators made in their showrooms is, perhaps, the most elaborate and varied to be seen anywhere in this country. It is almost a department of the World's Fair in itself.

— GEORGE BOLTON of the George Bolton Boiler Company of Detroit showed a model of the new improved G. & J. R. Bolton boiler made by the Foskett & Bishop Company, New Haven, Conn., and the Nashville Machine Company, Nashville, Tenn. Mr. Bolton was assisted in explaining the boiler to the visitors by John C. Doyle of Nashville. Circulars containing interesting information on the construction which they employ are freely distributed. Mr. Bolton was well known by the members and kept jokes in free circulation.

— THE RAYMOND & CAMPBELL MFG. CO., Middletown, Pa., have on exhibition three of the Lindemuth Sun heaters for steam and hot water. The Sun heater No. 2 for hot water is shown with galvanized iron casings. The Sun heater No. 2 for steam has the castings painted white with gold stripes, while the casing is of planished iron with polished brass bands. The Sun sectional heater No. 2, of which a sample is also on exhibition, is mounted in a manner similar to the steam heater.

— SMITH & WINCHESTER of Boston, Mass., exhibited the Volunteer boiler, made by the W. H. Page Boiler Company, Norwich, Conn., both for steam and hot water, in charge of N. E. Frost, who dispensed the literature. The boilers are made in ten sizes and both the ash pit and the fire pot section are cast in one piece, while the upper water sections are shipped all screwed together, so that only two joints are to be made when setting them up. A sensitive draft regulator in connection with the boiler is operated by the expansion of the water and not by the temperature of the room.

— G. W. DUNN presented a very acceptable souvenir from the Western Valve Company of Chicago, in the shape of a small directory of the city and the fair, with a map. With this almost any point of interest in the city can be found.

— J. D. STILES, the representative of Jenkins Bros., is a real orator whether talking valves or other matters and always holds his audience whether engineers or social acquaintances.

— AMONG the most popular representatives were the ladies that were in attendance, about 40 in number.

— HOSEA WEBSTER, the manager of the Chicago house of Henry R. Worthington of New York, distributed a souvenir that had very little to say about pumps, but was a large and very acceptable map of the city and the World's Fair Grounds.

— W. S. PHILLIPS of Phillips, Doup & Co. of Brooklyn, N. Y., manufacturers of steam and hot-water heating apparatus, is making quite a study of the fair, and spends odd moments in writing friends at home that Chicago and the fair can be seen at a reasonable cost, and that his impression before starting of exorbitant charges has been demonstrated all wrong.

— WHEN he has time from the many demands made upon him, as the official stenographer of the association, P. G. Munroe, of the *Master Steam Fitter*, can relate a story with telling effect and is generally rated good goods.

— IN THE ABSENCE of the popular Doc Morgan, John B. Hughes was pressed into service as sergeant-at-arms, but after a good dinner it was next to impossible for him to get a quorum promptly into the meeting hall.

— THE POPULARITY of P. S. Hudson is not hard to understand. He is one of the most genial of men, never too deeply immersed in business to forget the dictates of politeness. A most striking example of this trait was shown while he was delivering his presidential address at the opening of the convention. The members were listening with the deepest attention to his incisive sentences when an acquaintance entered on tiptoe, and noiselessly took his seat. But the eagle eye of the president saw him nevertheless, and with an aside "How are you, Harry?" went on again with his address, unconscious of having done anything unusual.

— J. POEHNER of Poehner & Dillman of Joliet, Ill., who carry on a general business in tinning, plumbing, gas fitting, hot air and steam heating, says they can never be separated and that the tinner will always be able to buy all the steam and hot-water goods he requires.

— E. N. SQUIRES, secretary and manager of the New York Central Iron Works Company, Geneva, N. Y., was a popular guest at the Revere House, and left as a souvenir a russia leather match safe bearing the inscription in gilt letters: "None can match the Dunning boiler for steam or hot-water heating"

— E. D. SMITH, from the New York house of Baker, Smith & Co., was a guest of the Chicago house and enjoyed the convention thoroughly, taking part in many discussions of heating and ventilation.

— JOHN A. FISH, managing director of the Gurney Hot Water Heater Company of Boston, was by no means a fish out of water, but right in his element, having a good time and doing the fair incidentally.

— H. B. SMITH & CO., Westfield, Mass, were represented by A. C. Mercer of the New York house, who left the Mills and Mercer boilers for steam and hot water out of the question, and was busy shaking hands and chatting with his many acquaintances.

— T. C. JOY & CO. of Titusville, Pa., were represented by C. W. Wright and S. S. Brewer of the Chicago house and D. Coldstock of Titusville. They made no display, but spread joy through the Revere House by an invitation to inspect their line, the pioneers of flue radiators, at 96 Lake street.

— SAMPLES of the Littlefield patent steam trap were shown by Foss & Noble, general agents. The object of this trap is to discharge condensation into tanks or into the atmosphere. There are no flanged connections or bolted joints in this trap, all necessary packing can be done without taking the trap apart and it is without any interior mechanism.

— THE AMERICAN BOILER COMPANY were well represented by George E. Downe, manager; C. V. Kellogg, treasurer, and traveling salesmen as follows: T. F. Gerrells of Denver, J. A. Farrell of Iowa, M. L. Foote of St. Louis and Robert Munro of Pittsburgh. The company made no exhibit at the Revere House, preferring to invite members of the convention to visit their elegant headquarters, not far distant, at 34 and 36 Dearborn street. The American Boiler Company have made no exhibit at the World's Fair, on account of lack of space to properly show their extensive line of boilers. Four of their Spence hot-water boilers are, however, in use whenever required in the propagating houses in connection with the horicultural department, and another was put in the Chinese theater.

ON TUESDAY C. H. Simmons of the Theodore Jacobs Company announced that he had been authorized by Mayor Harrison of Chicago and President Higginbotham of the World's Fair directory to invite the members of the convention, the ladies accompanying them and the manufacturers and jobbers to attend the performance of "America" at the Auditorium on Wednesday evening. Forty boxes were placed at their service. The courtesy was accepted with hearty thanks. It was afterward ascertained that the modesty of the Chicago members caused them thus to conceal the fact that they were responsible for this entertainment and not any outside interests.

— E. J. YUNKER of the D. F. Morgan Boiler Company, in behalf of the manufacturers and jobbers of the United States, extended an invitation to the delegates and their ladies to visit the World's Fair on Thursday afternoon. A sufficient number of tally-ho coaches was engaged to take the entire party to the fair by way of the magnificent boulevards on the south side of the

city, and on arrival at the grounds a fine lunch was provided in one of the restaurants.

— MINGLING among the members, meeting with a hearty welcome everywhere, was George Standart, secretary, treasurer and manager of the Exhaust Steam Purifying Company, Chicago and New York. The headquarters of this company are at 736 Monadnock Block, Chicago.

— THE W. C. VOSBURGH MFG. COMPANY, makers of gas fixtures and electroliers, were represented by Theo. W. Starbuck for the East, R. A. Sugden for the South and Nate L. Maher for the West. The company's headquarters in Chicago are at 184 and 186 Wabash avenue, where they have a very fine salesroom.

— THE UNITED STATES HEATER COMPANY of Detroit, Mich., were represented by their vice-president, A. T. Henderson, a man of genial presence and wide acquaintance among the members of the convention.

— THE THANKS of *The Metal Worker* are due to P. G. Munroe, the official reporter of the association, for courtesies received at his hands.

— THE MODEL HEATING COMPANY of Philadelphia, New York and Chicago were represented at the convention by John J. Spear and George S. Gregory of Chicago, who discoursed on the merits of the Novelty hot-water circulator.

— MARK E. MONASH, vice-president of the Van Auken Steam Specialty Company of Chicago, made every man glad to meet him, and could by pressure by induced to say a word about Van Auken's duplex automatic air valve.

— THE NASHVILLE MACHINERY COMPANY were represented by Manager John C. Doyle, who thoroughly enjoyed meeting so many good fellows in his line and entirely forgot the machine shop, brass foundry and line of steam fitters' supplies he left at home.

— JAMES P. MARSH of James P. Marsh & Co., Chicago, had a pleasant greeting for each visitor at the convention, and the question of valves never came up except as a stop to the interview, when his card showed the improved automatic air valve.

— A TALL MAN, A. J. Sweeting, Auburn, N. Y., carrying what resembled a gun case, attracted no little attention, but he was found to be most docile and genial, and his weapon Hill's adjustable chain pipe wrench. The lever or handle of the wrench screwed up against the jaw, so that the trouble of getting a chain wrench to take hold is avoided. Mr. Sweeting is the general agent for the Roll Paper Cutter Company of Richford, N. Y. One of his orders for this wrench was from a Western house for 100.

— LOUIS BENDIT, representing Scott Valve Company, Chicago, was an acceptable visitor to every group at the convention.

— G. M. DAVIS & CO., Chicago, exhibited in parlor B several of their steam heating and regulating specialties. A Davis noiseless back-pressure valve was shown with the side cut out, giving a clear idea of its working.

— THE A. A. GRIFFING IRON COMPANY, Jersey City, N. J., were represented by treasurer S. D. Tompkins and Leonard Elliott and F. W. Somers of the Chicago house. In their headquarters, parlor 100, they exhibited something new in radiators, the Colombia, for both steam and hot water, which was investigated with interest by the fitters.

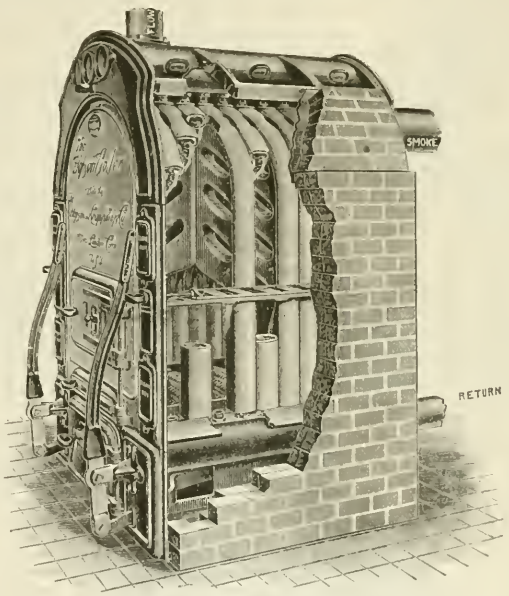
— JOS. MACWILLIAMS of Jos. MacWilliams & Co, Louisville, Ky., who stands high with the members as a good fellow, reported a growing interest in heating by steam and hot water in his section.

— BEAUTY, brilliancy and *bon comaradie* were represented at the convention by R. D. Reed of H. B. Smith Company, J. D. Stiles of Jenkins Bros. and Clarence Woolley of the American Radiator Company.

— IF ANY feel slighted by missing their names from this list it is due to the mist on our glasses when we looked their way.

The Hopson Boiler.

The cut presented herewith shows a broken view revealing the interior construction of a Hopson boiler, an apparatus designed for warming houses by hot water, and made by the Hopson & Chapin Mfg. Company, New London, Conn. The general features of the boiler are clearly shown in the engraving. It consists of upright sections comprising side waterways, and inclined intermediate waterways connecting with a vertical passage in the middle. At the top nipple connections are made



Broken View of Hopson Boiler, Showing Interior Construction.

with a water dome of elliptical section, while the bottom of the water legs are similarly connected to headers on either side of the boiler. The whole is incased in brick, or made portable if so desired, and at the top are hand plates which may be removed so that the interior surface can be thoroughly cleaned. In addition to the removable plates at the top, clean out plates are provided at the front and rear, so that every part of the boiler is accessible and likewise in plain sight. The course of the hot gases is controlled by means of damper plates at each side of the sections between them and the casing, as shown in the picture. The hight of the boiler is 6 feet, the width of the portable style being 47 inches and of the brick-set style 60 inches. They are made in nine sizes, with from 8 to 16 sections; 135 to 280 total square feet of heating surface, and 4 to 9⅛ square feet of grate surface, adapted to an average radiation supplied of from 1100 to 2600 square feet.

GEO. H. TAY COMPANY of San Francisco are considering the advisability of locating a branch establishment in Portland, Ore. The company give attention to steam, hot-water and hot-air heating throughout the entire coast country, and also do a large business in plumbers' and tinners' supplies. They have put many large heating plants in buildings in the Pacific Northwest during the past year, and at the present time are figuring on large contracts in that territory. They have heretofore been represented in Portland by B. F. Rittenhouse, Jr.

How We Selected a Boiler.

BY SWIPED JOINT.

My wife and I thought we ought to have our new suburban residence warmed by steam or hot water. Our neighbor, Mr. Stay-at-home, advised us to let the job to MOTTS, our town PLUMMER, who, he said, needed all the work the place could give him to sustain his yacht. My wife, who was very anxious to secure the very best boiler made, suggested inserting a brief notice in *The Metal Worker* and Westfield GEYSER, asking for circulars and prices.

Thinking this a CAPITOL idea, and one likely to secure a good deal of information about MODERN heating apparatus, it was promptly acted upon. Business took me out of town for two or three days. After my return I went to the post office, where I found a brief note from the postmaster requesting me to call at his private office. Going there in considerable wonderment, he called my attention to a large pile of mail matter, and informed me that being unable to place it in my box he had instructed the clerks to deposit it on the floor of his office, and requested me to have it removed. Requesting him in turn not to put on such MAJESTIC airs, I politely directed his attention to the addresses, reminding him that the office was a free delivery one, and I would hereafter have my mail delivered at my residence. A colored *attaché* of the post office took that mail away in a wheelbarrow. When I reached home

my wife handed me a letter from our architect, DUNNING me for a promised advance payment on the plans and specifications of our new house. She said the rest of the mail would keep until after supper. Soon after supper she accompanied me to the library, where the accumulations of three days lay piled in heaps on the floor.

Christopher COLUMBIA ! That gun was loaded. There were circulars and pamphlets, illustrated and otherwise, of every boiler and circulator on this GLOBE and under the SUN. Every PAGE filled with ROYAL descriptions and testimonials of their UNIQUE construction and PERFECT circulation ; each and every one of them entirely FAULTLESS and worth their weight in GOLD, and all O K beyond a doubt. We postponed more particular examination until the next evening. While at breakfast the next morning the mail carrier came BOLTON in with another grist, and the NOVELTY of selecting an IDEAL heating boiler was becoming real interesting. Our daughter, LILY, foreseeing how we should be engaged, sought permission to accompany a newly landed French gentleman, LE BOSQUET, to the WINDSOR hop that evening. I was about to GRANT her request when our oldest son, GORTON, said : "If sis goes you MOUAT let me go, too." His mother VOLUNTEER-ed to remind him that two were company but three was a crowd.

I came home early that afternoon expressly to select our boiler, and found the collection of *circulating* literature had been very materially increased during the day. My wife told me that the mail carrier had intimated possible trouble if we were using the U. S. mail to further some fraudulent scheme. I replied that I did not care a CONTINENTAL for what he said, but if this was to go on increasing we would have to find a larger house or leave town. This remark of mine occasioned my wife some little anxiety, and she very *fitting*-ly remarked : "WETHER-BED we better go, MERCER ?" However, after supper, and when baby had gone to sleep, we both went at it, determined to settle the *heated* question before we went to sleep. My wife insisted that we should practice ECONOMY. This thing was going to cost "like sixty." She had been looking over the circulars during the afternoon with Mrs. BOYNTON, whose house was heated by hot air, which didn't cost one-third as much as hot water. Mrs. B. told her that, during last winter, by putting on double sashes, storm doors and weather strips, their house was part of the time so warm the plants withered and the wall paper cracked. Everything shrunk, including the children's cheeks. There were occasional puffs of gas and smoke, "but you know," Mrs. B. said, "you can't help that."

"SCOLLAY, my dear (I call my wife Scollay for short), you know we are not building a hot house, only a dwelling to live in and we want it well warmed and ventilated. We don't want to get withered too soon. It makes wrinkles." That was a SPLENDID hit, for you know women hate wrinkles. If you want your wife to put on the airs of a *Eulalia* just intimate to her that you see a wrinkle coming in the corner of her eye. So, she says, "ALL RIGHT," and into it we went. After that the way my wife went through that pile of *heating material* would make a salamander laugh. Judging it prudent to slow her down a bit I very sweetly remarked, "MA HONY, see here la the STOVER and the SOLIEL ; they are about PERFECTION; examine them." Evidently she misunderstood and replied: "Stover builds windmills, but we don't want a solid wheel," and off she ran again before I could check her. She reminded me of a summer whirlwind playing antics in a meadow. I could catch glympses of renowned names, SMITH, MACKAY, GURNEY, BUNDY, O'KELSEY, as the circulars landed here and there about me. I began wishing that we lived away down in FLORIDA or somewhere about the EQUATOR where heating apparatus are not needed.

Seeing that matters were rapidly approaching a CLIMAX, and unable to bear the su-SPENCE any longer, I clasped her in my arms, exclaiming, "STAR of my hopes ! SUN-RAY of my heart ! Radiate your attention toward your offspring." With a cry of pain she tore herself away, and dashing pamphlets to the winds, bounded from the room and grasping the half-waking infant, exclaimed, "Run for Doctor PLAXTON, quick ! Baby has got the DIRIGO. Been eating green KEARNS (currants) again."

When peace and tranquillity had once more assumed their sway we retired. But the curtain of night failed to shut out those heating MILLS. Visions of *valves*, *regulators* and *registers* came trooping through my brain. When sleep had about put a *damper* on them, I was gently borne away on a steamship to shiver among polar icebergs. Then, shifting course, we cross the GULF STREAM, and sail amid palm-laden islands, the fragrance of TROPIC bloom burdening every breeze. Changing to a rumbling railroad train, the lick-a-ty-click of the wheels calling faintly, "direct-indirect," "direct-indirect." Again, slowing down, as though approaching a station, it calls: "Vent-i-late," "Vent-i-late," "Late," "*Too-late*," as a GIANT form rears itself above me. Now the scene changes to a merry-go round, where the hobby riders assume the forms of boilers and radiators, carrying gaudy banners inscribed: "America for AMERICAN s," "On to RICHMOND," "To the VICTOR belong the spoils," "The UNION forever."

Round and round they fly. Faster and faster grows the merry race. They mingle and pass in such rapid succession. Royalty and plebeian melt into one chaotic mass. With the accompanying music of the organ, voices are heard calling "What's the matter with FURMAN ?" "A million dollars reward for the arrest of WILKS !" Now, as the very earth trembles with the tumult, there rises a cry of alarm. "*Where are we at now ?*" While amid a whirring noise that rivals the roar of a thunder storm the response comes: "*Hurrah for the hot-water convention !*" as the merry-go-round and its boisterous crew vanished from sight as though a CYCLONE had swept it away.

Again the scene shifter interposes and rank on rank of cavalrymen and infantry come marching to solemn music, followed by carriages and civilians bearing wreaths and garland of roses and jasmine. With well regulated step and floating banners the procession threads its way toward a cemetery where 10,000 grass-grown graves and marble slabs mark the last resting places—not of patriots and heroes, nor of those who wore the blue or the gray—but of the unnumbered victims of hot-air furnaces. As we approach we behold incribed on the arch gateway: "Sacred to the memory of those who died from hot air."

A sharp, glad cry, EUREKA, at my side dispels the sad vision, and my wife tells me the vexing question is solved, for she has found a NEW CIRCULATOR that not only warms the house from cellar to attic, but has surplus power to heat the conservatory and run a greenhouse. It will regulate itself, shake down the ashes, put on fresh coal, wind the clock, lock the front door, turn off the gas and call the servant girl in the morning. Evidently, she too, has been dreaming, and the problem contains many HITCHINGS yet. How shall we end this too realistic dream ? And ending it end all. Truly, I never would have monkeyed with this thing had I supposed it was loaded. And to make my sorrow all the harder to bear my wife says "I told you so." Mr. Editor, stop my paper and notify the trade that we are not going to build a house, and have bought a boiler and gone to Chicago.

HEATING NOTES.

THE WORLD'S FAIR STEAMSHIP COMPANY'S steamer, "Christopher Columbus," claimed to be the largest excursion boat in the world, is heated with radiators manufactured by the American Radiator Company, 111–113 Lake street, Chicago.

A PRICE-LIST of wrought iron, brass pipe and boiler tubes, brass and iron valves, &c., is issued by the Exeter Machine Works, 32 Oliver street, Boston, Mass. The pamphlet of 16 pages contains a list of prices, tables of sizes, illustrations of the more important goods and several cuts of some of their specialties, including the Exeter radiators, Exeter sectional steam boiler, &c. Separate sheets carry half-tone engravings, beautifully printed, of various Exeter radiators, including the plain for steam or hot water, direct steam, dining room, direct water and semi-ornamental for steam and hot water.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until June 27, for all the labor and materials and fixing in place complete of heating and ventilating apparatus for the following named public buildings: Ashland, Wis.; Atchison, Kan.; Beatrice, Neb.; Danville, Ill.; Fremont, Neb.; Lansing, Mich; Lafayette, Ind., and San José, Cal., in accordance with drawings and specifications, copies of which may be had at the office of the Supervising Architect, or the office of the superintendent at each of the buildings.

THE RAYMOND & CAMPBELL MFG. COMPANY, from their New York office, send out notices to the trade that George Evans is no longer acting as their agent, and that correspondence should be addressed to the Raymond & Campbell Mfg. Company, 244 Water street, New York City. They add that Alexander B. Johnston is in charge of the business at the above address, as manager, and has an attractive line of goods to offer the trade.

JENKINS BROS., 71 John street, New York, have recently perfected a rubber compound valve seat, in the form of a hard rubber disk, which successfully holds against high-pressure steam. They feel it has passed the experimental stage. The disks now sent out are an advance on those heretofore made during the past year. They have also increased the thickness of their iron body valves, so that hereafter they manufacture only one grade for high or low steam pressure.

THE RETAIL STORE.

The Miller Lamp.

Edward Miller & Co., 10-12 College place, New York, are putting the lamp on the market shown in Fig. 1. From Fig. 2 it will be seen that there are three wick carriers represented by the

Fig. 1.—The Miller Lamp.

letter K. It is remarked that the wick is fastened to the carrier, requiring no bands, so that it may be raised or lowered evenly, producing a round and even flame. The combination screw and lift movement for raising and lowering the wick is described as being so arranged that with the screw movement the wick can be raised or lowered as little or much as desired, or it can be raised or lowered the full extent of the rod with the hand by one movement. Another feature of the lamp is the cone, which, it is stated, is so adjusted that all sweating of the oil is carried back into the lamp, avoiding leaks. The indicator is a metallic one, hinged so that when filling the lamp it is brought into sight by being raised by the oil, indicating that enough oil has been poured into the lamp. The manufacturers claim that every part of the burner is detachable, so in case of breakage any part can be replaced at a small cost. The lamp is made in two sizes: Nos. 2 and 3. The wicks and chimneys to fit these lamps correspond in size to those used for the Rochester lamp, No. 2 being the same as No. 2 Rochester, and No. 3 the same as No. 10 Rochester.

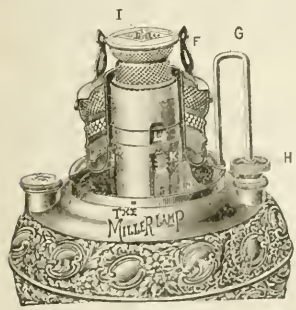
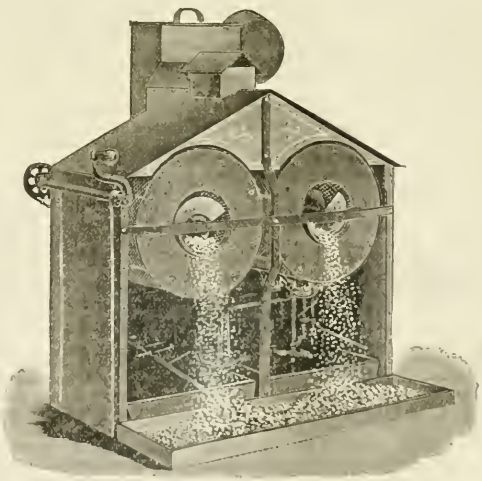


Fig. 2.—Construction of Burner.

Twin Cylinder Corn Popper.

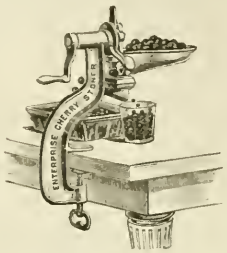
Donathen Novelty Mfg. Company, 510 Broadway, Kansas City, are putting this popper on the market as shown herewith. The fire or heat is furnished by five single burners to each cylinder, formed into a cluster. It is explained that the burners under each cylinder are opened and closed by a single lever, moving about 4 inches, enabling the operator to regulate or to shut off the heat instantly. The cylinders are described as being operated by a double gear, turning the outside shell holding the unpopped corn slowly over the fire, while two pick ups, of coarse wire cloth, separate and carry the popped corn rapidly to the conveyer trough, to overcome all danger of choking up. It is stated that the conveyers discharging the popped corn run at twice the speed that the shell does, thus preventing all danger of the corn catching fire. The machine is provided with a self-feed, described as being under perfect control, to hold the shelled corn. A tube extends through the feed, which is designed to draw surplus heat from the cylinders through the body of corn, to warm it thoroughly before it is thrown into the cylinder. The heating of corn before it goes into the cylinder is referred to as reducing the time required in popping one half. The manufacturers claim that the machine is fed regularly while in motion, thus wasting no time in feeding; that one man operates two cylinders with ease, and that the machine pops corn without stops until the work is all done. The machines are made with a capacity of from 4 to 47 barrels per ten hours.



Twin Cylinder Corn Popper.

Enterprise Cherry Stoner No. 12.

The Enterprise Mfg. Company, Philadelphia, Pa., are introducing the above



Enterprise Cherry Stoner No. 12.

article, illustrated herewith. It consists of a clamping frame, with a platform and feed hopper. On the upper end of the clamping frame is an extended eye, through which passes a spindle operated by a crank handle. The end of the spindle fits into a slot or groove in the head of a four-bladed vertical knife adjusted to a groove immediately in front of the hopper. The operation of the machine is described as follows: By turning the handle the cherries pass from the hopper, the knife takes out the stones, which fall into a vessel, and the knife returns; a sweeper attachment to the spindle follows the plunger and carries the fruit into a receptacle. The manufacturers claim that the machine will stone cherries with the least possible cutting or disfigurement. The stoners are supplied tinned only.

WORLD'S FAIR NOTES.

Pennsylvania's Mining Exhibit.

Pennsylvania's pavilion in the Mining Building is just in front of the north entrance east of the main aisle. Stepping into the pavilion the visitor passes between neatly finished glass cases containing 300 bottles filled with petroleum and petroleum products. In front of these cases stands a huge relief map of the State, 7 x 14 feet, showing the location of all coal and iron mines, oil and gas fields, blast furnaces, pipe lines and railroads. The most attractive feature in the exhibit is a complete working model of a coal mine and breaker. The model occupies a space 24 x 8 feet. Nine engines are shown with the work they do from the time the coal is hauled up the inclines, dumped into screens, where it is assorted into sizes and loaded into railroad cars, while the mine cars return by gravity for fresh loads.

Beside the model stands a little pavilion constructed to show the possibilities of slate. Every use to which slate can be put—for roofing, school slates, and so on—is shown. At the west side stand 16 truncated pyramids, disposed in rectangular form, showing all the varieties of anthracite found in the anthracite region and also all the commercial sizes. Analyses of the different varieties are exhibited. At the corners of the rectangle are glass cases 2 feet square and 8 feet high displaying the varieties of bituminous coal. A colored drawing is shown, illustrating the manufacture of zinc oxide and spiegeleisen. Another case contains samples of the 30 varieties of fire clay found in the State, crude and burnt, and the bricks made from it.

Next to it are cases showing the varieties of tile clays, crude, floated, ground, unburnt, burnt, glazed and unglazed. There are also samples of the 78 varieties of building stone in the State, finished and unfinished, shown at the north end of the pavilion. Then there are samples of the glass sands of the State, the different mixtures used for the various kinds of glass and specimens of the finished product. Soapstone, nickel, manganese, iron ore and various stages in the manufacture of iron with charcoal, anthracite and bituminous coal are to be seen.

Near the model of the mine and breaker stands a primitive furnace, such as was used in the beginning of the iron industry. Grouped about it are the various tools used in mining. Upon the south and east walls are photographs, charts and maps of geological and mineralogical surveys, relief maps and the like. In the center of the Mines Building not far distant stands what the Pennsylvanians call an anthracite "needle." It is a shaft of anthracite showing a vertical section through a 54-foot vein in Schuykill County, with the coal, slate seams, &c., in their proper place.

A California Midwinter Fair.

Californians in attendance at the World's Fair have conceived the idea of holding a fair on the Pacific Coast next winter as a sequel to the Chicago fair. Having secured the necessary financial backing by correspondence with their home institutions, they have gone so far as to specifically announce that an exposition will be given in Golden Gate Park, in San Francisco, which, opening on December 25 of this year, will be continued during a period of 25 weeks following. In the 25 vacant acres in Golden Gate Park four great buildings will be erected, and to these all the principal foreign exhibitors now having space in the World's Fair buildings at Jackson Park will be asked to exhibit their wares before Californians and visitors from the East and West.

From National Commissioner M. H. De Young of California came the original plan of the projected midwinter commercial World's Fair. The vast extent of the exhibits now at Jackson Park made the plan of putting them into smaller space seem scarcely feasible. But the business interests represented by the exhibitors and the small cost of transportation of those exhibits to California after the close of the World's Fair here made the matter appear in a more practical light. Then came in the consideration of California's glorious climate, a climate where autumnal sunshine fades into the quickening glow of springtime without a day of snow or an hour of winter. Many exhibitors who had gone to enormous expense in making their short-time display at Jackson Park hailed with delight a chance to visit the great West, to them almost commercially unknown, and be afforded a chance to show their wares and perhaps enter into commercial relations with States that they only knew from the pictures in illustrated geographies. During these little informal chats Commissioner De Young chanced to lay his plans before R. Cornely of the German commission and formerly director-general of the Bremen Exposition. Mr. Cornely hailed the plan as a great and glorious one. He immediately enlisted, and within a score of days following he had secured the verbal promise of over 2000 exhibitors in the German, Italian, Swiss, French and Austrian sections to send the best they had in the showcase to California's Commercial World's Fair immediately after the gates at Jackson Park shall close.

The Award System Modified.

John Boyd Thacher, chairman of the Committee on Awards, has, it seems, at last yielded to the pressure brought to bear upon him by foreign and American exhibitors and modified his interpretation of the rules governing the awards. On Tuesday of last week he addressed a letter to the foreign commissioners in which he intimated, it is said, that more than one examiner might be appointed in case a desire to that effect were expressed by the commissioners. The communication was addressed to Camille Krantz, the French Commissioner General, who laid it before a meeting of foreign commissioners the same day. The letter was regarded as being conciliatory, but was not sufficiently clear to satisfy the members, and accordingly Mr. Thacher's assistant, ex-Governor Hoyt, attended the session to elucidate the meaning of his chief's letter. After much questioning Mr. Hoyt made the statement that two or more examiners could be named to pass upon an individual exhibit instead of a single expert judge. This interpretation of the letter was regarded generally as being satisfactory, but to be certain of their ground the commissioners wanted a written statement from Mr. Thacher. They also complied with a previously expressed wish of his that a committee be appointed to meet him and listen to his propositions. There were 30 commissioners in attendance, and from their number they appointed a committee of five, as follows: James Dredge of Great Britain, Adolf Wermuth of Germany, Anton von Palitschek-Palmforst of Austria, J. J. Grinlinton of Ceylon, and Manuel Lemus of Guatemala.

On Wednesday Mr. Thacher himself went before the Special Committee of Foreign Commissioners and told its members they could have juries to pass upon their exhibits. He made this statement so clear that there was no misunderstanding his meaning. This was, of course, very gratifying to the commissioners. But Mr. Thacher did not entirely yield another point for which they have contended, and that is that the Departmental Committee shall have the exhibit written up by the person or persons whom they should designate. At this time, however, it developed that somebody had acted without authority in withdrawing the British exhibits from competition for awards. The secretary of the British commission advised the Foreign Affairs Department that the withdrawal was not approved by the commission.

On Thursday Vice-Chairman King of the Executive Committee on Awards issued to Arthur Leffler, the secretary of the Foreign Commissioners' Association, an authoritative statement of the attitude of the Bureau of Awards, in which it is denied that a one-judge system is to be adhered to. Nothing could be plainer or more conciliatory than the language in which this communication was couched, and it helped strongly to clear up all points of difference. On Friday the foreign commissioners met and addressed a letter to Director-General Davis saying that they would consent to Mr. Thacher's compromise if he gave assurances that it would be carried out. The foreign delegates seemed to fear that Mr. Thacher would go back to the one-judge plan after they had restored their exhibits to competition. The commissioners still insist that the juries shall apportion the work among themselves instead of receiving instructions from Mr. Thacher. While they object to that feature of the plan it is probable that the representatives from Sweden, Norway, Japan, Italy, and perhaps several other nations, will come in for competition rather than have any further discussion with Mr. Thacher. They have secured the jury system, and if that is the only concession they can get, they will accept it under protest. Thus, what might have proved a very disagreeable episode in an international fair has very probably been so well settled that it will no longer vex officials and exhibitors.

The Sunday Question.

Affairs are getting entangled now with regard to Sunday opening. Every department of the fair was thrown open on the last Sunday in May. The machinery was not in operation, but in every other respect the display was the same as through the week, although here and there exhibits were covered by owners who were not in favor of Sunday opening. The day was pleasant and the attendance was large, but not up to the extravagant figures that had been widely estimated by the enthusiastic advocates of an open Sunday. The attendance on Decoration Day, two days afterward, far surpassed it.

Litigation on this question is now proceeding. On Monday of last week the exposition directors were temporarily enjoined from closing the fair on Sunday by Judge Stein of one of the State courts, in the suit of Charles W. Clingman against the World's Columbian Exposition to enjoin them from Sunday closing. The questions at issue were gone over in the opinion, which is

quite a lengthy one, but which rests mainly on the ground that Jackson Park was given to the people for public uses only and that no power existed to debar them from using it on any day of the week. The logic of the decision seems to be in favor of the free admission of the public also, but that point was not pressed. The preliminary injunction expires on the 8th inst. and is then expected to be made perpetual by the Sunday openers. On the following Wednesday, however, Judges Wood, Jenkins and Grosscup, sitting as the United States Circuit Court for the Northern District of Illinois, took up the hearing of the chancery suit of the United States vs. the World's Columbian Exposition Company, to enforce the Sunday-closing clause adopted by Congress. The whole question of the rights of the parties, the condition of the contracts, and the powers of the company to make and enforce a Sunday opening rule was discussed by counsel, the hearing occupying several days. Another suit to enforce Sunday closing has also been brought by Wanamaker & Brown of Philadelphia and P. W. Pratt of Massachusetts, stockholders in the Exposition Company, who claim that their stock will be injured by the adoption of the measures necessary to satisfy the Government in case the exposition is regularly opened on Sunday.

The Sewage Cleansing Works.

From no odor would the large white building in the southeast corner of the grounds be discovered as the sewage cleansing works. It is marked IK on the maps, and is well worth a visit by all interested in sanitary matters. The system of sewers and the works were placed by W. S. MacHarg, one of Chicago's engineers, who is engineer of the water supply, sewerage and fire protection of the exposition. Conveniently located to the different buildings are 26 large pits into which the sewage from the adjacent buildings runs. Connecting these pits with the branch sewers are 52 ejectors, which work automatically by compressed air, emptying the contents of the pit through the branches into the main sewer running to the cleansing works. Compressed air for all purposes on the grounds is secured from a central plant for compressing it in Machinery Hall. On reaching the works the air pressure raises the fluid about 50 feet through a 36-inch pipe, where it overflows on a wire sieve which catches sticks and other insoluble matter. Passing through the sieve it falls to the bottom and through pipes it enters four purifying tanks, each of a capacity of 250,000 gallons. In the pipes which carry it to these tanks a solution of alum is thoroughly mixed with it by mechanical means, and at another point a solution of lime is mixed in the same way. In three of the tanks alum and lime are used, but in the fourth copperas and lime give apparently the same results. Slowly passing through these tanks the sludge settles at the bottom, and the clarified water made chemically pure passes off to Lake Michigan. By a careful system of measuring this outgoing water an increase in attendance at the fair is detected very quickly. The sludge which collects at the bottom of the tanks is pumped off and forced through the filter by compressed air, the accumulation being pressed into cakes at a pressure of 110 pounds. These cakes are taken to a garbage furnace and burned, a jet of crude petroleum forced in with a blast of compressed air being the only fuel used. The works are under the charge of Allen Hazen, a chemist from the experimental station of the Massachusetts State Board of Health at Lawrence, Mass., who has been detailed for this important work out of courtesy from the Bay State to the World's Fair, through the influence of Engineer MacHarg. The attendance at present sends about 1,000,000 gallons of sewage to the works every day, and the capacity is 6,000,000 gallons. The increased attendance on Decoration Day sent 299,000 gallons extra sewage to the works. At the present rate of attendance about 4150 tons of sewage are handled daily and the solid matter after being pressed weighs but 3 tons. The crude oil, used for various purposes about the grounds, is brought from Lima, Ohio, by a pipe line. For burning the sludge from the works and the garbarge made inside of the gates about 500 gallons of crude oil are consumed daily.

In addition to cleansing this sewage, Mr. Hazen is compiling some other statistical information in reference to the work. The principal visitors to call on Mr. Hazen have been sanitary engineers, and doubtless with the Mecca of the United States being located at Chicago this year, his interesting charge and the genial courtesy of both himself and his assistant will bring him many other visitors.

We recently saw at the New York office of Henry R. Worthington a set of 13 pictures, showing exterior and interior views of the Worthington Hydraulic Works at Brooklyn and Elizabethport. These pictures are bromide enlargements, 30 x 40 inches, from original plates 11 x 14 inches, made by Geo. P. Hall & Son of New York, and are to be used in connection with the Worthington exhibit at the fair. The subjects were so selected as to convey a good idea of the magnitude of the works, and to give a clear conception of the detail arrangement of the several departments. From a photographic point of view the pictures are exceptionally fine.

OBITUARY.

JOSHUA HENDRICKS.

Joshua Hendricks of the metal firm of Hendricks Brothers, 49 Cliff street, died suddenly in New York City Saturday evening, at his home, 512 Fifth avenue. Mr. Hendricks belonged to one of the oldest and most prominent Hebrew families in New York. He was 61 years of age. The business house of Hendricks Brothers, which is one of the largest of its kind in this country, was established in 1764 and has been in the family through four generations. Mr. Hendricks was widely known. He had been a member of the Chamber of Commerce for many years, and at one time he was vice-president of the German-American Bank. He also belonged to the American Geographical Society. A widow and three sons survive him.

A process of enameling sheet-metal work has been patented by Victor Dubois and William C. Stewart of Harvey, Ill. The special feature of the process relates to the means of producing a mottled effect. The first coating of enamel is applied in the ordinary way, and to the porous unglazed enamel coating a suitable volatile liquid is applied in spots or mottles, after which the article is placed in an oven and dried, so that the volatile liquid will be evaporated. When this has been done and the article placed in the furnace the spots or mottles are developed, producing the desired variegated appearance.

Granite City.

At the invitation of F. G. & W. F. Niedringhaus, about 100 gentlemen, representing the commercial interests of St. Louis, visited Granite City, Ill., the new city established by the Niedringhaus Bros., on Saturday, the 27th ult. The occasion of the visit was the opening of the new Union Depot and the breaking of ground for the new factories of the St. Louis Stamping Co. A special train was provided which conveyed the party to the ground, where they were shown over the city by F. G. Niedringhaus, after which they were invited to partake of a collation tendered. Addresses were made by leading citizens of St. Louis, who wished the new city every prosperity, and one and all took occasion to congratulate F. G. Niedringhaus, president of the St. Louis Stamping Company, upon the change which had been wrought in a place which a few months since contained nothing but trees and underbrush, but which to-day is a beautifully laid out tract. The city will contain the works of the St. Louis Stamping Company, comprising an open-hearth steel furnace, a rolling mill and stamping works, which will employ between 1200 and 1500 people. In addition to this plant will be the machine shops of the St. Louis, Chicago & St. Paul Railroad, the Goltra Steel Company, whose plant will occupy 5 acres, with a daily output of from 75 to 100 tons of steel, and a car spring and car coupler works will also be built. Granite City will contain an extensive and modern gas works, electric light works, a large and modern hotel, public schools and many residences, a number of which are already finished. Granite City is located in Illinois on the east side of the Mississippi River, about 2 miles from the city of St. Louis. Nineteen railroads give access to the East, assuring cheap freight, rapid transit and no bridge charges. The city is also surrounded with a belt line, which connects it with every railroad centering in St. Louis, 27 in number, thus giving it all the railroad advantages enjoyed by St. Louis itself. There are also 3 miles of river front, securing access to river navigation and at the same time river rates on freight. A free public library will be built.

The coal fields adjoining this city supplied 4,000,000 tons of coal during the year 1892. We are informed that a saving of from $8 to $10 per car is made on coal delivered in Granite City. When this is taken into consideration, and the railroad facilities are borne in mind, it is easily understood why the St. Louis Stamping Company and others have decided to move their plants to this point.

There are a number of manufacturing concerns who are at present negotiating for ground on which to erect their plants, but the negotiations have not as yet reached a point where their names can be published.

It is reported that at the McShane Bell Foundry, Baltimore, Md., drawings are being prepared for what will be the largest bell on the American continent. It will weigh 44,000 pounds—1000 pounds for each State in the Union.

PLUMBING and GAS FITTING.

Texas Master Plumbers.

The annual meeting of the Association of Master Plumbers of the State of Texas was held in the city of Fort Worth, May 22 and 23, 1893. The convention was called to order by J. A. Rogers, president of the local association, who introduced Mayor B. B. Paddock in a pleasant little speech such as plumbers are especially happy in. Mayor Paddock welcomed the delegates in behalf of the city of Fort Worth, and what he said was received with much applause. Gen. F. M. Clark, secretary of the Board of Trade, and who is also an orator of well-deserved reputation, was next introduced and delivered an address full of pleasing hits and good humor. The meeting was then called to order by President Berla of El Paso and proceeded to business by appointing a Committee on Credentials, after which an adjournment was taken until 2 p.m.

The afternoon session was given up principally to a consideration of the report of the Committee on Credentials until 4 o'clock, when a carriage ride was taken to view the water works plant, the suburban part of the city and the brewery. At the latter place the affable president, Martin Casey, turned things loose, and every plumber, it is needless to say, enjoyed himself. Each delegate was presented with a handsome Russia leather purse as a souvenir of the visit, for which the thanks of the association were duly returned. If there is one thing above another a Texas plumber prizes, it is a purse (well filled).

After supper a short session was held and at 10 p.m. the entire party partook themselves to the Arlington Inn on the Heights to partake of a bounteous repast, which was enjoyed thoroughly by all. Remarks were made by General Clark, who acted as toastmaster, Mayor Paddock, Hon. D. F. Sullivan, Editor Senter of the *Gazette*, President Berla, General Frank A. Campbell and others, which made life worth living. There was still some doubt, we understand, whether it was frogs' legs or chickens that the plumbers feasted on.

Tuesday morning's session was devoted to routine business. The election of officers and delegates to the National Convention was next in order. The following officers were elected to serve the ensuing year:

President, D. J. May, Galveston.
Vice-president, Edward Braden, Jr., San Antonio.
Secretary, George Mummert, Dallas.
Treasurer, A. H. Shafer, San Antonio.
Sergeant-at-Arms, J. T. Rogers.

EXECUTIVE COMMITTEE.

D. F. Sullivan.
F. A. Campbell.
G. D. Aekley.

The following delegates were elected to the National Convention:

D. F. Sullivan, Dallas.
A. Berla, El Paso.
J. F. Osbourne, Fort Worth.
A. H. Shafer, San Antonio.
D. F. May, Galveston.
D. Cavanaugh, Dallas.

A vote of thanks was extended to the Mayor, Superintendent of the Water Works, secretary of the Board of Trade, brewery management, the press and the local association, for hospitality and courtesy shown. The convention then adjourned.

Water Service in Tenements.

From R. M. J., *Baltimore, Md.*—Can you help me with an opinion as to the best way of arranging service pipes in a building where each floor is occupied by a family and by which the inconvenience of one tenant having to wait until some other tenant has ceased to draw off water in order to get the needed supply from his own faucet may be avoided? The water is supplied from street pressure, and I am supposed to be able to arrange the pipes so that while the occupant of the lower floor would be drawing off water the top-floor tenant could do the same. I have been told that if I carry my main supply pipe straight through to the top floor without taking off branches for the several floors, then make a return bend and carry the pipe downward, taking from the down pipe the branches necessary to supply each floor, I will be able to accomplish the desired purpose. As this double piping is rather expensive as an experiment I would wish to be certain of my ground before I would undertake to solve the problem in this manner? Is there any reason why this plan should not work satisfactorily? Have you anything better to suggest?

Answer.—The plan proposed by our correspondent is not a desirable one as far as results to be obtained are concerned. 1, There is the cost of the double or return line of pipe, made necessary by the fact that no supply branches are to be taken off the riser. 2, Because the pressure from street mains in cities is unequal at different hours of the day and consequently is unreliable as a steady means of supply where the water has always to rise a sufficient hight to be carried over the bend and down the return pipe. There should be sufficient head in the main at all times to give any promise of satisfaction by this plan, as a little consideration will show. Let us suppose a lessening of the head or pressure by which the water would not be forced over the bend, how was the supply to be furnished to the several floors. The only dependence in that case would be on the syphon principle by which the cocks or faucets below the level of the head might be supplied, but as the syphon is easily broken, for instance by the opening of a cock above the level of the water in the rising service pipe, the chances are that the supply of water for the entire house during the continuance of the low pressure will be cut off until the pressure in the main is again sufficient to bring the water over the bend.

Other plans have been devised for accomplishing the results aimed at—viz., enabling occupants of different floors in a building to draw water at the same time from a rising pipe supplied by street pressure, but they have been failures for the most part. One, however, which is advocated by one of New York's most experienced plumbers, is to increase the size of the pipe on the upper floors while the supply branches are of the ordinary size. He contends that this is the only safe and satisfactory plan where there is no tank. A larger column of water is maintained in the rising pipe than can be drawn off by the branches on the several floors, and this supply being kept in continued volume there is little fear of interruption in the supply unless under some combination of circumstances which at times cannot be wholly provided for. The master plumber who advocates this latter plan assures us that it is the most satisfactory of the various methods of solving this vexed problem of tenement house water service.

TRAPS AND VENTS.

THOS. HUGHES of the sanitary supply house of Hughes & Keith, Denver, Col., has been in Chicago superintending the plumbing work being put in the Colorado Building at the World's Fair. The above firm have also secured the contract for plumbing work in the capital at Denver, which is to be one of the finest buildings in the country.

HIGGINS & WEAVER, a plumbing firm of Springfield, Ohio, are well spoken of in a late issue of the *Springfield Republic-Times*. They are said to be adepts in their craft, and also in gas and steam fitting; much of the work in the large public buildings and business blocks of the city having been carried out by them.

A CATALOGUE embellished with colored and gilt front cover is issued by the Instantaneous Water Heater Company of Chicago. The scene on the outside of the pamphlet to which we allude is a pretty mixture of the nineteenth century and mythological times, but the chief feature, it is needless to intimate, is the indirect reference to the heaters made by this firm. The

first part of the catalogue is given up to full descriptions and illustrations of the Douglas and the Acme instantaneous water heaters for baths and domestic purposes. Various styles of each of the heaters are shown. Other fittings and specialties are noted in the catalogue, the latter pages of which are given up to testimonial letters.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until June 20, for labor and materials for the plumbing and contingent work for the United States court house and post office at Abingdon, Va. Drawings and specifications may be had at the office of the Supervising Architect, at Washington, or from the superintendent at Abingdon.

KIRTLEY BROTHERS, 1213 Walnut street, Kansas City, Mo., have issued a little circular relating to a new and simple system of supplying water by means of compressed air to dwellings, hotels, schools, court houses, and in fact all buildings in city or country. The circular states that the water is lifted by the makers' double action force pump from a well, cistern, spring or lake and forced into a thoroughly tight underground steel tank, made in stock sizes from 6 to 100 barrels capacity. The tank has two openings, and as the water is forced through the check valves, filling the openings, all escape of the air is cut off, and the continued pumping simply compresses the air until no more pumping can be done. The air may be compressed in this way until the tank will be more than two-thirds full of water, when the pressure of air upon the water forces it through the pipes supplying the house or yard fixtures until the tank is emptied. The system is referred to as being very simple and thoroughly practical, and those who have used it speak in high terms of its merits.

THE CINCINNATI DELEGATES to the National Association of Master Plumbers, to be held at Milwaukee, will arrive in Chicago Sunday morning, June 11, at 9 o'clock, via the Monon route.

THE STATE VICE-PRESIDENT OF ILLINOIS, Wm. T. Geary, has issued a call to the master plumbers of the State to convene at 10 a.m., Monday, June 12, in the rooms of the Chicago Master Plumbers' Association, for the purpose of forming a State association. A large attendance is expected.

THE GILBERT & BARKER MFG. COMPANY, 90 John street, New York, are distributing a little book entitled "Home Comfort," as applied to improved methods of cooking, laundering, heating of water and the etceteras incidental to good housekeeping, through the medium of gas as a fuel, in connection with ranges and water boilers adapted to its use. Stress is laid on the facilities for obtaining heat quickly without the annoyance of handling wood, coal and ashes, as well as the ease with which it may be increased, decreased or discontinued, especially during the warm months. The objections from out of town residents are met by offering the Springfield gas machine, which, it is claimed, will economically supply necessary fuel.

Tin ore found near Kenova, W. Va., which has been assayed in Cincinnati, is reported to be of very rich character.

Japan coal can be delivered in San Francisco at $7.50 per ton, including freight and duty, and an American firm is said to have contracted for a large quantity, beginning with 100,000 tons per annum.

Prize Competitions

$25.00.

Prize Competition No. 27.

SUBJECT:

Local Associations of Merchants.

It has been found feasible to form associations in many places for the purpose of securing more friendly relations among competitors and reaching an understanding in regard to matters of common interest. Among the good results referred to as coming from such associations are the following: Overcoming petty jealousies; cultivating a spirit of fraternity; listing of undesirable customers; an understanding in regard to time of presenting bills; putting in operation early-closing movements; agreement as to the prices at which goods are to be sold; mutual accommodation in supplying goods which one merchant may be temporarily short of, &c. The subject is thus evidently a broad one and of a good deal of practical interest. In discussing it the following points are suggested:

Whether it is desirable to have such associations:

How such associations may be organized;

The objects to be accomplished by them.

It will also be of interest to have any information in regard to the practical working of such associations.

This competition will remain open until July 8, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded:

First prize	$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which, in the judgment of the Committee of Award, are most suitable for publication and of the most general interest.

We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than July 8, 1893. They should be addressed as follows:

DAVID WILLIAMS,
96-102 Reade street,
New York.
Prize Competition No. 27.

The committee to whom the contributions in Prize Competition No. 13 were referred have awarded the prizes as follows:

First Prize to E. D. WARNER, Jackson, Mich.

Second Prize to G. H. BURNETT, St. John, N. B.

Third Prize to JAMES D. RICHARDS, Covington, Ky.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 20. (Reopened.) Closing June 10.

A Reliable System for Securing the Correct Charging of All Goods Sold on Credit.

No. 25. Closing June 24.

Show-Window Display.

No. 26. Closing July 1.

To What Extent Are Manufacturers and Jobbers Justified in Selling to Consumers.

No. 27. Closing July 8.

Local Associations of Merchants.

Owing to the depressed state of an overstocked market during the last two or three years, says the United States Commercial Agent at Magdeburg, in a letter published in the June number of consular reports, German manufacturers of enameled sheet iron have formed a trust, with the object of preventing overproduction by regulating the output upon the home market. Incidentally a scale of prices, rebates and other charges have been agreed upon. No attempt is, however, to be made for the present to control the sale of exported wares, even when sold to German buyers. The combine is made up of manufacturers in various parts of the country, some 30 works having been included thus far. The principle upon which the association will operate is to measure future production by the general average of past sales, the exact quantity to be produced by each factory being apportioned by a committee. It is not proposed to effect sales through the central agency, which is in Berlin, but every firm will secure their own orders as heretofore, and are responsible for carrying out their contracts. One firm is permitted to take over the orders of another, but no firms thus uniting may exceed their combined quota. If at the end of the year certain works have failed to produce their allotted quantity they are to be reimbursed for the difference at a fixed rate by those firms overproducing. This is adjusted through the central bureau. Guaranty deposits are required to be made with the central office by each firm, and members bind themselves not to erect new works or interest themselves in firms outside the combine. The trust compact expires December 31, 1895.

Peace is restored in Nicaragua by the success of the revolutionists and trade is resumed.

STOVE TRADE NOTES.

Echoes of the Stove Convention.

—THE STOVE MANUFACTURER who didn't attend the convention because he thought the National Association was about defunct made a mistake. He should have gone at any rate, because sometimes it is a gracious act even to go to a funeral. As it was he would have found a very lively corpse. The general opinion is that the late convention was one of the best ever held.

— IT WILL BE GRATIFYING to many who did not attend the convention, owing to an intention to visit the fair later, to learn that the fair is well worth seeing, and that the convention will go down to history noted for the general harmony of feeling and the deep interest taken in its affairs by all present.

— AS IS NATURAL with an interchange of ideas, the educational gain to members at the convention will be of great benefit. It has made many much stronger in their loyalty to the association.

— "STOVES HAVE SEEN THEIR DAY," was the odd observation of a visitor who said that sales of hot-air furnaces had greatly increased last year and that about 100,000 was the number marketed. From another source came the remark that stoves and steam and hot-water heaters would make the hot-air furnaces rank as an antiquity at the next fair. Interesting prophecies!

— P. W. ELLIOTT AND A. W. WALKER of Boston and W. E. Walker of Taunton, Mass., not only represented their particular companies, but also New England, with an interest and energy that made up for the lack of numbers from that section.

— HENRY WILSON, who travels for the Thomas White Stove Company in Oklahoma and surrounding territory, was earnest in his recapitulation of the many climatic, scenic and agricultural advantages of that section. Arcadia possessed no more attractions for the blacksmith, Basil, the father of Evangeline, in the poetic past, than Oklahoma presents to the settler for a homestead to-day, according to Brother Wilson.

— DE WITT VAN EVERA was welcome in every group in the Palmer House rotunda, for his little reminiscences were the reflections of a gentleman with a lively sense of humor and a keen eye for the bright side of everything and a fund of information.

— WILLIAM WEWERS of the Gem City Stove Mfg. Company, Quincy, was the largest man, physically, in attendance at the convention. Representing a stove foundry which was started nine years since on a very limited scale, his position in the stove trade has gradually risen until he is looked upon as one of the coming leaders. His company have just completed an addition of 60 x 60 feet to their foundry, making room for ten more molders.

— H. W. BENNETT of the Indianapolis Stove Company is one of the cultured men of the stove trade and a brilliant conversationalist.

— MANY FAMILIAR FACES were missed from the Eastern Pennsylvania delegation. Prizer, Seivard and J. Allison Orr came from Reading; Canfield represented Danville; Mott, Pfahler and Stevenson from Philadelphia, and Lansing from Scranton completed the representation. The confidence placed in Pennsylvania is reflected in the selection of Mr. Prizer for first vice-president and the re-election of Mr. Stevenson for treasurer of the National Association, and the re-election of Mr. Mott for treasurer of the Defense Association.

— ONE of the cheeriest talkers met was Geo. W. Willcox of Charleston, Ill., a true philosopher, who envied no man his exceptional prosperity, believed in doing the best under all circumstances, and regarded the field big enough for every one to get a reasonable share of business.

— FRED. WILL of the Sill Stove Works was the picture of good health, and no man received a warmer welcome than he from his trade associates.

— W. H. WHITEHEAD of the Chicago & Erie Stove Company is one of the patriarchs of the trade, although time has not yet whitened his locks. Keenly appreciative of the humorous side of life, he is, nevertheless, predisposed to gravity, and seriously and with dignity carefully analyzes the various problems coming up for solution.

— J. W. EMERY of Quincy, smoothly shaven as usual, presented the youngest appearance of any that have seen so many heats poured off in their time.

— THE MAN who will always be young is Fred. W. Gardner. He seems to have found the long-sought-for elixir of youth, which not only protects him from the footprints of time, but preserves the fascinating and unique personality that makes every acquaintance a friend. Few would suspect his erect form and jaunty air to be burdened with the vast responsibilities which he so easily carries.

— OF THE YOUNGER GENERATION of manufacturers, J. D. Graff left the foundry at Sharon, Pa., to represent Graff & Co. of Pittsburgh, and Lew A. Anshutz of the Anshutz-Bradberry Company also journeyed to Chicago to assist in the deliberations of the convention. Mr. Anshutz is proud of the fact that his foundry up to May 1 had made 100 heats, which means 300 for the year, if there are no untoward interruptions.

— THE FOLLER-WARREN INTERESTS, East and West, were ably represented by G. G. Wolfe of Troy, N. Y., and Fred. Hawkins of Chicago.

— THE MASTERLY PRESENTATION of the manufacturers' side in the wages conference by ex-President Grange Sard was the talk of the convention. As a man of affairs, thoroughly well informed, broad in his views, blessed with an easy flow of language, courteous in his manners and free from all affectation, Mr. Sard has won a high position in the estimation of his fellows. Ratubone, Sard & Co.'s Western branch was duly represented by Wm. H. Sard and Edmond Rattery, to whose ability the great success of this important undertaking by the company is largely owing.

— THE NORTHWESTERN REPRESENTATION was not numerically strong. Neenah, Superior, and other stove works north and west of Milwaukee were unrepresented. Manager Ralph of the defunct Sioux City Stove Works was a looker on, but not a participant in the proceedings. By the way, Mr. Ralph takes a very hopeful view of the future of this plant if experienced stove men secure control of it.

— HENRY CRIBBEN was not obliged to conduct an active electioneering campaign for the presidency of the Defense Association. He would indeed have preferred to step aside if the association had expressed a preference for some other leader. But they regard him as "the right man in the right place," and will probably continue to re-elect him as long as he does not positively refuse to serve.

— IT IS BAD ENOUGH to oppose a man as a candidate for an office and then see him elected by a unanimous vote, but it must be infinitely more galling to find that his salary has also been raised, as a sort of sinister tribute to the effectiveness of the opposition. Such was the result of the attack on Secretary Thomas. Who wouldn't be attacked if this was to be the result? Another campaign of opposition will probably mean another advance of $1000 or $1500 a year.

— AMONG the stovemen at Chicago seen in the Palmer House rotunda, but not members of the convention, were C. W. Smith, vice-president and general manager of the Cincinnati Steel Range & Furnace Company, makers of Burton steel ranges; T. F. Hull, manager H. Rendtorff & Co. of Chicago, and John Rogers of the Home Stove Works, Chicago. Although not members they were very much interested in the proceedings.

— MANAGER HULL of Rendtorff & Co., Chicago, it may now be stated, has just taken a radical step which will cause something of a sensation in the stove trade. He has engaged Mrs. A. F. Strobel, formerly of Keokuk, Iowa, to represent the firm in Nebraska. Her husband is traveling salesman for F. & L. Kahn & Bros. of Hamilton, Ohio, in the same territory. Mrs. Strobel has had experience in managing a retail store, and she is expected to do well in her new line. It is believed that she is the first lady stove salesman (?) on the road. Manager Hull deserves much credit for making the experiment. May she prove an unqualified success!

— C. W. SMITH of the Cincinnati Steel Range & Furnace Company has but recently returned from a trip through the extreme West. Among their recent notable shipments was one to Honolulu of ten Burton steel ranges, which is only the first of a lot that is to follow.

— THE SOUTHERN REPRESENTATIVES at the convention were: W. J. Anderson and R. G. Rennolds of Richmond; Henry Terstegge and W. L. Bridgeford of Louisville; and J. M. Kelly of Lexington, Ky.—all men of substance and high standing.

— CENTRAL ILLINOIS turned out in force. Quincy was well represented by Castle McAfee, and others; Peoria by Hunter; Bloomington by Hamilton; Charleston by Willcox; Joliet by Moore; while across the river, and practically in the Quincy district, came both Duffy and Trowbridge from Hannibal and Hobbs from Keokuk.

— THERE have been conventions at which Ohio was more conspicuous in numbers. But what was lacking in quantity this year was made up in quality. Lazard Kahn of Hamilton read a fine paper on "Consolidation."

— ST. LOUIS takes great interest in the association, and is likely to be more interested than ever with Geo. D. Dana in the president's chair. Holland, Van Cleave, Filley, Hogan and McCulpin are a strong team to back any president, but backing Dana—well, just look out for next year.

— WE HAVE ONLY one fault to find with Brother Dana. He is too modest. He should have permitted his address to be printed in *The Metal Worker*, even if he kept it out of every other paper.

— DETROIT was well represented as usual. The Michigan Stove Company had a full delegation, but the genial countenance of E. S. Barbour was missing from the De-

troit Stove Works. The Peninsular Stove Company showed up strong, and the Art Stove Company had their secretary in attendance.

— STATISTICS of the stove trade are lacking this year. We can't tell our readers how many per cent. 1892 surpassed 1891, or how many per cent. 1893 is going to fall below 1892—simply because the secretary's report was not permitted to be made public.

— NEW YORK turned out well. There was a delegation of 12, who came from every section of the State.

— THE INDIANA STOVE MAKERS took strong interest in the proceedings. The stove trade of that State is growing rapidly.

— J. L. PRESCOTT & Co. of New York, manufacturers of Blackene stove polish, had a lively representative in the person of J. M. Trnesdell of Chicago, who seemed to know everybody. Mr. Trnesdell has established an office at 15 Michigan avenue, Chicago, where he carries stock for filling small orders.

— MANY MEMBERS of the convention had their wives with them, who took great pleasure in visiting the points of interest about Chicago, and, of course, attending the fair. They were specially invited to see the onyx and brass lamps and tables which E. A. Ireland of the Matthews & Willard Mfg. Company had on exhibition.

— THE THANKS of *The Metal Worker* are due to B. W. Dodson of the Detroit Stove Works for invitations to enjoy the luxury of the company's tally-ho for a trip from the heart of Chicago to the World's Fair grounds. Only lack of time could have prevented the acceptance of such an invitation.

— THE DETROIT FOUNDRY EQUIPMENT COMPANY of Chicago and Detroit distributed among the members of the convention an indexed guide map and key to the World's Fair, which was very highly appreciated. A. T. Whiting and S. T. Johnston of this company were on the ground renewing old acquaintances and forming fresh ties of sociability.

— CHARLES E. BRACKETT, well known in connection with the trade press, has established a special credit reporting agency, devoting its entire attention to stove manufacturers and dealers. It will be known as the American Stove Association. Headquarters are in the Manhattan Building, Chicago, and a branch office is located at 150 Canal street, New York.

— ALLEN W. UHNER met J. A. Orr and H. Seward of the Mt. Penn Stove Works of Reading, Pa., at the Palmer House attending the convention, he having just returned from a trip to the Pacific Coast, where the Penn stoves and ranges meet with a welcome that brings substantial orders.

— A NEW DAMPER SLIDE KNOB was shown at the convention by H. C. Matthews of Waterbury, Conn., which held the slide tightly in place and could be fastened securely in an instant with the hands. It was examined by the members with much interest.

— C. H. MATTHEWS of the Ireland & Matthews Mfg. Company of Detroit paid a tribute to the stove molders by presenting each member of the committee that appeared before the State Convention with one of his "Always on Time" bronze gripsacks that formed the case for a clock.

— THE COMMITTEE which went before the Stove Convention from the Molders' Union have a kindly feeling for E. A. Ireland, who is the manager of the branch house at 5 Wabash avenue, Chicago, of the Matthews & Willard Mfg. Company of Waterbury, Conn. He presented each representative with one of his souvenir inkstands.

— GEO. P. STEEL of the Geo. P. Steel Iron Company, Camden, N. J., is in Chicago, doing the fair and talking his line of steam and hot water goods.

— W. MCK. BARBOUR, treasurer of the Boston Furnace Company of Boston, is in Chicago, renewing old friendships, having been formerly connected with the Chicago branch of the Abram Cox Stove Company of Philadelphia.

The American Cook Stove.

BY M. P. LOW.

[There is a certain, sad interest attaching to the following incomplete article, which will draw to it more than ordinary attention. The author, Major Low, was well known to the stove trade and had been a familiar figure in and about New York for many years. At the time of his death, which occurred a little while ago, he was engaged in writing an article on the American cook stove, but only the first chapter found completion. The only change that we have made in it is to omit the pathetic "To be continued," which is a promise that can no longer be fulfilled.—Ed. *The Metal Worker.*]

I wonder why man, being "an animal that cooks its food" and endowed with uncommon vigor of mind and inventive genius, should have left the cook stove so long undiscovered. One would suppose that it would have been among his earliest inventions. But be allowed thousands of years to pass, gratifying his taste for cooked food by many rude contrivances for a roast, or fry, or broil, down to the early part of the nineteenth century before he discovered a cook stove. His neglect, or indifference, or ignorance of fire and its uses for culinary purposes during the time from Adam to Noah may be offered and accepted as a plea during that period, for we have no evidence to the contrary, except Tubal Cain, who is alluded to as an artificer and skilled in all kinds of brass and iron work, which implies the use of fire for mechanical purposes only. His plea of ignorance as to the knowledge of fire and its uses will be strengthened when we consider that Noah was commanded to take food into the ark as it was then eaten, and notwithstanding the explicit details given him for plans and specifications for building the ark, no provision was made for the use of fire in any form, or for any purpose whatever. In fact, as the ark had but one door, one window and no chimney, and was "pitched within and without," fire would have been extremely hazardous. I think it is safe to conclude that man's taste for cooked food was unknown to the antideluvians, but was an acquired task, discovered at Ararat, when Noah selected some of the clean beasts and clean fowls from the ark and roasted them upon a rude altar as an offering to the Lord for his safe delivery from the flood. This is the first evidence we have of fire being used for culinary or cooking purposes. As the sweet smelling odors arose from the roast and floated around they were pronounced "good," and man made a discovery by accident as valuable to his race as those made by the fall of the apple, the boiling of the tea kettle or the combustion of anthracite coal.

Many centuries elapsed between Noah and Moses. Man was allowed the flesh of beasts and birds for food, and had cultivated a taste for it, and enjoyed the luxury of having it cooked. It seems, however, that he made but little if any improvement upon Noah's mode of cooking. He had no fire places, no chimneys, no bake ovens. A few stones piled up as a mound to keep the fires and coals from the damp of the earth, a cross bar, supported on uprights at each end of the mound, or niches cut in the sides of rocks and banks as fire chambers, comprised about all the means for gratifying his taste for cooked food down to the time when Moses was commanded to build the tabernacle. During the interval man had sought out and contrived many useful inventions. But he had not produced a cook stove, and had improved but little upon Noah.

Moses had very precise and detailed plans and specifications given him for building and furnishing the tabernacle in every particular except the altar for burnt offering. He was told that Bezaleel, a man of great ingenuity and skill in metal working, had been spoken to in person and requested to devise and construct a suitable altar of cast brass with trimming and mountings and elaborate with gold, and to furnish a supply of pots and shovels and basins, flesh hooks, fire pans and a kitchen paraphernalia of cooking vessels, which he did, except the cook stove.

Four or five centuries passed from Moses to Solomon—many cities with untold wealth and millions of men were on the earth—but not a cook stove. Neither Solomon with all his glory and wisdom, nor Hiram of Tyre, his contractor to build the temple, with all his knowledge and cunning works in metal could produce a suitable cook stove for it. There had been no improvement or new method in cooking among the millions of people since the days of Noah and Moses, for the altar, and its surrounding of pots and basins, and flesh hooks, &c., which Bezaleel had made for the tabernacle of Moses, had been taken to Solomon's Temple to be used at its dedication feast. "They were found to be too little" to cook for so many thousand people, and Hiram, instead of devising a cook stove of sufficient dimensions, went to work and added another lot of small vessels to those brought from the tabernacle. Thus with bonfires in the open air, and numerous pot hooks and trammels, and cross bars, was the great feast at the dedication of Solomon's Temple cooked and served.

There was a long interval of centuries between Solomon and Columbus. Wonderful discoveries had been made by man. Fire places and chimneys and glass were added to the luxuries of his habitations, and fires to supply them with warmth and comfort. But Columbus brought no cook stove with him to America, nor did he find any here on his arrival. He discovered that although the natives had acquired the taste for cooked food, they were using about the same means for cooking at San Salvador that Noah used at Ararat.

Still another century and a quarter passed and the May Flower arrived at Plymouth Rock bringing some useful kitchen furniture, new to us, such as long-handled fry pans, cast-iron bake pans and clay fire pots for burning charcoal, tripods and braziers, but no cook stove.

During the next century the inventive genius of the American was fully developed and is conspicuous in the printing press, the lightning rod, the sugar mill, the cotton gin, the steamboat and

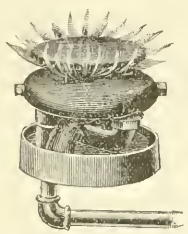
THE AMERICAN COOK STOVE.

THE NORTH DIGHTON CO-OPERATIVE STOVE COMPANY of North Dighton, Mass., advise us that they are now furnishing their Oak Grand, Live Oak and Prize Oak ranges with an oven-door opener. This neat device goes on back of the door and is said to be the only one made that swings the door clear back by a slight touch of the foot.

The P. A. Burner for Coal Oil Gas.

The advantages in cooking and heating enjoyed by those resident in districts where natural gas is available may now, in a measure, be also enjoyed by residents in all sections of the country by reason of an appliance recently introduced for the manufacture and combustion of gas from coal oil. The appliance is shown in Fig. 1 of the accompanying illustrations and is placed upon the market as the P. A. burner. It is very simple and may be adjusted to any stove, range or heater with little trouble.

Fig. 2 shows the burner when in position for use, with the connections necessary for the oil supply. The oil tank A is placed on iron brackets against an outside wall, or any convenient outbuilding, at least 8 feet above the level of the burner, so as to give a pressure to the oil. The tank is made of No. 22 galvanized iron of any desired



Burner for Using Coal Oil Gas.—Fig. 1. —Showing the Burner in Operation.

size and shape. A pipe carried down from the tank through the house wall and under the floor to a point directly in the front of the range or stove supplies the burner with oil. This pipe must be ½ inch as far as the union 7, and from that point to the burner ¼ inch should be used. If the burner is to be used in a heater in a cellar, the supply pipe should be carried along the cellar floor close to the wall so as to be out of the way. The pipe is brought through the floor so that the needle valve 8 will be just outside of stove, and a little to one side, so as to be kept out of the way of doors, and in such a position as to prevent it becoming heated by the fire. A safety overflow pipe, 9, of ½-inch pipe runs from the burner pan to a convenient point distant from the stove where it can be connected to a drain pipe, or where a can or bucket may be utilized to catch any oil which through carelessness may run through the burner. Common brown soap should be used on the threads, and under no circumstances should white or red lead be used for the purpose; a gate valve, 5, controls the supply, and a drain pipe and valve, 2, at bottom of tank drains it. A graduated tin gauge and float, 3, indicates the contents of the tank.

The tank should be filled with 110° coal oil, or standard headlight oil, obtainable of any oil dealer.

Fig. 3 shows a section through the burner. In lighting the spreader 13 is removed, and the cleaner 14 inserted through the central hole until the wire tip 15 enters the gas outlet 11, when the cleaner should be turned once or twice, taken out and the spreader replaced. The valve 2 is then opened and a little oil allowed to run into the lighting pan 6, by way of the gas outlet. The valve is then closed and the oil in the pan ignited. The oil will burn nearly out in from three to four minutes, and in this time will have heated the generator sufficiently to make gas. The valve should then be opened slightly, the gas will form and the operation of lighting is complete. The air feeders are shown at 9 and the generator at 8.

It is claimed that the burner will furnish a steady heat, which will be ready for cooking or baking five minutes after lighting. The fire may be put out in a minute, a very desirable feature in summer, and in winter may be continued during the whole season, the heat at all times being increased or diminished at will by the regulation of the oil supply. The cost of fuel, it is stated, is somewhat less than coal, and the use of the burner obviates the annoyance of putting in and storing coal and the labor and dirt consequent upon taking out ashes and their removal from the premises. The burner is strong and well made, is designed to last as long as a range and is free from smoke. It is placed upon the market by the Pyroleum Appliance Company, of which John Reilly is president, Wm. H. Magoffin treasurer and Dillwyn Wistar secretary and manager. The offices of the company are in the Drexel Building, Philadelphia, and their salesroom is at 242 South Fifth street. At the latter place the burner may be seen in operation in a large-sized cooking stove and its working examined.

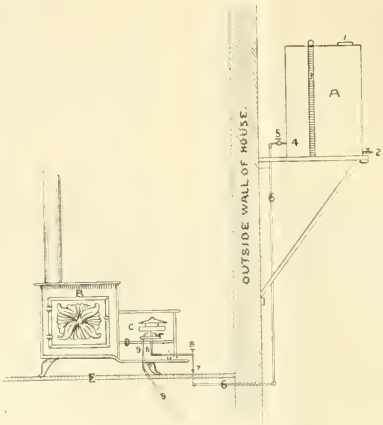


Fig. 2.—Burner Connected with a Stove for Use.

The Western Stove Works

of Peoria, Ill., favor us with a copy of an illustrated catalogue and price-list which they have just issued for the season of 1893, covering leading lines of their manufacture. In offering it to the trade the company state that it has been their aim to keep in the front ranks in the manufacture of stoves and to make improvements where such are desirable in order to meet the demands of the trade. In this they feel they have been successful, and are in a position at present to offer a line of ranges, cook stoves and heaters which "are second to none in the market." The volume, which comprises 34 pages of letterpress, bound in colored paper covers, is profusely illustrated and presents in connection with each stove various dimensions, weights, prices, &c. The leading goods include the

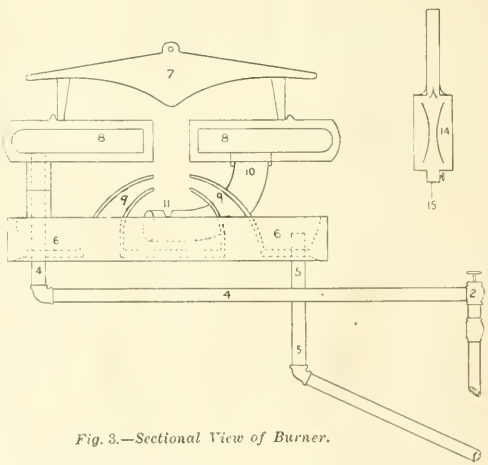


Fig. 3.—Sectional View of Burner.

Lakeview, a six-hole range for soft coal or wood, made in the usual varieties; the Lakeview cook stove, adapted for coal and wood and embodying the modern features; the Silver Lake, a four-hole cook stove for coal or wood, and the Peoria Pride, a four-hole cook stove for wood only. The greater portion of the volume is taken up with cook stoves and ranges, leaving only a comparatively few pages for heaters. The leading place is given to the Pleasant Home, a very neat square base burner for hard and soft coal. This stove has been entirely reconstructed for the season of 1893, and is offered in two sizes. The New Home is a square direct-draft parlor heater for soft coal, having large fire pot, capacious ash pan, cone grate, and other features of obvious utility. The Pearl, a direct-draft heater for soft coal; the Western Cannon, made in four sizes, and the Forest, an all-cast Todd wood stove, are some of the other goods to which attention is invited.

Traveling Salesmen.*

BY C. S. PRIZER.

One of the chief difficulties the stove manufacturer encounters in marketing his productions is the selection of a force of efficient and satisfactory traveling salesmen. The standard of qualifications required of salesmen is steadily advancing. The increasing pressure of competition, the general advance in the intelligence and business capacity among retail dealers, and the necessity of strict business methods enforced by the dwindling profits of these times, make it necessary for manufacturers to employ men of ability and character to represent them to the trade.

These higher requirements have relegated to the shelf many a salesman who was successful under the old *régime*, but who has been unable to make the strenuous effort required in these latter days, or to adjust himself to the changed conditions which now prevail.

It is probable that a larger proportion of those who embark as traveling salesmen fail of success than the proportion of men who fail in any other occupation. This, at least, seems to be the case with those who try to become salesmen in the stove business.

QUALIFICATIONS OF GOOD SALESMEN.

To the making of a good salesman there go tact, judgment, good hard horse sense, a knowledge of human nature, the bargaining instinct and the power and disposition for hard work. The qualifications required to make a successful salesman are distinctly higher than those necessary to insure success in an ordinary retail business. Yet every small retail stove dealer who fails in business seems to hold firmly the opinion that he is peculiarly fitted for the occupation of traveling salesman. Not infrequently he holds out to the manufacturer the tempting bait of a proposition to work out in installments the account which represents the said manufacturer's wrong guess as to his chances of success in the retail business.

Every manufacturer has his idea of what a salesman should be, but I trust that I will not be thought guilty of any discourtesy to that excellent and worthy body of men who are the couriers and missionaries of the stove business, when I say that the manufacturer seldom realizes his ideal among the salesmen in his employ. The difficulty, perhaps, is that those who would make ideal salesmen prefer to labor in other fields, or it may be that in this, as in other departments of business activity, the man who attains unto doing a thing in the best manner does not need to do it himself, but can better find his value in seeing that other men do it.

It would seem that of all businesses none would require of its salesmen a more thorough, technical and practical knowledge of the goods than the stove business. Yet I have known several successful salesmen who knew nothing about stove construction, and to whom even the simple and primary principles governing the operation of stoves were as a sealed book. And I have known several learned, able and eloquent gentlemen, living encyclopedias in the science and literature of stove construction, who were complete, absolute and total failures as salesmen.

MUST HAVE EDUCATION AND CULTURE.

It will be readily granted that every salesman should be a man of education and culture, able to quote Greek and Latin to those of his customers who are graduates of the universities, and to meet them on equal terms in the discussion of the latest scientific and literary questions. Yet, strange to relate, there are many successful salesmen who seem ignorant of the rules that pedants have formulated for the use of their mother tongue, and to whom Herbert Spencer's definition of evolution would be a high-sounding jargon of unmeaning words. It will doubtless be assumed that a good salesman should have a knowledge of that most popular of modern sciences, political economy, which treats of the production and distribution of stoves, as well as of other forms of wealth. Yet there are salesmen who have discovered the secret of selling stoves to the coy and reluctant dealer who do not have a passing acquaintance with Adam Smith, to whom the tariff and currency questions are a weariness, and who know nothing and care less about the factors of production and the laws of distribution. It would be supposed that to insure success the salesman would at least have to be methodical and systematic in his work; and, while method and system are undoubtedly valuable, there are successful salesmen who lack them utterly. I know a successful salesman whose traveling is so devoid of plan or system that he cannot be bribed, coaxed or threatened into furnishing his employer with even the skeleton of a date schedule of a trip. This unpleasant failing is tolerated because of his good work in other directions.

It is often impossible to analyze the qualities that make one salesman successful, or to define the shortcomings that result in the failure of another. The personal characteristics of the saleman are a large part of his equipment, and these he must use after his own fashion. For this reason the knowledge of how to become a good salesman cannot be communicated, be the teacher and the learner ever so willing.

The relations existing between a house and its salesmen should be of the most confidential and intimate character. How can you expect a salesman to appear creditably before the trade as your sole visible representative unless he feels identified with the interests, the policy, the history, the plans and purposes of the house he represents? I believe it is the part of wisdom and prudence for us to furnish our salesmen with as much information as they can absorb concerning the business they are called upon to represent.

Especially should we teach them how to compute the cost of producing and distributing goods. If possible they should be made sharers in the enthusiasm and anxiety for the success of the business which is felt by those whose capital is at stake.

The difficulties and trials of the business should be explained to them, so that they may be the more resourceful in meeting the troubles and frictions that present themselves in their department of work. Every house impresses its character and policy upon its salesmen to a greater degree than upon any of its other employees. Is the house disposed to yield easily to the pressure of competition? Then the salesman soon finds himself unable to secure remunerative prices for his goods. Is the house slovenly and unmethodical in its business? The salesman will inevitably be like it in these respects. Is the house firm and business-like in its policy? The salesman will acquire spinal rigidity and will learn without regret to decline unprofitable business.

UNPROFITABLE PLACES.

The places where goods are sold without profit seem to have a strange fascination for some salesmen. If a salesman of this class finds a dealer who is buying goods somewhere at prices below zero he becomes seized with a mad desire to count that dealer as his own special customer. Why cannot his house sell goods as cheap as any other? What a business this salesman could do if his employer would but allow him a reasonable discretion in prices!

Some salesmen lose their energy and efficiency as soon as they encounter a price which they cannot match. The soul of a salesmen of this sort is filled with terror by the fact that there is some other salesman roaming around with lower prices than he can make, and he cannot do business even where prices are normal and his scalp is safe. I have known salesmen who were completely demoralized by finding two or three places on a route where prices had been cut below them. Some manufacturers and some salesmen seem constantly to be in search of rat holes into which they can pour goods at or below the cost of production. It should be the policy of the salesman to develop and cultivate the trade where prices are remunerative, shunning the sections and the special trade where goods, if sold at all, will yield no margin of profit.

Much of the money spent by the manufacturer for salesmen's salaries and expenses is wasted. I know a small stove dealer located in a cross-roads town in Pennsylvania who keeps a record of every visit paid him by salesmen. This record for 1892 shows that 17 stove manufacturers spent in visiting this one dealer at least 60 per cent. of the total amount of his stove purchases. This, of course, is an extreme case, but I am convinced that manufacturers in many instances spend an amount of money in visiting the small country trade which is out of all proportion to the amount of goods sold.

COST OF DISTRIBUTION.

About one-half of the entire distributing expense consists, for the stove manufacturer of the amount expended for salesmen's salaries and expenses. In these days, when the cost of distribution is steadily increasing, it is remarkable that few, if any, manufacturers are curtailing their outlay for salesmen. On the contrary, it is probable that in this outlay is to be found a considerable part of the increase in the cost of distribution. Under present conditions no manufacturer feels that he can safely curtail this expense. The pressure of competition, growing more strenuous every year, seems, indeed, to render it necessary that he canvass the trade with a thoroughness unknown in former times. The proportion that the cost of maintaining salesmen bears to the selling price of stoves has unquestionably increased progressively during the past 20 years. Is it not possible that this increase in the cost of canvassing for trade might be checked and reversed by some plan of co-operation among manufacturers? Might it not be feasible for a number of manufacturers of one district, producing similar lines of goods, to employ one traveling salesman to represent them in common in country territory where it will scarcely pay each one of them to maintain his own individual salesman?

There are many members of this body who believe that when stove manufacturers are sufficiently civilized they will pool their capital and management, and that they will thereby economize in the costs of production and distribution to such an extent that prices can be materially reduced and profits increased at the same time.

MARKETING GOODS.

Would it not be worth while for manufacturers to take the first step in co-operation by marketing part of the goods they produce by employing salesmen in common to canvass territory which cannot be profitably worked by one house alone? Should an experiment prove successful, the plan could be extended, and it might lead up to that complete co-operation or consolidation, which, to many manufacturers, seems to be the millennium of the stove business.

It has been frequently said that traveling salesmen are employed only because of competitive necessity. That is, it is said, that there is no real reason why personal visits should be made by manufacturers to the buyers of their productions, for if all manufacturers would agree not to send out traveling salesmen, the demand for goods would not be reduced, and the sales of the different manufacturers would bear to each other the same proportion as they do now. If no house had a single salesman upon the road, could not the large saving of expense be divided between the dealer in lower prices, and the manufacturer in higher profits?

While it is true that the present method of marketing goods through traveling salesmen is costly, yet I am inclined to think that under present industrial conditions it is the cheapest plan that could be devised. And it is certainly an error to suppose that manufacturers could realize higher profits by dispensing with able traveling representatives.

* Read at the twenty-second annual convention of the National Association of Stove Manufacturers, held in Chicago May 31 to June 1.

Nothwithstanding the remarkable facilities of exchange and communication that have marked this era, it seems still to be desirable, if not necessary, that those who buy and those who sell should either directly or through representatives meet face to face. In former times, when few salesmen were sent out by manufacturers and wholesalers, the buyer usually visited them at least twice a year to personally make his purchases. As a method of distribution this was wasteful and extravagant, compared with the present plan of employing traveling salesmen. No stove manufacturer spends in salaries and expenses of salesmen as much as it would cost his entire roll of customers to visit his factory once a year.

Any special saving that one manufacturer can make by placing his cost of conducting business below the average may result in higher profits to him if he does not think that it enables him to sell goods at lower prices than those of his competitors. But a general saving which is adopted by all manufacturers cannot permanently increase profits, for the reason that profits in all business, risks and coutingencies considered, tend irresistibly to an equalization. Competition would soon cause a decline in prices that would offset the saving that stove manufacturers could effect by dispensing entirely, by general consent, with traveling salesmen. The largest single item of cost in our business is molding. If the cost of molding could be reduced next week, by the application of machinery or otherwise, to 1-10 cent per pound, profits two years hence would be no greater than they are now. In these meetings of the National Association of Stove manufacturers there is frequently heard the complaint that profits are decreasing, as though this was a condition peculiar to this one business. This, it seems to me, is an error. The economic forces that have reduced profits in this business have reduced them in all others which are not bedged arouud with a monopoly of some sort. Profits cannot be higher than the general average for any length of time in any particular business. For a busiuess that earns more than the average profit will quickly attract capital to such an extent that its earnings will be reduced to the general level.

RATE OF INTEREST.

A reduction in the general rate of interest is always accompanied by falling profits. Interest has slowly but steadily declined in this country during the past 30 years (in Illinois it is said to have fallen one-half during that period), and business profits have decreased correspondingly. To the traveling salesman in the stove business, as well as to his employer, it seems that there is an overproduction of stoves. The business, it seems to them, would be in a much more healthful condition if there were fewer stoves produced ; but this, of course, applies to all stove factories except their own. It is held by many, indeed, that one of the greatest barriers to prosperity is general overproduction in all departments of industry. Now, special overproduction tends speedily to correct itself by reducing profits in the particular line where it occurs, and thus causing the withdrawal from that business of capital and persons, or what is equivalent, by preventing capital and persons from entering it. Special overproduction of certain goods also tends to correct itself by increasing the production of all other goods. For a special overproduction of certain goods enables the people to secure a given quantity of such goods in exchange for a less amount of their commodities or services than would otherwise be required, and they are then able to demand more of the other things that gratify their desires.

LIMITED SUPPLY.

It is, of course, natural for those engaged in a business to desire the supply of the kind of goods they are producing to be limited, but it must be apparent to whoever will think that the largest possible production of all commodities cannot militate against the prosperity of the whole country. Bad times, which mean deprivation and want to large numbers of people, are never caused by overproduction. People never suffer from the lack of clothing, provisions, furniture, shoes, stoves, or any of the other things they desire because there are too many of these things produced.

PRODUCTIVE CAPACITY.

Our productive resources are sufficient in this country to provide enough of all the commodities that gratify human desire, so that every man who is not an idler might have not only the necessities and comforts, but many of the luxuries of life. If many of those who work, or who are willing to work, are unable to secure a good living, it must be because there is some maladjustment in our economic system that prevents our enjoying, as a people, the blessings of comfort and plenty that are easily within our reach.

Indianapolis Stove Co.

We are indebted to the Indianapolis Stove Company of Indianapolis, Ind., for a copy of the catalogue of stoves, heaters and hollow ware which they are distributing to the trade. It is a volume of nearly 70 pages of letterpress, printed in colored ink upon good paper, and bound in attractive covers. In connection with each stove is given such information as the dealer requires in obtaining an idea of the features embodied and the sizes in which the stove is made. The cooks for coal or wood include the Atlantic, the Crown and the Atlas, and those adapted for coal only are made under the name Clifton. The wood cooks embrace the Windsor, the Charm, the Kitchen Queen, the Improved Indianola, the Dexter and the Monon. The ranges are represented by the Tremont, a first-class construction for burning coal, wood and natural gas. The heating stoves occupy the second half of the publication and include many attractive patterns. The oaks are first considered, embracing the Burr, Black, Columbia and Sylva oaks, the latter two being new constructions of attractive appearance. Both are intended for burning wood or coal, the Columbia being made in five sizes, while the Sylva is offered in three. A varied assortment of globe, cannon, cottage parlor and Todd stoves are also included. The company enjoy facilities for turning out first-class work, and the constantly increasing demand for their goods justifies the belief that their stoves are highly satisfactory. In addition to their regular Favorite hollow ware, the company are in a position to furnish a line of extra polished hollow ware when so desired. Illustrations of these goods are found in the closing pages of the catalogue.

The Ideal Traveling Salesman.*

BY FRANKLIN L. SHEPPARD.

Not long since the writer saw in a trade journal the statement, "The only use of a salesman is to sell goods ; and any salesman who does not make this his sole aim must expect very soon to be superseded." It is possible that in a purely mercantile business, one concerned merely with the buying and selling of goods that have no peculiar or distinctive qualities, this may be true. In such a business the goods offered to the customer are exactly similar to goods offered to him by the salesmen of competing houses ; and the decision of the customer as to the house from which he shall purchase, the prices of the goods being assumed to be equal, will be determined by the tact and persuasive powers of the salesman. Other considerations play no part in the transaction.

In the case of a salesman who is offering the products of a stove foundry, however, other elements are present, to which due weight must be given by him, if he is to render to his employer the most effective service. The goods which he is to sell have in some degree, and in many instances in a very large measure, an individual character. They possess certain features which distinguish them from those of competing manufacturers. They bear a distinctive name, under which extensive advertising has in many cases made them known to the general public. They consequently enjoy a certain reputation. This reputation it is the desire of the manufacturer to maintain, and, if possible, to increase. Now, the man who has goods of this sort to sell is working under different conditions from a salesman who is merely offering goods upon which a mercantile profit upon an immediate sale is the only thing sought. The writer of this paper has often felt that in the business of stove manufacture and sale the fact stated is commonly lost sight of, not only by the salesman but even by his employer.

EMPLOYERS TO BLAME.

Employers are often to blame for the shortcomings of the man whom they send out upon the road to represent them. The employer is in most cases strangely unconscious of this. Scarcely a stove convention during the last 20 years has passed at which some one has not deplored the difficulties of the business, and then laid them all at the door of the unhappy traveling salesman. Thus, if prices were too low it was alleged to be due to the foolish salesman, who was ever ready to lend a willing ear to every dealer who would tell him of the far lower prices at which he could buy goods of other manufacturers. If there had been too large an expenditure in patterns, that also was the salesman's fault ; for was he not always insisting that other manufacturers had something better, that patterns must be remodeled to be sold, and that his customers demanded such and such features in the goods, and would not buy until they were added ? If collections were slow and difficult, that, too, was to be charged to the account of the salesman ; for did not his eagerness to sell goods outstrip his prudence, and was he not always bringing an unwarranted pressure upon his employers to sell to men of whose responsibility he was not sufficiently informed ?

No doubt there has been some show of reason in all these complaints, and yet, in the view of the writer, the employer is fully as accountable for their existence as the salesman. It is believed that they arise out of a misconception, on the part of both parties, of the duties of a salesman in a business such as that of stove manufacture. What, then, constitutes the "ideal salesman," and how is he to be educated ?

AIM OF THE SALESMAN.

"The ideal salesman" is not a mere seller of goods. He is the personal representative of the employer in dealing with the customer. The more nearly he can be brought to look at things from his employer's point of view, the more effective service he can render, and the more nearly will he approach the ideal standard. Now, what is the employer's business aim ? Surely not merely the sale by the traveler, upon a given trip, in a given time, of a certain quantity of goods. That is excellent as far as it goes, but the employer's aim is far beyond that. Any manufacturer who has judgment enough to succeed must look far beyond immediate results, and lay hold upon a distant future. He must seek a permanent trade, a steadily growing trade, and a profitable result. To accomplish this three things are necessary:

1. To attach customers permanently to the house.

2. To establish for his wares a good and growing reputation.

3. To obtain prices and terms that shall yield a due margin of profit.

There is, perhaps, more involved in these considerations than appears at first sight. They must be kept constantly in view by the man who aims to reach the standard of the "ideal salesman."

SECURING PERMANENT CUSTOMERS.

First, let us see what is involved in securing the permaneut attachment of customers to the house. In the first instance, tact in approaching the dealer whom it is desired to secure as a customer. His confidence must then be gained. The "ideal salesman," will by his candor and evident sincerity produce the impression that the dealer will find in his house one that will seek the dealer's interests, as well as those of the seller, in their mutual transactions. He will not overpersuade the dealer, if in a buying mood, to purchase more goods of a given kind than the salesman, with all his knowledge of facts, would himself be willing to order if he were in the dealer's place. He will never "double up" an order and send 12 stoves instead of six. He will never scour the immediate neighborhood of a dealer to whom he has sold goods in search of scattering orders from other parties whose trade may

* Paper read before the twenty-second annual convention of the National Association of Stove Manufacturers, in Chicago, May 31-June 1, 1893.

interfere with his. He will give his customer a clear field in which to work. He will see that he is supplied with all the facilities offered by the house in the way of making the goods known. He will show, in every possible way, a friendly and helpful disposition toward the customer.

MAINTAIN THE REPUTATION OF HIS GOODS.

But, in the second place, the "ideal salesman" is careful to maintain the reputation of his wares. To accomplish this he must know them thoroughly—their merits, their defects, and their practical operation. In addition to this, he must also know the merits and defects of competing goods. He must be able to give the dealer as full information as to size, weight and peculiar selling points of his own goods, and he must know the peculiarities of competing goods well enough to hold his ground against all objectors. Herein lies the weakness of most traveling salesmen. They do not know the principles of construction, nor the reasons on which the peculiarities of the goods which they are selling are based. When fault is found they do not know how to meet it. When asked, "Why was your stove made thus and so, and not so-and-so, like Smith & Robinson's stove?" they have no answer ready. They give it up. They go back to their hotel and straightway write to their employers something like this: "No use to try to sell our goods here, Smith & Robinson's goods have the inside track. Get up something next year like Smith & Robinson's stove and we can sell them like hot cakes." Perhaps the employer does so. But next year Smith & Robinson have a stove out which the dealer maintains is still better, and the salesman finds himself just where he was before his employer made the additional investment in patterns.

The "ideal salesman" meets objections at once, and displays an amount of practical information that at first surprises the dealer and then convinces him. He knows that he has goods that are in every way equal in quality and performance to "Smith & Robinson's," and he is competent to prove it. The average salesman always believes that he could sell something that he did not have far more easily than what he was sent out to sell, and this habit of mind is fatal to success. The "ideal salesman" occupies himself with selling what he has, not what some other man has.

SOMETHING THE EMPLOYER SHOULD DO.

It must be remarked that the employer is often to blame for this defect in his salesman. Employers need to take the salesmen more into their confidence, and see that they know the constructive features of their goods as thoroughly, if possible, as the employers themselves. Salesmen should have the opportunity of acquainting themselves freely with the processes of manufacture. They should not be strangers to the foundry, or the mounting room, or the pattern shop. Their interest in all these things should be stimulated and their knowledge increased. They cannot approach the ideal until they know far more, practically, of the goods they are selling, and this they cannot learn unless their employers give them a chance. The "ideal salesman" is kept at the foundry long enough every year to learn all he needs to know. His employer knows better than to suppose that the "salesman's only use is to sell goods," and that he has done all that he needs to for the salesman when he has put a catalogue and price-list in his hands and started him on the road. He knows that under such conditions all that the poor fellow can do is to offer the goods at the lowest price given him, and if he cannot sell them to write home for authority to sell at a price still lower.

FAIR MARGIN OF PROFIT.

This brings the writer to the third point—namely, the necessity of obtaining, in the sale of goods, prices and terms that yield a fair margin of profit. This calls for a combination in the salesman of all the qualities before alluded to—tact, knowledge, persuasive power, candor, sincere regard for the interests of the customer and fidelity to those of his employer. The ethics of trade do not require either that a salesman should get the highest price that he can shrewdly force from a purchaser or that he should offer his goods at the lowest price that his employer, under stress of circumstances, can be induced by his representatives to make. He should never forget that he is the employer's personal representative, and that as such he is bound to act, as nearly as lies in his power, as he believes his employer would act if he himself were present. With such a guiding principle he will not accept unproven and hasty statements from dealers as a basis of prices; he will not disregard the interests of a customer; he will not risk his employer's goods, which are his capital, by placing them in the hands of irresponsible parties or by offering prices in ordinary dealings that were confided to him in his discretion for use in specially important transactions. He will do all in his power to sell on short time, and to effect settlements where he may have the opportunity.

MUTUALITY OF INTEREST.

All this implies a certain degree of intimacy of knowledge of the employer's business policy. The employer, if he wishes to train up men of this sort to sell his goods, must give them such evidence of his confidence and such knowledge of his business policy as shall enable them, when away from home, to judge accurately as to what view the employer would entertain in any given case that they may encounter. This, too, implies a certain permanency of relation. The "ideal salesman" is a long time with one house. He does not change every New Year's day and spend a good portion of each year in scheming to get a place with some other firm. Nor does his employer encourage him to make a change by constant fault finding and censure in respect to trifling matters, nor by paying him a meager compensation. Both parties recognize a mutuality of interest, and each is careful to give the other his just dues.

SUMMARY.

Such is a brief sketch of the "ideal salesman." The "ideal employer" has a good deal to do with his training. He is tactful, well-informed, just, sincere, industrious, careful alike of the interests of dealer and of employer—a man who would scorn to make a misrepresentation of any kind, and who enjoys the respect and confidence of all with whom he comes into contact. He is master of his business and master of himself. He is not often found, alas! If he were numerous, the vexed question, "What is the matter with the stove trade?" would receive the prompt answer: "Nothing whatever!" When he is found, the worst of it is that the "ideal salesman" does not long remain such. He is very apt to be taken into the firm.

ODD PLATES.

WALTER L. CULVER of St. Louis, Mo., is the patentee of a cook stove or range possessing several features of interest. The arrangement of parts is such that the products of combustion pass from the fire chamber over the top of the oven, down the rear, and then through a flue between the oven bottom and the plate forming the top of the warming closet. The products of combustion then pass upward between the oven and the plate separating it from the fire box. In this way the hot gases pass entirely around the oven before they escape to the chimney. A damper is provided by means of which the area of the opening between the bottom and ascending flues can be regulated.

THE MINNESOTA STOVE COMPANY of Shakopee, Minn., have, we understand, recently increased their capital stock from $50,000 to $75,000.

H. H. WILLIAMSON, representing the Cleveland Mica Company, has just returned from a visit to the East Indies, where he has been purchasing a stock of mica for his company. With regard to the mica industry he is reported to have expressed himself as follows to a representative of one of the Pittsburgh papers: "The finest mica in the world is found in the East Indies, but it is now getting very scarce, and in a few years will play out altogether. I do not know the amount of the annual production, but it is very large, as many European firms, besides those in America, are interested in that field. We are now depending for a good percentage of our material upon the mica producing fields of America."

THE DANGLER STOVE & MFG. COMPANY of Cleveland, Ohio, are the assignees of a patent granted on May 23 to Henry Ruppel of Cleveland, Ohio, for a tank adapted for use in connection with gasoline or vapor stoves. The device consists of an outer and inner tank, the outer one being provided with a false bottom, having a central opening which may be closed by a disk operated by a spring. The bottom of the inner tank also has a collar to which is attached a plug and a valve, also operated by a spring. The object of the invention is to furnish a tank of such construction as to regulate the supply of oil to the burner and also prevent explosion and insure safety in case of accident.

LEWIS F. BETTS of Brooklyn, N. Y., has patented an oil stove so made that all the parts are easily accessible for lighting and cleaning. It is constructed in such a way that the chimney can be conveniently turned upon its hinge and the stove carried about like a lamp, without danger of burning the hand. Mr. Betts has assigned a one-half interest in the patent to the R. E. Dietz Company of New York.

THE KIBLER STOVE COMPANY of Denver, Col., have recently amended their articles of incorporation, making their capital stock $200,000.

A HEATING STOVE of somewhat novel construction has recently been patented by Lyman P. Converse of Chicago, Ill. The fire box is surrounded by an air-heating chamber, having outlets at its base and air outlets in its upper end. The grate is in the form of a cone, the point being some distance above the base. When the fuel is introduced it is suspended in such a manner as to cause the combustion to take place in an outward as well as a vertical direction. The combustion chamber is surmounted by another chamber, the base of which carries upwardly extending sectional rings, which afford an increased heating surface, as well as a circuitous passage for the air entering the chamber at the outer edges and passing toward the central outlet. Pipes lead from the chamber surrounding the fire box to the one surmounting it. Between the walls of the combustion chamber and these pipes space is afforded for the passage of the products of combustion.

THE PLYMOUTH FOUNDRY COMPANY of 90 Union street, Boston, Mass., have been appointed New England agents for the Laurel oil stoves, manufactured by the Art Stove Company, Detroit, Mich.

THE CORNING MFG. COMPANY of Corning, N. Y., favor us with a photograph of the Victor hot-air furnace, shown with the outer casing removed. This heater embodies a number of interesting features, the improvements having been patented in January of the present year. The Victor is a low furnace, adapted for use in low cellars, although it can be used with equal, if not greater, advantage in high cellars, permitting as it does greater angles with a horizontal plane for the hot-air pipes. The furnace has a cast-iron return-flue radiator under the dome, the latter having a cast top and bottom, with cast-iron air flues inside the dome. The object of this arrangement, we understand, is to increase the temperature of the air already warmed by the radi-

ator. The use of improved dampers in the hot-air pipes in the cellar permits the heat to be turned on and off in any room without going to the registers or to the cellar. The furnace has large ash pit, hollow grate bars, which are said to be easily adjusted, and a water pan at the bottom of the furnace.

THE S. M. HOWES COMPANY, 40-46 Union street, Boston, Mass., have issued a neat catalogue of several pages relating to their line of furnaces. Attention is invited to their new top return flue heater, with top radiator cast in one piece and having deep and heavy fire pot, with draw-center grate, and to the Valiant portable furnace, which is offered at a low price. The company call the attention of builders, contractors and architects to the fact that they make a specialty of contract work, and in addition to furnaces offer a large variety of steel plate and cast-iron ranges, fire-place fixtures, heating stoves, laundry stoves, &c. Accompanying the pamphlet is a four-page circular illustrating the Royal Winthrop range.

THE MICHIGAN STOVE COMPANY are circulating among their friends in the trade sheets of blotting paper intended for desk use and bearing upon their faces advertising matter relative to the line of goods manufactured. One of these inscriptions reads as follows: "Don't blot from your memory that Garland stoves and ranges cook food and warm homes for millions, and are the very best that money and ingenuity can produce." At the left hand is a *fac-simile* of the Garland trade-mark, below which is a line reading: "Don't blot with this side."

E. S. ROCKAFELLER, who for a number of years past has filled the position of sales and office manager for the Griswold Mfg. Company, makers of fine hollow ware and stove furniture, at Erie, Pa., will, after July 1, give his entire attention to the Hollands Mfg. Company, in which he is a leading stockholder. Mr. Rockafeller was for a time with the Harker Company of Pittsburgh, who handled the hollow ware made by the Griswold Mfg. Company, after which he went to Erie, where he has been active in building up the business of the latter company.

ONE OF THE FEATURES of Memorial Day in Albany, N. Y., was the gathering in Harmann's Bleecker Hall, where Capt. John Palmer, past-commander of the G. A. R., delivered a spirited and patriotic address. Several national airs were rendered by the Albany City Band Orchestra, and a solo, "The Old Guard," was sung by William A Newton, well known to the stove trade as vice president of Newton & Co. of that city.

HEAD'S IRON FOUNDRY, Utica, N.Y., are distributing an 8-page circular giving testimonial letters from some of those who have used their heaters. The first page of the circular carries a view of the Standard Junior furnace, while the last page shows the Rival Junior.

THE THATCHER FURNACE COMPANY of 33 Peck slip, New York City, report the volume of their business thus far the present year as largely in excess of that for the corresponding period of 1892. This is all the more gratifying, as last year's business was much in excess of that of any other year since the company were organized. The Thatcher furnaces are sold by dealers in all sections of the country and the company are busily engaged in all departments in filling their orders.

A POSTAL CARD, bearing date of June 1, states that the agency for the Jewel and Excelsior gasoline stoves has been transferred to Reeves & Horner of 45 North Second street, Philadelphia, Pa.

THE MARCH BROWNBACK STOVE COMPANY of Pottstown, Pa., issue a postal-card announcement, bearing date of June 1, to the effect that the arrangement heretofore existing between them and F. M. Borden & Brother for the sale of stoves and repairs for the city of Philadelphia and adjacent territory has been discontinued. The company have made arrangements with Reeves & Horner, at 45 North second street, Philadelphia, Pa., to represent them in the locality named.

WM. EARLEY, 1315 Ridge avenue, Philadelphia, Pa., publishes an illustrated circular relating to his heating apparatus. On the front page is shown the Earley steam and hot-air combined portable furnace, a broken view revealing its construction and connections with radiators being shown. The back of the circular illustrates the Earley portable hot-air furnace. The general features of these apparatus are alluded to, and a number of testimonial letters and references are given in the circular.

THE DANGLER STOVE & MFG. COMPANY of Cleveland, Ohio, are the assignees of a patent granted a short time since to Henry Ruppel for a gas radiator. The radiator is constructed with a series of gas jets at the base of the stove flues, means being provided for readily lighting all of the jets at the same time. There is also a spreader so placed as to diffuse the heat after it ascends through the flues. The object of the invention is to provide a light, easily handled radiator for heating by means of gas as a fuel.

BUCK'S STOVE & RANGE COMPANY, St. Louis, Mo., extend a cordial invitation to their friends in the trade to visit their exhibit in Manufactures Building at the World's Columbian Exposition. While they have endeavored to make a display that would attract the attention of every visitor, they have not altogether forgotten the comfort of their friends who will call on them. To the tired dealer the reclining chairs and sofas provided by the company will prove a boon, and should the dealer feel disposed to transact any business, he will find writing materials provided for his use. Letters can be addressed in care of the Buck's Stove & Range Company in the Manufactures Building, which will have their best attention.

THE RINGEN STOVE COMPANY, St. Louis, Mo., manufacturers of the well known Quick Meal gasoline and gas stoves, have from year to year issued a circular diagram better known as the Quick Meal Pie, in which they show the sales for each year since they started in business. During the year 1892 their sales amounted to 54,715 stoves, and a large section of the Pie was necessary to illustrate this number. We are advised that up to May 23 their sales have just reached the entire number sold last year, viz., 54,715; and as there are two months of the season still left, a little calculation will show that the Quick Meal Pie is in imminent danger of being entirely consumed.

THE WILLIAM MILLER RANGE & FURNACE COMPANY, 9 to 11 West Fifth street, Cincinnati, Ohio, favor us with a copy of a 32 page publication which they have issued relating to the Miller-Monitor hot-air furnace, adapted for use in private dwellings, school houses, churches, &c. The goods are claimed to be constructed upon scientific principles "insuring purity of air and the most satisfactory results from combustion, and are absolutely gas tight." The Monitor steel radiator hot air furnace, adapted for ordinary residences, is furnished with patent draw-center anti-clinker grate, and arranged for burning anthracite or bituminous coal or coke. Another heater adapted for use in private dwellings is the Miller-Monitor steel dome return Flue furnace, embodying the latest improvements. The greater portion of the volume before us is devoted to testimonials from some of those who have used the hot-air furnaces made by the company. These letters come from various sections of the country and testify in a striking manner to the satisfaction which the Miller-Monitor goods have given.

WE ARE INDEBTED to the Sill Stove Works of Rochester, N. Y., for a photograph of a very handsome parlor heater which they have just brought out under the name of Silver Sterling. In general appearance and construction it closely approximates their high grade Sterling Ventilator, but is offered the trade at a less price. The Silver Sterling is made in two sizes—No. 41 having a 14-inch fire-pot and No. 51 a fire-pot measuring 15 inches in diameter, one size being offered with oven attachment. In the ornamentation of the Silver Sterling nickel plate has been somewhat liberally employed, and manipulated in such a manner as to produce an appearance suggestive of the name of the stove. The treatment of the skirt and base section is very clever, cast ornament being combined with nickel with pleasing results. The fire-pot and magazine sections are largely composed of open work of conventional design, thus admitting of a liberal use of mica, and giving; when the stove is in operation, a bright and cheerful effect. The dome top is cleverly managed, while the ornament which surmounts the stove adds in no small degree to its appearance. Considered as a whole the Silver Sterling is a heater of which the makers may be proud, and for which there should be a large sale.

THE SYRACUSE STOVE WORKS, Syracuse, N. Y., have made an addition to their line of Welcome stoves and ranges in the shape of a medium-priced parlor heater, constructed with revertible flue and also as direct draft. The manufacturers claim for this heater originality in design, ample flue capacity, satisfactory operation and attractive appearance. The heater, we understand, is of such a character that the company feel confident it will meet with a large sale and prove a successful leader for the average stove dealer.

One of the main buildings of the J. B. & J. M. Cornell Iron Works in this city, located near Eleventh avenue and Twenty-fifth street, New York, was burned down on Friday morning. The fire began in the finishing room, and spread furiously. The loss was estimated at $600,000, which may be too large. The building was full of valuable machinery—punching, drilling and sawing machines, and the rolling mills, one of which cost $75,000. One of the punching machines cost $40,000. There is also a heavy loss on patterns and on a two years' stock of structural iron which was on hand. This is the busy season, and the fire throws about 500 men out of work.

British Tin Plate Exports.

In the June number of United States Consular Reports is published the following abstract of the amount and value of tin plates and sheets exported from the United Kingdom to other countries during the quarter ended March 31, 1893, and for the corresponding quarter of the years 1891 and 1892.

Quantity of Tin Plates and Sheets Exported from Great Britain.

Country.	Month ended March 31—			Three months ended March 31—		
	1891.	1892.	1893.	1891.	1892.	1893.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Russia	3,222	4,365	3,630	6,114	8,361	9,260
Germany	137	361	309	435	1,068	812
Holland	227	447	474	799	1,246	951
France	534	838	1,166	1,095	3,474	2,445
Portugal, Azores and Madeira	290	559	660	729	1,148	1,991
Italy	398	451	556	1,250	2,370	1,236
Roumania	89	612	549	103	1,084	559
United States	38,638	23,789	31,334	98,909	64,611	75,022
Brazil	401	581	460	1,062	1,395	1,454
Argentine Republic	301	138	247	862	577	923
British East Indies	113	525	478	409	1,727	1,202
Australasia	686	796	439	1,853	2,552	1,520
British North America	1,433	1,062	501	2,719	3,088	1,641
Other countries	1,147	1,481	1,670	3,609	5,959	4,365
Total	47,626	36,005	42,473	119,948	98,660	103,381

Value of Tin Plates and Sheets Exported from Great Britain.

Country.	Month ended March 31—			Three months ended March 31—		
	1891.	1892.	1893.	1891.	1892.	1893.
Russia	£54,030	£55,636	£44,372	£95,743	£109,449	£113,641
Germany	2,419	4,902	4,107	7,549	15,060	10,632
Holland	4,168	6,535	7,095	14,036	18,208	14,806
France	9,011	11,968	16,209	18,421	50,314	33,767
Portugal, Azores and Madeira	5,373	7,654	8,461	12,525	15,833	25,333
Italy	6,997	6,204	7,182	21,209	32,565	15,830
Roumania	1,574	8,848	7,892	1,803	15,625	8,035
United States	651,515	324,653	410,139	1,630,803	887,561	983,468
Brazil	7,388	7,985	6,152	19,309	19,610	19,649
Argentine Republic	5,834	1,952	3,263	15,993	8,581	12,956
British East India	1,914	7,223	5,992	6,255	23,402	15,396
Australasia	12,595	12,012	5,919	32,807	37,443	20,748
British North America	24,342	15,259	7,388	46,514	46,381	24,449
Other countries	21,505	22,396	22,852	66,750	87,990	60,204
Total	£808,755	£493,227	£557,113	£1,989,717	£1,368,112	£1,358,414

The report is furnished by Consul Howard of Cardiff, Wales.

The British Imperial Institute.

A great event in the commercial history of Great Britain and her colonies took place recently in London when the magnificent building, known as the Imperial Institute, was opened by the Queen in the presence of representatives from every part of the British Empire. The institution is an outcome of the jubilee celebrations which six years ago marked the fiftieth year of Victoria's reign. It is designed as a kind of focus to draw closer together the ties which bind the mother country and her colonies and dependencies, and, in the words of an official notice, "to be a meeting house for over-seas men when they come home, a show room and exchange for over seas produce, a great practical book of reference for information about every part of the Empire: bringing about a closer connection between its component parts by a variety of interests—commercial, social, intellectual and sentimental." The main scope of the institution is industrial, and the edifice will be a great trading fountain head, where the best and latest information regarding the various portions of the Empire may be obtained. Permaaent exhibitions of goods have been placed there by the governments of all the British possessions, and it will contain an imperial museum. Large and handsome rooms are provided as conference rooms, where the representatives of the colonies may meet on important occasions, as well as other apartments devoted to the social objects of the institute. In these rooms colonists visiting England may, for a moderate subscription, enjoy the advantages of a high-class club, with the other special advantages which the institute is designed to provide. The idea has been enthusiastically taken up in all parts of the British Empire, and the colonists have entered fully into the spirit of the undertaking, the cost of the building, which was nearly $2,500,000, having been subscribed in a few months.

A patent has been obtained in England by F. G. Bates of Philadelphia and W. R. Renshaw of Stoke-on-Trent, England, for a process of coating metals with lead invented by them. By this invention it is claimed that a leaden coating is obtained upon sheets of iron or other metals which is brighter, smoother, harder and more firmly adherent than such coating as hitherto produced. The process is described as follows: The lead is first melted in a suitable vessel, its surface being covered with powdered charcoal, or preferably powdered brick, and the following materials are added to it in the order named: Aluminum, sal-ammoniac, arsenic, borax, or alum or other flux, and cryolite. The proportions it is preferred to use are:

Lead	100 pounds.
Aluminum	5 pounds.
Sal-ammoniac	2 ounces.
Arsenic	½ ounce.
Borax	½ ounce.
Or preferably alum or similar flux	1 pound.
Cryolite	1 pound.

The aluminum will be found to combine with the lead and produce an alloy which is more suitable for coating metal than pure lead. The arsenic also combines with the lead and hardens it, and the other metals act as fluxes to keep the metal surfaces clean and to insure the molten metal taking upon the surfaces. The plates, after being properly cleaned, are passed through the molten metal, as in the ordinary processes.

SCRAP.

A GENERAL STRIKE took place recently at the Carmarthen Tin Plate Works of Thomas, Lester & Co., Carmarthen, Wales. The dispute which led to this action on the part of the workmen was the right of their employers to impose fines for breakages. Two rolls had been broken by two of the millmen, for which they were mulcted in the amount of £1 apiece. The workmen demanded that the fine should be remitted, which was refused by the manager, on which a general strike of the employers took place. The experiment of overlooking breakages was tried for some time at the Carmarthen works, but it is said to have been a failure, resulting in serious loss.

THE WORKS of the Blairaville Rolling Mill and Tin Plate Company, Blairaville, Pa., are reported to be very busy in both the rolling mill and tinning departments. The demand from other concerns for American black sheets for tinning purposes has taxed their resources to keep abreast of orders in this line. Their output of tin and terne plates continues to the utmost capacity of the plant, and all the product is said to find a ready market in the vicinity. James B. Scott & Co., Pittsburgh, Pa., are sole factors for the Blairaville mills.

RUMOR ASSERTS that tin-plate manufacturers are anticipating some difficulties with their workmen in regard to wages. Tin-house men contemplate, it is said, demanding an advance, to date from July 1.

The Legislature of Cyprus has decided to introduce railroads into that island. The prosperity of the protectorate has been much hampered hitherto by inadequate means of internal communication, and it is hoped that the provision of railroad facilities will give it the necessary stimulus. Cyprus is a large producer of grain of various kinds, linseed, wine, oil, silk, cotton and salt, and there are mineral resources in the island yet undeveloped.

The Sheffield technical school, in England, which languished for several years is now prospering, both in the engineering and electrical departments.

TRADE REPORT.

The Iron Market.

The Iron and Steel trade is still under a cloud, which those who are pessimistically inclined claim to be getting blacker. The situation shows very little change from last week, but the feeling is probably of a more settled character, and to that extent there is improvement. There is a pretty fair demand for nearly everything in small lots, quick delivery, but there are no new or important orders on the market. Thus far indications are that the different wage scales will be ready for presentation to the manufacturers much earlier this year than ever before, and should no serious trouble occur between the manufacturers and the workmen, the new scales will have been formulated and signed before the ones now in force have expired. The Chicago market is seriously affected by financial disturbances, and, while the panicy feeling is largely confined to the poorer classes, business men are concerned over the situation.

Pig Iron.—New York sales agents report a very dull market, although there have been no indications in the territory tributary to this city of the exceptionally low sales for quick delivery and for cash, which are spoken of as having taken place in other markets. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13.75 @ $14.50 for No. 2, tidewater. Southern Iron, same delivery, $14 @ $14.50 for No. 1; $12.75 @ $13.50 for No. 2, and $13 @ $13.50 for No. 1 Soft.

There is not much business doing in territory tributary to Philadelphia, so that it is difficult to say whether the market is better or not, or to what extent it is better. Those who have Iron for sale are asking the full prices of last week; and as stocks are in good shape, there is no necessity for forcing material on unwilling buyers. Buyers and sellers alike are trading from hand to mouth at about the following prices delivered for Philadelphia or equivalent points, and 20¢ @ 30¢ less on brands at Harrisburg, and intermediately to Baltimore:

American Scotch, No. 1X	$16.00	@ $16.50
American Scotch, No. 2X	15.00	@ 15.50
Lake Superior Charcoal	$16.50	@ $17.00
Local Coke Foundry, No. 1	14.75	@ 14.25
Local Coke Foundry, No. 2	13.00	@ 13.25
Local Coke Foundry, No. 3	12.75	@ 13.00
Local Scotch	14.00	@ 15.00

We learn from Chicago that consumers are curtailing their requirements and trade is light, running only to small lots for immediate shipment. Concessions may perhaps be obtained on our quotations, but in the absence of transactions to test values we make no change. Quotations are as follows, cash, f.o.b. Chicago:

The Pig-Iron trade in Southern markets has been light all the week, and, while there is no quotable change in prices, the general tone of the market is easy. There continue to be applications to hold back deliveries on maturing contracts, and there is no disposition to buy in advance of consumptive necessities. There is no demand for Charcoal Iron, and prices are little better than nominal. Quotations are as follows:

Foundry.

Southern Coke, No. 1	$13.00	@ $13.25
Southern Coke, No. 2	11.50	@ 11.75
Southern Coke, No. 3	11.00	@ 11.25
Ohio Soft Stone Coal, No. 1	16.00	@ 16.25
Ohio Soft Stone Coal, No. 2	15.00	@ 15.25
Lake Superior Coke No. 1	15.00	@ 15.25
Lake Superior Coke No. 2	14.00	@ 14.25
Hanging Rock Charcoal, No. 1	18.50	@ 19.00
Hanging Rock Charcoal, No. 2	17.50	@ 18.00
Tennessee and Alabama Charcoal, No. 1	15.00	@ 15.50
Tennessee and Alabama Charcoal, No. 2	14.00	@ 14.50

Metal Market.

Pig Tin.—There has been a slight turn for the better in the surface appearances of the market, but the turn looks feeble rather than healthy, suggestive, in fact, of nicely timed manipulation calculated to stiffen the backbone of buyers who are now receiving Tin on old contracts purchased at prices considerably below those at which supplies can be secured at the present time.

Copper.—Immediately after the writing of last week's report, exporters closed contracts for about 1,000,000 lb of Lake Superior Ingot at, it is understood, 11¢ ₮ lb. Since then there has been nothing done outside of ordinary home trade transactions, involving comparatively unimportant quantities. Current prices are about 11¢ for Lake Superior Ingot, 10½¢ @ 10¾¢ for Electrolytic and 10¢ @ 10⅛¢ for common Casting brands.

Pig Lead.—The upward movement that characterized values last week has given place to a turn in the opposite direction and the market is at present in a somewhat perturbed condition, being affected to greater or lesser extent by financial complications in Western trade centers, as well as extreme reserve on the part of consumers generally. At the close the market was soft, with sellers of round lots at 3.80¢ for July and 3.82½¢ for later delivery.

Spelter.—The Kansas coal mining labor troubles have served to keep the market in a somewhat feverish condition. The popular quotation for deliveries at this and common Eastern points is 4¼¢, but the chances are that attractive orders could have been filled at a shade less.

Antimony.—Demand has been slow and prices are easy, with Hallett's, quoted at 9¾¢ @ 9¾¢, L.X. at 10¢ @ 10½¢ and Cookson's at 10⅝¢ @ 10¾¢, in wholesale lots.

Tin Plate.—There has not been the slightest improvement in the demand. Spot goods have been taken in moderate quantities only and futures are still practically neglected. Values are rather soft nearly all along the line, yet showing no radical change. The demand for Tin Plates from consumers is limited, with unchanged prices.

Chicago Report.

Scrap.—Old Material is absolutely neglected. Dealers quote buying prices as follows:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12.00	....
Machinery Cast	9.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	6.50	....
Burnt Iron and Grate Bars	4.00	....
Sheet Iron and Hoops	3.00	....
Plow Steel and Breaking Stock	8.00	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	7.00	....
" (Iron)—cut in single Sheets and Rings	10.00	....
Old Gas-Pipe and Boiler Tubes	7.50	....
Cast Borings	4.00	....
Turnings	5.50	....
Horseshoes	12.00	....
Copper Bottoms	....	8 ¢
Copper Clips and Heavy	....	9 ¢
Heavy Brass	....	8 ¢
Light Brass	....	4 ¢
Pipe Lead	....	3 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	2¾¢

Anthracite.—Quotations on carload lots of 12 net tons are as follows:

	Egg, Grate.	Sto. and Ch.
Chicago, Ill.	$5.60	$5.85
Milwaukee, Wis.	5.60	5.85
Kansas City, Mo.	8.80	9.05
Council Bluffs, Iowa	8.80	9.05
Lincoln, Neb.	8.95	9.20
Sioux City, Iowa	8.80	9.05
Aberdeen, S. Dak.	8.85	9.10
Dubuque, Iowa	6.90	7.15
Madison, Wis.	7.10	7.35
St. Paul, Minn.	8.10	8.35
Burlington, Iowa	7.10	7.35
Des Moines, Iowa	8.55	8.80
Davenport, Iowa	6.90	7.15
St. Joseph, Mo.	8.80	9.05
Leavenworth, Kan.	8.80	9.05
Omaha, Neb.	8.80	9.05

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.	
Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo.	10.00
All points between Denver and Missouri River	9.35

The packing of kerosene in inferior cans results in leakage, and other merchandise is liable to serious damage.

CONDITION OF THE

Hardware Trade.

There is little change in the volume of business since our last report. It is evident that a fair amount of goods is being distributed by the jobbers throughout the country, but trade on the whole is rather quiet and of less volume than was expected earlier in the year, and the general expectation is that business for the next month or two will be dull. Buyers are placing orders only for pressing and early requirements, the uncertainty in regard to the financial situation being the principal feature of the market at present. Prices are naturally inclined to droop, but manufacturers are wisely refraining from forcing their goods on the market. There is a good deal of complaint in regard to collections, but in this respect the situation is not more unsatisfactory than for several weeks past.

Advices from Chicago.—The Shelf Hardware trade again improved during the past week, Monday's mail being decidedly heavier at the jobbing houses here than had been the case for several months previous. The improved demand has extended to all classes of goods, regular Hardware showing a decided increase, and Builders' Hardware moving much more freely. Trade in seasonable goods is now quite heavy, but staple goods, such as Nails, are still comparatively neglected. Heavy Hardware keeps up unexpectedly well, manufacturing consumers buying better than it was supposed they would this month. Collections show an improvement, but this may perhaps be due to the fact that the first of the month has just come in. The whole situation is better in every respect.

Notes on Prices.

Cut Nails.—The market in Cut Nails is weak. The price in the East is represented by the quotation of $1.05 for carload lots at mill, but it is understood that this figure has been slightly shaded. The weakness developed in Wire Nails has its effect upon Cut Nails, and the manufacturers of the latter are hoping that the Wire Nail manufacturers may be able to reach some understanding by which prices will be put on a better basis. Small lots of Cut Nails from store in New York are held at about $1.35.

Advices from Chicago,.—Cut Steel Nails show no new developments. Manufacturers are not competing so vigorously for orders, and the small volume of trade now coming up in a natural way is taken care of easily by the local makers. Factory lots are nominally quoted $1.25, but prices are not strong. Small lots are selling from stock at $1.35.

Wire Nails.—During the past week or ten days Wire Nails have been selling at considerably lower prices than have ruled for a long time. Some round lots have been quoted at $1.35, f.o.b. mill, and it is even intimated that this figure has been slightly shaded. This recession in price is accounted for in part by the fact that the mills had pretty well cleared up their orders and were desirous, as far as possible, of avoiding the accumulation of stock. The fact that some large jobbing houses had considerable stocks of Wire Nails purchased at old prices, so that they could compete with or undersell the manufacturers, had also its influence in inducing this weakness. The present situation is very unsatisfactory to the manufacturers, and there has of late been a good deal of conference with reference to measures which might be adopted to regulate prices and production. A largely attended meeting of the Wire Nail manufacturers was held at Cleveland on Thursday. It has been decided, we are advised, to shut down the mills during the entire month of July. It is thought that the manufacturers are more disposed to make mutual concessions, with a view to securing a satisfactory arrangement among themselves, than when such an attempt was last made.

Advices from Chicago.—Manufacturers' agents report a larger business in Wire Nails, but this is made up of numerous transactions in carload lots, heavy buyers being conspicuously absent from the market. Prices are somewhat weaker, and while $1.50 is the regular price on factory lots, concessions have been made by some of the mills desiring to convert their stock on hand into cash. Jobbers report their trade quite light at present, but continue to quote on small lots $1.65 to $1.70, making some concession to best buyers.

Barb Wire.—There is little change in the Barb-Wire market. Quotations are on a basis of $2.45 to $2.50 for Four-Point Galvanized in carload lots at mill. Small lots delivered in New York are quoted at $2.70 for Galvanized and $2.30 for Painted.

Advices from Chicago.—Barb Wire has been in somewhat better demand from factory, but carload prices have weakened to $2.15 for Painted and $2.55 for Galvanized. Painted is in much better supply than Galvanized, as the demand for the latter still continues to gain on the former. Jobbers report only a small trade from stock and maintain quotations at $2.30 and $2.70, respectively.

Binder Twine.—For the past two or three weeks there has been more or less uncertainty in the Binder-Twine market, resulting largely from the possibility of a shortage. Arrangements have now been made, it is understood, by which the Twine held by banking concerns, as collateral, may be released and put upon the market. The warmer weather for the past few days has increased the importance of prompt shipment of Twine, and the tendency is toward stiffer prices. The withdrawal of the National Cordage Company, as a factor in the trade, has had a tendency to increase the business of outside factories to a considerable extent.

Stove Polish.—The Raven Stove Polish Company, 59–61 Lake street, Chicago, Ill., are quoting their Polish at the following net prices:

Raven Liquid:
6 oz. Bottles, per gross.....$8.00
8-oz. Bottles, per gross..... 9 00
Water Polish, large boxes, per gross 7.20

These goods are put up in ¼ and ½ gross cases. Raven Paste Polish is put up in 5-pound pails, in cases of 6 and 12 pails, upon which prices are made according to the number of pails ordered.

Mica.—The movement in this commodity in connection with the stove trade may be alluded to as moderate at present, being between seasons, except for oil stoves, for which there is still some inquiry. Shippers of ranges and heating stoves will not need the goods for a month or two. For electrical purposes there is more activity. Prices are well maintained and orders have been declined from buyers in good standing at even slight concessions. The opinion is advanced that from now until the end of the year the demand will fully equal what can be produced.

Tinware.—Manufactured Tinware as well as Enameled Ware is in good demand; the trade, with few exceptions, referring to the volume of business as large, although is seems to be true that excessive competition is enabling buyers to supply their wants at very slight advances on cost of production. Net prices are still given when quotations are made.

Conductor Pipe.—Such demand as is being made for this class of goods is being supplied on about the same terms, there being no changes of moment.

Sheet Iron.—Black Sheets remain about the same, with but little change either way, and but a fair amount of goods changing hands. Galvanized Sheets are more active, as is usual at this season, and much trade is being done, with a tendency to shade prices where the quantity is an inducement, although some buyers affirm they are unable to supply their wants at any concession.

Tin Plates.—Trade in this line among importers and jobbers appears to be moderate in amount, as small manufacturers are absorbing but little beyond current needs, while the larger producers supply themselves directly from the mills whether foreign or domestic. Stocks in this market are said to be light and not of a speculative character, with comparatively little owing on them, so during the period of contraction there is little pressure to force sales.

Cordage.—The Cordage market is characterized by a somewhat firmer tone and slightly advanced quotations. The base prices for large lots, f.o.b. factory or New York, are as follows:

	Cents.
Manila	8¼ to 8¾
Sisal	7¼ to 7½
New Zealand	6½ to 6¾

Some of the companies connected with the National Cordage Company are re-entering the market. In the meantime negotiations are progressing with reference to a reorganization, but nothing definite in this direction is yet announced.

Paragon Rotating Washer.—Olds Wagon Works, Fort Wayne, Ind., are the manufacturers of this Washer, which is sold to the trade at $42 per dozen.

Glass.—The situation in the Glass market is practically unchanged, and remains about the same as reported last week. The more favorable weather for building has not increased the demand for Glass from factory to any considerable extent, although dealers report an increase in inquiries for Glass for fall delivery. Restrictions in credits are becoming almost universal, and conservative dealers are satisfied with furnishing Glass to only those from whom prompt returns may be expected. The times do not seem favorable for an increase in list prices, especially as importers do not appear disposed to consider propositions made by the National Window Glass Company. The Window Glass involved by the failure of ex Secretary Foster, which, it is stated, amounts to about $75,000, will probably be put on the market at much lower prices than the official discounts would allow. The productive capacity of Glass is being decreased by pots and tanks going out each week, which is a condition to be expected at this time of the year. Although the demand for Plate Glass has increased, it is intimated that the stock at the various factories is sufficient to meet the demand for months to come, and production is being curtailed by not starting up factories again by the National Plate Glass Company after stock taking was finished. Quotations remain unchanged as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, ton lots	℔ lb.	@ $0.03½
Rubber Shoes, ton lots	℔ lb.	@ .04
Large Hose	℔ ton	@ 9.00
Wringer Rolls	℔ lb	@ .04½
Wringer Wire Rolls	℔ lb. .01	@ .02
Syringes	℔ lb	@ .05

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags	℔ lb	4¢
No. 2 White Rags	℔ lb	3¢
Mixed Rags	℔ lb	1½ @ 1¾
Blues and 3ds	℔ lb	1¾ @ 2
Hard Sized White Shavings	℔ lb	2¾ @ 3 ¢
No. 1 White Book Shavings	℔ lb	2¼ @ 2⅝¢
No. 2 White Book Shavings	℔ lb	1½ @ 1⅝¢
Light Book Shavings	℔ lb	⅞ @ 1 ¢
No. 1 Mixed Shavings	℔ lb	1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @ ⅞¢
No. 1 Printed Books	℔ lb	1⅜ @ 1½¢
Ordinary Mixed Books	℔ lb	¾ @ ⅞¢
Newspapers	℔ lb	1½¢
No. 1 Manila Paper	℔ lb	1½ @ 1¾¢
No. 2 Manila Paper	℔ lb	⅞ @ 1 ¢
Bogus Paper	℔ lb	¾ @ ⅞¢
Common Paper	℔ lb	⅝ @ ¾¢
Straw Chips	℔ lb	½ @ ⅝¢
Binders' Clippings	℔ lb	½ @ ⅝¢
Jute Butts	℔ lb	1¼¢
No. 1 Jute Bagging	℔ lb	1¼ @ 1⅜¢

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb	9½¢
Light and Tinned Copper	℔ lb	8½¢
Heavy Brass	℔ lb	7¢
Light Brass	℔ lb	6¢
Lead	℔ lb	3½¢
Tea Lead	℔ lb	3½¢
Zinc	℔ lb	2⅝¢
No. 1 Pewter	℔ lb	14¢
No. 2 Pewter	℔ lb	7¢
Wrought Scrap Iron	℔ gross ton,	$13.00
Heavy Cast Scrap	℔ gross ton,	9.00
Stove Plate Scrap	℔ gross ton,	6.00
Burnt Iron	℔ gross ton,	4.00
Mixed Bagging	℔ lb	1 ¢
No. 2 Bagging	℔ lb	⅞¢
Hemp Twine	℔ lb	2½¢
Manila Rope	℔ lb	2½¢
Jute Rope	℔ lb	1½ @ 2 ¢
Mixed Rope	℔ lb	⅝ @ ⅞¢

Trade Notes.

THE J. A. FAY & EGAN COMPANY of Cincinnati, Ohio, have recently been favored with a large order for machinery to go to Padang, Sumatra, Dutch East Indies. From this it would seem that the "Dutch" are in favor of American wood-working machinery, and the indications appear to be that more will follow. The company have recently adopted a new business card, which is unique in its way. On one side is the name and address, a list of purposes for which the company's wood-working machinery is specially adapted, the names of officers and directors, together with a *fac-simile* of the decoration of the Legion of Honor conferred by the French Government at the Paris Exposition. On the other side of the card is an engraving representing a bird's-eye view of the company's immense plant; also a list of grand medals of honor awarded for the displays of machinery at various expositions.

IN OCTOBER, 1892, E. S. Wheeler & Co., New Haven, Conn., covered the roof of the South Dakota Building, at the World's Fair, with Gilbertson's Old Method Tin Plate, using 24 boxes, 20 x 28, which was taken out of Chicago stock and put on unpainted and without special preparation. In this condition it passed through the severe winter, resisting unusually adverse atmospheric conditions and is now, we understand, as bright as when put on.

LALANCE & GROSJEAN MFG. COMPANY, New York, have received some unusually large orders for Enameled and Tin Ware within the last few weeks from Brazil. That country is said to be again becoming an important customer in these goods with the improvement in her financial condition. On the other hand the trade with Buenos Ayres has fallen off materially of late in consequence of troublous times in the Argentine.

IN OUR ADVERTISING COLUMNS there is a rather startling announcement headed "Confession." The substance of it is a letter addressed to the Kelsey Furnace Company, Syracuse, N. Y., from a firm of engineers and steam-fitters who refer to the excellent results obtained with a Kelsey No. 24 furnace. The special point they make is that this furnace more nearly approaches a steam plant in the area of heating surface for warming the air. The Kelsey Furnace Company report an excellent trade thus far this year, it being 100 per cent. ahead of the same period a year ago. The contracts on hand assure them that they will be able to place every furnace they can produce before January 1 next. They especially allude to the feature of their positive attachment as giving them a strong hold with the dealers.

THE RUTLAND FIRE CLAY COMPANY of Rutland, Vt., turn out a fine grade of Stove Linings, which are the subject of a very complimentary article printed in a recent issue of one of the Chicago papers.

A PICTURE OF A RAVEN, one of the most intelligent of winged creatures, and at the same time remarkable for the single color of his plumage, is a striking feature of the announcement of the Raven Stove Polish Company, 59-61 Lake street, Chicago, Ill., that appears elsewhere. The picture, however, is only incidental to what the company say of their goods, as the subject of the advertisement is the thing the trade is really interested in. The merits of the Raven Paste Polish are alluded to, and it is said that it has met the approval of over 150 large stove manufacturers and jobbers. The manufacturers allude to the excellence of their polish, which they say is manufactured from the cleanest and most excellent graphite taken from their mines at Sonora, Mexico. The company have been forced to re-equip their manufacturing plant with the most improved modern appliances, and they say they are now in position to take care of their trade in the best possible way. The firm also manufacture a domestic water polish, put up in non-corrosive rubber-lined boxes, which has an excellent sale. A clever advertising plan that they are responsible for is a mechanical figure in the show window of the Siegel Cooper Company's store in Chicago, which shows a woman blacking a range.

THE NEW YORK WIRE CLOTH COMPANY'S FACTORY, at Hamilton, N. Y., was almost totally destroyed by fire about 5 a.m., June 3. Of 100 looms in operation 75 were burnt, those remaining being of an old pattern and of little use. The loss, although not yet ascertained, is fully covered by insurance. The company will now run their Homer, N. Y., plant night and day, and expect to experience but little difficulty in executing existing contracts. Fortunately, some two weeks ago they started up their Brooklyn, N. Y., factory, and since that time have been weaving as well as painting cloth at that point.

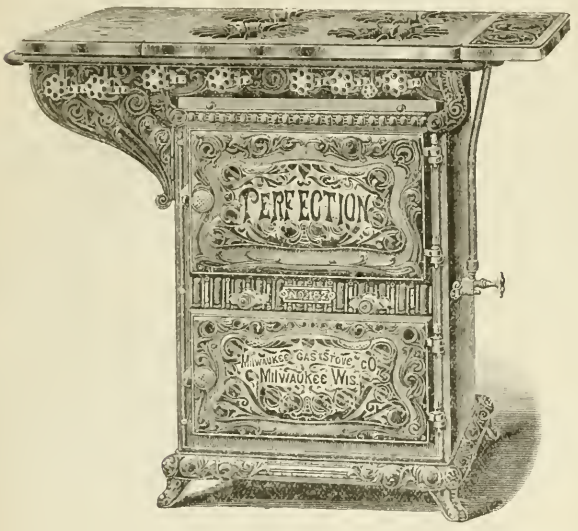
AN ATTRACTIVE announcement is made elsewhere by the Safety Furnace

Pipe Company, Detroit, Mich, who show a stack of Pipe in position by means of an outline drawing ; also some of their special fittings.

THE COPPERSMITH WORKS of Engel, Kirchnie & Regnier, at Baltimore, Md., has been destroyed by fire causing a loss of $33,000.

New Perfection Gas Range.

An illustration is herewith given of a new gas range brought out by the Milwaukee Gas Stove Company of Milwaukee, Wis. It is a four-hole range, with water heater, manufactured with sheet-steel back and sides, and adapted to natural or any manufactured gas, including gasoline gas. It is of good



New Perfection Gas Range No. 182.

size, the top plate, including shelf, measuring 40 x 24 inches, hight 35 inches, baking and roasting ovens 18 x 18 x 11 inches, and broiling oven 18 x 18 x 10 inches. Special features are patented self-cleaning burners, adjustable valves for regulating pressure, special burners for ironing, simmering burner, telescope oven burners, which can be lighted and regulated from the outside, and water coil made of seamless drawn copper tubing. Cooking can be done over the water coil while water is being heated for the boiler. The front is of handsome design, in keeping with the fine finish of the working parts.

Maris & Beckley of Philadelphia, manufacturers of cranes and hoists, report business in their line particularly brisk. The orders for traveling cranes at present in hand are heavy and necessitate the running of their shops at their fullest capacity. During the past year some improvements have been made in their Teal portable hoist. In its present shape the demand for the hoist has considerably increased, and the firm state that they find it difficult to keep up with the orders.

The Oldest Railroad Man.

There lives within a few miles of Charleston, W. Va., an individual who, according to local report, is probably the oldest railroad man in the world. He is Rev. Ralph Swinburn, a Baptist minister, who, on the authority of the *Daily Gazette* of Charleston, was associated with Robert Stephenson when that engineer constructed in England the first locomotive and operated the first railroad in 1825. Mr. Swinburn, when a young man, is said to have actually run Stephenson's first locomotive as engineer, and to have been superintendent of the road on which it was run—the Stockton & Darlington. He was occupied in railroading for 25 years in his native country, and for several years in the United States, to which he emigrated in 1850. Retiring from railroad business, he took to farming, and was ordained a Baptist minister in 1856. These occupations he has followed ever since. Mr. Swinburn is 87 years old, and is described as very active for a man of his advanced age, preaching regularly and managing his farm.

The Chambers Brothers Company of Philadelphia have just issued a 32-page catalogue and price-lists of the Waldron flexible friction clutches. The company claim to have given in the lists a very conservative rating of power for the different sized clutches, their aim being to give the customer a large margin within the actual slipping point under ordinary circumstances.

The Stow Flexible Shaft Company of Philadelphia find their manufacturing facilities taxed to the utmost to keep up with orders received for shafts for cleaning castings, for emery wheels and for other purposes. They have received quite a number of orders from the Government Navy yards for shafts to be used in connection with electric motors.

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CHICAGO, JUNE 8, 1893.

Tin—

Straits pigs.....21½¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
	IC, 10 x 14.....@	$6.75
	IC, 12 x 12.....@	6.75
	IC, 14 x 20.....@	6.75
	IC, 20 x 28.....@	13.50
Calland'and	IX, 10 x 14.....@	8.75
Melyn Grade	IX, 12 x 12.....@	8.75
	IX, 14 x 20.....@	8.75
	IX, 20 x 28.....@	17.50
	DC, 12¼ x 17.....@	6.50
	DX, 12½ x 17.....@	8.50
Allaway Grade,	IC, 10 x 14.....@	6.50
"	IC, 12 x 12.....@	6.50
"	IC, 14 x 20.....@	6.50
"	IC, 20 x 28.....@	13.00
"	IX, 14 x 20.....@	8.00
"	IX, 20 x 28.....@	16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14.14x20.....@	$6.00
IC, 14x20.90 ℔.....@	5.75
IC, 14x20, 100 ℔.....@	5.85
10 x 20.....@	9.00
IC, 20 x 28.....@	12.00
X, 10x14, 14 x 20.....@	7.50
Grade. IC, 10x14, 14x20.....@	6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—
IC, 14 x 20 ....@ $5.62½
20 x 28.....@ 11.25
IX. 20 x 28.....@ 14.25

Worcester Brand and equal.—
IC, 14 x 20.. 6.12½@ .....
IC, 20 x 28..12.25 @ .....
IX, 14 x 20.. 7.62½@ .....
20 x 28..15.25 @ .....

American Tin Plates.

Charcoal Plates.—Bright.

Irondale, A, A.—	IC, 14 x 20	$7.00
" "	IC, 20 x 28	9.00
" "	IXX, 14 x 20	11.00
" "	IC, 20 x 28	14.00
" "	IX, 20 x 28	18.00
" "	IXX, 20 x 28	24.00
Florence.—	IC, 10 x 14, 12 x 12, 14 x 20..	$6.75
	IX, 10 x 14, 12 x 12, 14 x 20..	8.75
Palma.—	IC, 10 x 14, 12 x 12, 14 x 20..	$7.50
	IX, 10 x 14, 12 x 12, 14 x 20..	9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, Tissue Packed, IC, 14 x 20,	$9.25
Royal, extra, IC, 14 x 20	7.25
Merlon, IC, 14 x 20	7.00
Almond, IC, 14 x 20	6.50
Mint, IC, 14 x 20	9.25

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (205 ℔), 20 x 28	@$12.00
Palm (205 ℔), 20 x 28	@ 12.25
Crescent, IC, 20 x 28	@ 12.50
Crescent, IX, 20 x 28	@ 15.75
Empire, IC, 20 x 28	@ 12.75
" IX, 20 x 28	@16.00
Hickory, IC, 20 x 28	@ 13.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20x28	@$14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.00
" IX, 20 x 28	@ 18.25
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@$21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	@25.60
Irondale: IC, 14 x 20	$8.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Westmoreland: IC, 14 x 20	$8.25
IC, 20 x 28	12.50
Juno: IC, 14 x 20	$5.75
IC, 20 x 28	11.50
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20	$9.50
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20	11.00
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28	10.00
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28	22.00
Neville, Stamped, IC, 14 x 20	6.25
" " IX, 14 x 20	7.50
" " IC, 20 x 28	12.50
" " IX, 20 x 28	15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.50
" IC, 20 x 28	13.00
Knoxall, IC, 14 x 20	6.25
" IC, 20 x 28	12.50
Globe, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
Miami, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
" IX, 20 x 28	15.00
" (Redipped), IC, 20 x 28	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
XXX, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50
X, 14 x 56	29.50	16.50
XX, 14 x 56	32.50	18.20
X, 14 x 60	31.50	17.65
XX, 14 x 60	35.50	20.90

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 16	℔ 2 7-10¢	3 3-10¢
17 to 20	℔ 2 8-10¢	3 4-10¢
21 to 24	℔ 2 9-10¢	3½¢
25 and 26	℔ 3¢	3 6-10¢
27	℔ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ A, 10½¢; B, 9½¢ dis. 5%

Galvanized.

List on following page.
Juniata or first quality.....dls. 70&2½%

Copper—

Ingot.

Lake.....12¢ @ 12½¢
Casting Brands.....11¢ @ 11½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ additional.

Brazed Brass Tubing.

(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 ℔.
Above 5-16 inch to 3 inch inclu...35¢
Plain, above 3 inch.....35¢ @ 40%
Plain, 5-16 inch.....45¢
Plain, ¼ inch.....60¢
Plain, 3-16 inch.....$1.00
Plain, ⅛ inch.....$1.50 @ 40%
Fancy Tubing, Brass, to No. 20 incl.....43¢
Bronze Tubing, 3¢ ℔ more than brass.

Roll and Sheet Brass

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 ℔ casks.....6¼¢
Less than Casks, ℔.....6½¢

Lead—

Soft Pig Lead.....4¼¢
Bar.....4.60¢@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10¢

Solder—

½@½.....13¼¢@13⅞¢
Extra Wiping.....12¢

The prices of these many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....12½¢@13½¢
Hallett's.....11½¢@12½¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain	60&10%
1¼ and under, Galv	52½&10%
1½ and over, Plain	70&10%
1½ and over, Galv	60&10%
Boiler Tubes, list Oct. 24, 1892	.65@67½%
Casing, list Nov. 16, 1892	52½%
Inserted Joints Casing, list Nov. 16, 1892	47½%
Steel Boiler Tubes	27½%
Cold Drawn Seamless Steel Tubing	.50%

Cast-Iron Soil Pipe—

Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive.....dls 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted	.55%
Austin's Corrugated	60%
Gordon & Gilbert's Corrugated	.55%
Ritchie's (Galv. Iron only) Cor'd	.55%
Ritchie's Spiral Lock Seam, Galv'd	.50%
Austin's Spiral Ribbed Pipe	55%
Plain Adjustable Elbows	.55%
James A. Miller Bros. (Galv'd Iron only) Corrugated	.55%

Furnace Fittings—

Discount from Excelsior Steel Furnace Co.'s list.....50%

Steel Roofing—

Perfection.....$3.75 square
Climax.....$3.50 square
The Lloyd Spanish Tiling.....$4.50 square

Metallic Shingles—

Cushman's.....$1.25 square
Merchant & Co.'s Spanish Tiles:
Copper, 14 oz.....$36.00 square
Steel, painted.....$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	℔ 0, 2 ¢
" " Brown	℔ 0, 1½¢
" " Purple	℔ 0, 2½¢
" " Ground in oil, B. Red	℔ 0, 6¼¢
" " Ground in oil, Red	℔ 0, 6½¢
" " Ground in oil, Brown	℔ 0, 5½¢
" " Ground in oil, Purple	℔ 0, 6 ¢
Linseed Oil, Boiled, in bbls	.53¢
Linseed Oil, Raw, in bbls	.50¢
Mineral Paints	2@4¢
Orange Mineral	10@12½¢
Pure White Lead in Oil	6¾@7¾¢
Dry White Lead in bbls	6¼@6¾¢
Red Lead, American	7@7½¢
Red Venetian, English, dry	.$1.65@$1.70
Red Venetian in oil; asst'd cans, 8½¢; kegs	7½¢
Spe's Japan Oil, in bbls, ℔ gal	.24¢
Spirits Turpentine, in bbls., ℔ gal	.34½¢
Asphaltum, Trinidad Refined, ℔ ton	.$45
Tarred Felt, 1 Ply, ℔ 100 ℔	.$1.65
Tarred Felt, 2 Ply, ℔ roll 108 sq. feet	.$1.50
Tarred Felt, 3 Ply, ℔ roll of 108 sq. feet	.$2.00
Roofing Pitch, ℔ bbl. of 300 ℔	.$3.20

NEW YORK, JUNE 9, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots, ℔ ℔, $0.75
No 1 (guaranteed to be 98 ℔ pure and over), in ton lots.....℔ ℔ .90
Lots less than 1 ton, 10¢ ℔ ℔ additional.

Antimony—

Cookson.....℔ ℔, 11½¢
Hallett's.....℔ ℔, 10¾@11¢

Brass—

Planished.....net
Roll and Sheet.....35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per ℔.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	35@40%
Plain, to No. 20, above 3 inch	45
Plain, 5 16 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3 16 inch	90
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inclu	43

Copper and Bronze Tubing—

3¢ ℔ ℔ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¼ to 3½ inches inclusive.....17¢ ℔ ℔
Over 3½ to 5 inches inclusive.....18¢ ℔ ℔

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive.....18¢ ℔ ℔
Over 3½ to 5 inches inclusive.....19¢ ℔ ℔

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $2.50 per doz.....10&10%

Conductors—

Corrugated. *Round or Square*—

Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—

Galvanized.....50%

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.....15@25%

Ingot.

Lake.....12¢
Ansonia Grade Arizona.....11¾¢
Ansonia Grade Casting.....11¢

Planished......net

Sheet and Bolt.....25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering*, in Current Handware Prices.

Damper Clips Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

Lap or Slip Joint.....list, net

Elbows—

Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four-Piece.				
1½	5	5½	6	7 inch,
$0.78	.87	.90	.99	1.20 per doz..20 %

Elbows and Shoes—

Flat Crimp,

Tin.....35%
Galvanized.....35%

Corrugated.
Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—

Black.

	Common American.	R. G. American.	Cleaned
Nos. 10 to 16	℔ 2¼@...	3¼¢	
Nos. 17 to 20	℔ 2¾ @...	3¾¢	
Nos. 21 to 24	℔ 2¾@...	3¾¢	
Nos. 25 and 26	℔ 2¾@...	3¾¢	
No. 27	℔ 3¼@...	3¾¢	
No. 28	℔ 3¾@...	3¾¢	
American R. R.	℔ 3¼@...	4¼@4½¢	

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ ℔, 12@13¢
Patent Planished....℔ ℔, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ ℔, 8¾¢

Galvanized.

	B. B.
Nos. 10 to 16	℔ ℔, 4¢
Nos. 17 to 22	℔ ℔, 4¼¢
Nos. 23 to 24	℔ ℔, 4¾¢
Nos. 25 to 26	℔ ℔, 4¾¢
No. 27	℔ ℔, 5¢
No. 28	℔ ℔, 5¼¢
Nos. 29 and 30	℔ ℔, 6¼¢

Filter Joints—

Lee's.....33⅓ %

Lead—

American Pig.....4¾¢
Bar.....4¾¢

New York Prices.

Pipe.....6½¢, 20%
Tin Lined Pipe.....15¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ ℔.

Philadelphia Prices.

Lead Pipe in whole coils, ℔ ℔, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ℔, .05½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Door Mats, Galvanized	25%
Window Guards, Paneled	15%
Tree Guards, Paneled	15%

Mitres Eave-Trough—See *Eave-Trough Mitres.*

Paints Oils &c.—

Lead, Ann. White, Dry or in oil:

Kegs, lots less than 500 ℔	7 @ 7¼
Kegs, lots 500 ℔ to 5 tons	6¾ @ 6¾
Kegs, lots 5 tons to 12 tons	6¾ @ 6¾
Kegs, lots 12 tons and over	6¾ @ 6¾
Lead, White, in oil, 25 ℔ tin pails, add to keg price	...@ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price	...@ 1
Lead, Red, bbls. and ½ bbls	6 @ 7
Lead, Red, kegs	6¾ @ 7¼
Ocher, American	½ @ 1½
Red, Venetian, American	½ @ 1½
	℔ 100 ℔...1.00 @ 1.10
Linseed Oil: City, raw, ℔ gal	...@ .50
City, boiled	...@ .53
Western, raw	...@ .50
Spirits Turpentine: In regular bbls	28½ @ .29
In machine bbls	29 @ .29½
Putty: In barrels and ½ bbls	.01¾ @ .01⅞
In tubs	.01⅞ @ .02¼
In tin cans	.01⅞ @ .02¼
In bladders	.01⅞ @ .02¼
Roofing Material, &c.: Asphaltum, Trinidad Refined, ℔ ton	$50.00@$35.00
Asphaltum, Rock, ℔ ton	$14.00
Coal Tar Felt, 1 Ply, ℔ ℔	.2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl	$2.24

Pipe, Drain—.....50%

Pipe and Fittings, Cast Iron Soil—

Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive	60&10%
Other sizes	55&55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 inches	60&10%
Other sizes	55&55&10%

Pipe, Spiral—

Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

For discounts see Current Hardware Prices.

Polish, Stove—

Raven Liquid:
6 oz. bottles, ℔ gro.....$8.00
8 oz. bottles, ℔ gro.....$0.00
Water Polish.....$7.20

Rivets and Burrs—

For discounts see Current Hardware Prices.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, June 17, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street.
PHILADELPHIA.....220 South Fourth Street.
BOSTON.....146 Franklin Street.
PITTSBURGH.....Room 509 Hamilton Building.
CHICAGO.....59 Dearborn Street, cor. Randolph.
CINCINNATI.....Rooms 22-24 Pickering Building
ST. LOUIS.....Bank of Commerce Building.
CLEVELAND.....312 The Cuyahoga.

BRITISH AGENCY: The Ironmonger, 42 Cannon street, London, England.

Evolution of the Steam Fitter.

As soon as gas is introduced into a country town the tinner is called upon to do the work of piping the houses. Having saved his money and added successively a line of stoves, hardware and house-furnishing goods, besides having had to do some plumbing, he now good-naturedly buys the necessary tools and fittings to do this line of work. Though new to him, he studies the principle and accomplishes satisfactory results. His knowledge of cutting, fitting and running pipes now brings the factory, mill and power-plant man to him with work that taxes his facilities to their limit, and he naturally extends them until he can handle pipe for his gas and pump work up to two and a half inches and furnish the necessary supplies. While this expansion has been going on in his shop, the information that has been crowding into his mind and the experiences that he has had, not all of which have been as pleasant as they have been educational, qualify him to receive the steam or hot-water salesman with intelligent interest.

The Heating Salesman's Field.

A salesman selling steam and hot-water goods would have a very restricted field if he did not visit the country towns of good size, and he could not hold his position if he only went where a full-fledged specialist in steam fitting was known to carry on that business. Probably no keener hunter exists than the salesman, and that he finds game in the country tin-shop, plumbing shop and hardware store reflects to the credit of the trade from either standpoint. It is true that his new customers tax his energy from their lack of acquaintance with many of the all-essential principles. If he, however, is a past master in the science of determining the flow and return and branches, simple rules can be given that will insure proper distribution of the heating medium and the correct exposure required for varied cases.

Heating and Ventilation.

While the humble installer of heating plants may be successful in heating ordinary buildings, those of greater proportions and requirements may be beyond his scope. If the architect is not a specialist in the science of heating and ventilation, he must consult the expert of the house from which he buys his goods, or seek the information from another laborer in this field who will lay out the whole work, with drawings and a list of everything that is required. The sound common sense of employing such help rather than struggling with a problem for which only a moderate preparation has been made is too clear to need further emphasis.

The Sun Spots

There has recently appeared upon the face of the sun an unusually large group of sun spots, remarkable not only for size, but for the suddenness with which they made their appearance. Just how far the amount of heat which reaches the earth from the sun is affected by the presence of such a notable quantity of spots as are now to be seen has never yet been determined, but it is generally accepted by astronomers that such spots are caused by cooler gases of combustion upheaved through a mass of much higher temperature; and, if this be true, the effect may be, on a large scale, analogous to placing a quantity of imperfectly heated coal from a fire that has nearly gone out upon the top of another glowing fire in a grate. The result is that a much less quantity of heat is emitted until the added fuel becomes thoroughly ignited again. Whether the remarkably cool spring we experienced had relation to a less amount of heat reaching us from the sun, as indicated by the presence of the spots in question, is something that cannot be definitely determined, but it is always interesting to connect the spots on the sun with changes in climatic, political or industrial conditions. It affords such ample opportunity for surmises that every one can develop a theory and get amusement for a lifetime in endeavoring to prove it.

Restrictions on Welsh Tin-Plate Production.

For some time past the question of restriction in the output of tin plates has been causing considerable friction between employers and employed in some of the Welsh tin plate manufacturing districts. In the interests of the workmen the Tin Platers' Union has decreed that 36 boxes is to be the limit turned out in one shift, this restriction being deemed necessary for the purpose of giving work all round and keeping the factories going; and in the present dull state of the market it has not been found difficult to induce the majority of manufacturers to permit the observance of this limit. But when busier times come, with increase of demand for tin plates, employers will, naturally, object to being tied down in this manner. They argue that it is contrary to reason where, as is the case with numbers of works, it is possible for the men to turn out from 60 to 70 boxes per shift, that they should be restricted to little more than half their capacity by such an iron-bound rule. In the Llanelly district, particularly, the hardship to the employers is much felt, as many of them have lately been to great expense in providing machinery and preparing for a large output, which outlay will be of no avail should they consent to the limitation dictated by the workers' union. Besides, they justly hold that such restriction, if imposed at all, should be general. This, however, is not the case, some manufacturers having, as we understand, refused to accept the demand of the union and are employing non-union men. Just at present matters in Wales are reported as being pretty quiet, owing, presumably, to the general flatness of business which has lately prevailed. But labor difficulties are likely to crop up in the future in regard to this point, both parties appearing resolute in maintaining their side of the question.

Anti-Trust Convention.

The great Anti-Trust Convention, which met in Chicago last week, with representatives from nearly all the States in attendance, was a failure. There was considerable discussion and sundry resolutions were passed, but they will not hurt anybody. The action taken by the regular convention presided over by Governor Nelson of Minnesota was too tame for some of the radical reformers, so they bolted and held a convention of their own. The familiar name of Gen. J. B. Weaver of Iowa appears as president of this convention. Both bodies made provision for continuous work against trusts hereafter. At one time the prospects were very favorable for effective work in arousing public sentiment in this way against combinations, but somehow the movement has fallen flat, and it will be singular, indeed, if the June Anti-Trust Conventions are remembered with more than languid interest when Congress assembles.

Unofficial advices from members of the American commission at Paris in connection with the Behring Sea arbitration do not give any hope of an early termination of the present proceedings.

The Waste of Anthracite.

Consumers of anthracite coal have a deep interest in the question which has been agitating the men of broad views among the colliery owners: How to lessen the waste in mining, preparing and burning of anthracite coal. It is only very recently that manufacturers on the seaboard, who have grown accustomed to make each succeeding purchase and sale at lower prices, have received with astonishment the announcement of an advance in the small sizes of anthracite coal, due to the greatly increased consumption. It has been often remarked that anthracite coal is altogether too precious a fuel to be dumped into a blast furnace, or be shoveled under a boiler. It may not be long before its industrial uses are confined to the sizes which cannot be burned in domestic fires. The territory which now depends upon anthracite as a manufacturing fuel must secure cheap coal, if it is to live in competition with other sections more highly favored. For that reason general interest attaches to every effort to reduce waste in the production and utilization of anthracite coal.

In 1889 the Legislature of Pennsylvania passed an act creating a commission to investigate the waste in coal mining, there being appointed J. A. Price of Scranton; Peter W. Sheafer of Pottsville, and Eckley B. Coxe of Drifton, Pa. The death of the two first named caused a good deal of delay in the work, Heber S. Thompson and William Griffith taking it up with Mr. Coxe, to whose earnest endeavors its completion is principally due. A neat volume just issued is the fruit of the labors of the commission. By far the greatest part of the report deals with questions touching chiefly the interest of producers. Thus an investigation is published concerning the probable percentage of the coal originally deposited in Eastern Pennsylvania which was left in the ground when the mining of anthracite first began. A. D. W. Smith figures out that it was 19,500,000,000 tons, of which 17,245,000,000 tons of marketable coal is still in the ground. It is estimated that the total coal won will not exceed 40 per cent. thereof, so that the supply is figured at 6,898,000,000 tons. With a production now of about 42,000,000 tons annually the future seems pretty well assured.

The commissioners deal carefully with the different sources of waste, unavoidable and otherwise, in the mining, the preparation and the shipping of anthracite coal, and note the improvements which have reduced it. They justly pronounce the most important saving of waste that due to the better utilization of the smaller sizes. Interesting experiments were conducted by John R. Wagner in the testing laboratory of Coxe Bros. & Co., on the burning of small coal with a forced draft. The conclusions are summarized as follows:

1. That the ashes produced by a steam jet were never as low in carbon as those produced by the fan; that is, an appreciably larger per cent. of the carbon was utilized by the fan blast. This appears to be due to the fact that when the carbon in the ash over the grate is reduced to a certain point the steam dampens it somewhat, and it ceases to burn sooner than it does when dry air only is blown through it.

2. That with the fan blast the rate of combustion per square foot per hour is greater than with the steam jet.

3. It was found that where a bed of coal was ignited and burned out, the percentage of carbon in the ash is much less than where coal is successively added to the burning mass. In practice it is not generally possible to allow the bed to burn out sufficiently before adding the cold, unignited coal. The result is a damping down of the fire, which causes the ash to cease burning sooner than it would do if there were no reduction of temperature and checking of the draft due to the adding of the coal.

4. There seems to be no doubt that the introduction of steam into the ash pit decreases materially the tendency of the coal to clinker on the grate in comparison with the fan blast or natural draft. It also changes the color, volume and character of the flame and increases the distance that the flame extends beyond the bridge wall. In many cases it is not practical, or at least it is very difficult, to burn the smaller sizes of coal without the steam jet on account of the clinkering. This effect of steam on clinkering is probably due to the fact that the steam, to a certain extent, moistens the ash close to the grate and prevents the ash from reaching there as high a temperature as it would with dry air. It is also probable that the decomposition of the steam into carbonic oxide and hydrogen, which takes place to a certain extent, and which, of course, is accompanied by a reduction of temperature, tends to prevent clinkering. The decomposition of the steam, accompanied by the formation of carbonic oxide and hydrogen, will probably account for the difference in the flame referred to.

5. A careful study of the burning of culm—that is, the burning of small coals with more or less dust in them—in these and other experiments, seemed to show that in almost all cases it is accompanied by a very high percentage of carbon in the ash, which analysis showed, in some cases, reached 58 per cent. Unless special precautions are taken to prevent it, a large portion of the fine coal runs down through the grate. When the culm gets red hot it acts almost like dry sand and works its way into the ash pit, thus increasing largely the percentage of carbon. Where coal has to be transported any distance, the value of the culm at the mines being very small, it is probable, from the investigations made, that it would be cheaper to remove the dust and transport only the larger coal.

6. It has been found that the percentage of iron pyrites, which occurs to a greater or less extent in all coals, increases very rapidly with the smallness of the coal. This is due to the fact that the iron pyrites occur generally in thin layers or incrustations on the coal. These thin layers are broken off and pulverized in the preparation and handling of the coal, and are therefore found to a much greater extent in the very small coal. It is, of course, well known that the presence of iron pyrites in fuel is very undesirable, as it generates sulphurous acid and has a tendency to destroy the grates or other iron work around the boilers, besides in many cases increasing the tendency to clinker.

7. That while the fan blast produces the best ash and gives a more perfect rate of combustion, yet in many cases it is more advantageous to use the steam blower on account of the clinkering, which may cause very serious trouble. In certain localities, particularly in cities, the noise of the steam blower is sometimes a disadvantage.

8. While it is not positively demonstrated, it is thought that the question of mixing small coals from different veins or different localities is a matter of importance. It would appear that sometimes two coals, each of which, when burned separately, gives reasonably satisfactory results, when mixed together clinker and give trouble, probably because the ash of the combined coals forms a much more fusible silicate than either of the ashes separately.

9. It would seem that the combustion of the small anthracite is more perfect when the coal remains undisturbed, or as nearly as possible in the condition in which it was put in the fire, instead of being turned over, so that the partially consumed and the unconsumed coal are mixed together.

When consumers learn to appreciate the fact that the furnaces and their appliances must be made to suit the fuel, the economical use of the smaller sizes of anthracite for manufacturing purposes will become more general, and important manufacturing interests will be favorably affected.

The Practical Mechanic and the Plumber.

BY JOBS.

A disagreeable leak had become manifest and word was sent to the plumber to come and find the cause of it and put a stop to it. He came, with gasoline fire pot, solder pot and a bag of tools, and on investigation found a piece of pipe several feet long as thoroughly perforated as a well worm-eaten log; but, fortunately, a stop cock was placed near by for shutting off the flow of water through this pipe.

The plumber explained to the lady of the house that a piece of lead pipe of considerable length would have to be put in, and that he would leave the floor just as he had torn it up until he could get the pipe, but as it was near night he would not return till the next morning. This the lady deplored, as she did not want her house to look like a workshop and could not see why he did not mend the old pipe, but supposed a plumber had to put in something new to make the bill larger.

In the evening she told her troubles to the professional gentleman who was her beloved, and who, in sympathy, told her he would investigate. So, clothed in an old smoking jacket, he proceeded to the scene of trouble and carefully searched the offending pipe, from the point where the leak had first furnished an uncalled-for water supply clear to the stop cock. The pipe was perfectly dry, without any moist evidence of a defect in it. His wife had been a witness to the entire proceeding, and now, with impressive dignity, he told her to explain to the plumber that he was something of a mechanical expert and had considerable skill in practical mechanics, which enabled him to penetrate the scheme that was to be worked, and he would treat any extortionate bill accordingly.

In the morning, immediately on the appearance of the plumber, the good wife conveyed this information with a force well calculated to annihilate, and with a "there now!" pause waited for the response, which was: "Couldn't find the leak, eh? and is an 'expert practical mechanic,' hum! Well, why didn't he open the stop cock?"

It is reported that a special effort will shortly be made by the Mexican Government to induce immigration. A circular letter has been sent out to the land owners requesting them to make efforts to that end.

The Foundrymen's Association.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club in Philadelphia, on Wednesday, May 7, with a large attendance of members. Francis Schumann was chairman. The minutes of the last meeting were read and adopted. The Executive Committee reported that at its last meeting the state of the foundry trade was fully discussed. It was found that collections were very difficult to make, owing probably to the fact that banks were refusing credit without gilt-edged securities, and were asking for additional collaterals for advances already made. It was noticeable that some of the large manufacturing concerns were the slowest pay, while the small operators found it necessary to make prompt settlements in order to establish a good name. Regarding the labor question it was mentioned that many negroes were employed in the trade, especially in the South. The negroes were also advancing North. They were now to be found in shops in Philadelphia, Baltimore, Cincinnati and elsewhere. They were finding employment as laborers and casting cleaners.

The circular inviting other foundrymen's associations to combine with their own organization had been directed to all interested parties at present known to the secretary and Special Committee. It seems that the Western Association of Foundrymen were under the impression that this was a local affair, and included only Philadelphia foundrymen, and it was necessary that the impression should be corrected. The Special Committee having the distribution of the circular in hand reported progress, and the intimation was made that the circular was favorably received by the recently formed Western Association. It was submitted that it would be in order for this association to send a communication to the new association at Chicago, congratulating its members on its formation and expressing the wish of this association to be in touch with them upon all matters, and offering them any information at present in its possession.

The treasurer reported the balance on hand June 1, $389.91, and all bills paid.

The McLaggan Foundry Company of New Haven, Conn., the F. M. Davis Iron Works Company of Denver, Col., the C. S. Swallow Company of Trenton, N. J., the Crown Smelting Company of Chester, Pa., and R. S. Newbold & Son of Norristown, Pa., were elected to membership in the association.

E. H Mumford of the Henry R. Worthington Foundry, Elizabethport, N. J., then made some remarks at length on the subject of

"Keep's Test for Cast Iron,"

pamphlets descriptive of the test having been distributed prior to the commencement of the meeting.

He said in introducing the subject of a new system of tests, he wished to state very plainly that neither he nor the company he represented had any interest in the system, other than the common interest he trusted they all felt in the bringing to the notice of their association anything novel that had been found to be of use to foundrymen. He might say, inasmuch as Mr. Keep had been kind enough to couple his name with his in the pamphlet then before the meeting, that in Detroit some years ago, Mr. Keep and himself were neighbors—that is, the foundry with which he was at that time connected and Mr. Keep's place of business were not far apart, and, having occasion to make a test for certain castings, he investigated Mr. Keep's method, and, becoming interested in it, had resolved that if ever he were so placed as to be dependent upon a system of tests he would know where to get a good one.

No longer ago than last July I experienced the need of some such guide in the management of our cupolas, and wrote to Mr. Keep, with the result that I secured from him the first set, I believed, of any apparatus sent out. The apparatus described in the pamphlet is more complete than the apparatus I am using, and, I believe, more complete than is recommended for foundry use. In fact, it is a question whether foundries are ready to adopt so elaborate a system as Mr. Keep proposes. While the pamphlet describes the test very completely, with the method of making it, it may be well for me to say a few words regarding it. 1, As to what the demand for any good foundry system of tests may be; 2, what the nature of such a test is; and 3, what results can be obtained from such a system. As to the demand for some kind of foundry tests, however crude, I think there is plenty of evidence that methods, ofttimes crude, for testing the strength of cast iron, are used. A bar clamped in a vise, and having a weight hung on the end, is considered good enough by many people, and there are many methods for making tests of shrinkage. I doubt whether the use Mr. Keep puts the chill test to has ever been followed for ascertaining the degree of hardness in castings.

The other day I had a call from a leading chemist who wished to give me an idea how useful chemistry was to the foundry, and, incidentally, how useful he, as a chemist, could make himself to our foundry. The chemist assured me of his belief that the system of tests I am using (Keep's) was very good, but too complicated for everyday use, and that it began at the wrong end. As a chemist, he said, he thought he could regulate the product of a foundry absolutely, and mentioned that, after the product of the cupola had been cast it would be too late to apply a remedy. This statement I was bold enough to deny, as I do not believe I can always predict an absolute result from the analysis. I am using chemistry as a sort of hygiene, and am supplementing it with Keep's test as a means of obtaining a diagnosis of symptoms with good results. The chemist may prescribe a diet, so to speak, but without a method for obtaining physical tests to indicate the results forthcoming castings may turn out hard and crack, and the trouble not be discovered until the castings had reached the machine shops some weeks after, and too late for remedy. The chemist in this case may be able to suggest a remedy, or, at any rate, explain the trouble. But unless the chemist has some means of making a physical test he has to work entirely in the dark.

For nearly a year it has been my practice to make tests almost daily by the Keep process, and to carefully record such tests in order to keep mixtures uniform, and at the same time keeping constant watch of the daily changes in the results. The time consumed in this way does not exceed three hours a week. If the iron appears to be going wrong, or getting hard, or shrinking too much, I know immediately what remedy to apply, thanks to the chemist; at this point chemistry counts. The main guide in the mixture for the cupola, as all know, seems to be the silicon, and if too much shrinkage is apparent it is evident that more silicon is required.

On the occasion of a visit to a roundhouse in England I found a practice in vogue of placing a sign on the boiler head denoting that the boiler was empty. I asked the foreman whether he found it a good plan, and it was admitted there was just a chance of a hostler at some time finding no sign there and putting in a rousing fire without any water, with disastrous results. The safest is always to try the gauge cocks. So it is with Keep's test. If there is implicit faith in the competency of the chemist to control the foundry output, men will place iron in the cupola, neglecting even rough inspection, and will eventually—it may be weeks later—find everything wrong. But if there are systematic physical tests made it will be found within a day that something is wrong, and there will be time to correct it. I cannot say much as to the nature of Mr. Keep's test that is not explained in the admirable little pamphlet before the meeting, but I, and doubtless all present, find it absolutely necessary to use some system of tests, and I feel that Keep's is superior to any that I know.

I consider it necessary that a man moling test bars should be kept at the work constantly, that the same kind of sand may be used, that the man may "keep his hand in," and that the ladle may be always in the same condition. Keep's test is unusually delicate in its indications, on account of the small size of the bars used.

This fact is illustrated in a letter I have just received from Mr. Keep regarding the effect of the condition of the ladle from which he pours his test bars. Chemistry will avail very little to show what effect a green ladle has on a casting, and I doubt whether a large test bar would show the same differences in iron poured from different ladles. Mr. Keep says that the results are startling. His bars were cast in three sets. One set from a green ladle, newly lined and baked over night; another from a ladle used the day before and cold; a third from a ladle in use for an hour, and therefore both dry and hot. From the green ladle his shrinkage on the ½ inch square bar 12 inches long was 0.155 inch, and the strength 369; from the ladle used the day before, and cold, the shrinkage was 0.151 inch, and the strength 386; while from the ladle that was hot, the shrinkage was 0.143 inch, and the strength 335. From my own experience I can quote a case of a casting which, although shown by Keep's test to be not up to the usual standard, yet passed satisfactorily. It was a cylinder casting. Keep's test, which ordinarily gives me from 0.155 to 0.159 inch in the square bars, jumped to 0.185 inch, and the chill obtained by splitting the end of the square bar, as noticed in the bar before the meeting, the chill occurring from the contact of the hot iron with the polished face of the chill, which ordinarily runs about 0.05 inch, jumped to 0.29 inch, or ¼ inch, and the strength, which is generally over 400, dropped down to 352. The results were so startling to me that I did not believe the casting to be good for its purpose. Yet, although it was found hard to bore out, it finally passed inspection.

Here is seen the usefulness of the test. Had there been anything in our regular mixture wrong, as appeared in this singular instance, it could have been at once corrected. The difficulty in this instance lay in the introduction of brass scrap by accident, the analysis of the iron showing copper 0.02 per cent., and there must have been also a good deal of spelter and tin.

The results to be obtained from this method of test, or any other careful method, are more to be looked for in making it possible to keep iron uniform and make a certainty of its being kept so than to bring about startling developments. While the strength of the test bar which is included in Keep's system is interesting, it is not as important as the shrinkage and chill tests. I believe that most designers make strength a very secondary question. At the same time the investigation of shrinkage leading to cracks in castings is very important.

I believe that it is the absolute routine and accuracy of the Keep test that make it of service and that the shrinkage and chill tests are far more valuable than the tests of strength. I have here a diagram of one of Keep's tests. A bar $\frac{1}{2}$ inch square not only stood a test of 500 pounds, but held it while I stepped to head of machine, and afterward endured a second application. The diagram shows very nicely what the characteristics of the bar are. It is a photograph of the iron itself.

Referring again to Mr. Keep's letter and the tests of the ladles, Mr. Mumford stated that the results as quoted by him should not be taken as final or correct, as they were were not yet fully verified. Mr. Keep had stated that the iron was caught from a cupola in one ladle and divided among the smaller ladles in 15 pound parts. He (the speaker) once made a mistake, or rather his molder did, by dipping his ladle for the test bars from the top of a large ladle, which made a great difference in the iron. As far as chemistry was concerned, the question was, whether it would overcome any variation in shrinkage made on the same day from the same cupola. Asked which test, chemistry or Keep's, he would use, supposing one test only could be made or adopted, he said he would use Keep's. Having Keep's test and knowing no chemistry, it would be quite possible to return to "No. 1 Scotch" and correct any bad results from the use of higher numbered brands, and this is what the practical founders would do at the sacrifice of cheaper iron, which it is the aim of men using Keep's test as well as men using chemistry in the foundry to render available. Keep's test was to point out the difficulty. Chemistry could only explain why the difficulty existed. Finding the difficulty, in his opinion chemistry should suggest the means of remedy.

The chairman remarked as to the question of the strength of cast iron, that it was a secondary question. The irons of to-day were so near to a standard, and the factor of safety used by engineers was so great, that the question the foundrymen had to consider was the procuring of an iron that would work easily, shrink uniformly, would not warp, would have no chilled surfaces, be homogeneous and free from flaws. This was the principal question nowadays. The question of strength was admitted to be there, of course, and in some cases a very high standard of iron was required. The main feature was to determine whether a brand of iron bought was of the necessary quality. Was it free from chill? In casting, would it crack before it was cold or after? In a simple way, at his company's works, they got at the quality by making a test piece 12 inches long, 3 inches wide, $\frac{1}{2}$ inch thick at one end, and feather edge at the other. In casting they could see marked differences. The feather edge showed the chill, and the foundryman drilled holes until he could not penetrate the iron. In the next heat he would find the chill deeper, or shallower, and the length of bar would give the amount of shrinkage. It was a very simple method. Some test pieces showed the chill from feather edge running up 4 to 5 inches where the iron was $\frac{3}{16}$ to $\frac{1}{4}$ inch, while in other pieces the chill would run only a short way. The test piece also indicated the fluidity of the iron. Of course the question of strength in these tests was lost sight of. The chairman then, in behalf of the association, thanked Mr. Mumford for his address.

The secretary then introduced to the meeting H. S. Sparr of Philadelphia, the general agent of the Greiner Economical Cupola Company, who read an interesting description of the Greiner process, as found in the pamphlet of the company, also extracts from an article which had appeared in the Franklin Institute *Journal*, entitled: "An Investigation of the Construction of Various Kinds of Cupolas for Melting Pig Iron." Supplementing his reading with remarks of his own, Mr. Sparr aroused considerable interest. Some discussion took place upon the subject, during which Mr. Rankin of the Abram Cox Stove Company of Philadelphia stated that the Greiner process was in use at his company's foundry, and that so far as they were concerned, it was no doubt worth all that it cost them. It had proved a saving to them, but not so much as had been represented to them that evening, by a good deal. They could melt more rapidly than before, and saved some fuel. He believed, however, that the process would be applied in a more efficient manner than adopted in their cupola. There was some fault in its application which would be remedied the next time the cupola was lined. He could recommend the cupola to any one melting from 15 tons upward, and believed it would prove a saving to them of from 8 to 12 per cent.

The secretary called attention to the fact that about last September he wrote a letter to the Assistant Secretary of State at Washington, asking a number of questions. He wished, for purposes of the association, to get information as to cupola practice in England, France and Germany, and requested the Secretary of State to get the information through his consuls. The Secretary of State accordingly sent out printed letters to each of the consuls of those countries, asking the questions contained in the letter, but up to the present time the association had received no definite answers to the questions. He again wrote quite recently, and received a reply to the effect that about 25 communications had been received, but publication of same could not be made until after July 1. He intimated that if all the questions were answered, the association would certainly get some valuable information which would enable them to draw comparisons regarding cupola and foundry practices in Europe and America.

The expediency of arranging a union or centralization of the associations of foundrymen at present existing or under formation was then discussed by the meeting, the prevailing opinion being that it would be better for the Foundymen's Association to continue on its own lines for the present. The chairman was of the opinion that as the different organizations became more complete a convention would probably result; and therefore it would be well to let things rest and watch the development of the associations throughout the country. The meeting then adjourned to the roof garden of the club, where the usual quarterly lunch was served.

After the lunch, P. D. Wanner of the Mellert Foundry & Machine Company, Reading, Pa., was asked to make a few remarks upon trade at the present time, and, although the hour was late, Mr. Wanner delivered an address which was listened to with marked interest. In the course of his address, speaking of the cast-iron pipe trade, which he more particularly represented, he said that all the foundries, as far as he could learn, were very busy. The demand for cast-iron pipe for this season, and for the year prospectively, would go away beyond any demand that the country had ever seen heretofore. The demand for cast-iron pipe at the present time was, in his opinion, very great, and for the year it would be simply enormous. He believed he made the statement at a previous meeting that the pipe trade was dependent to a great extent upon the weather, and that the droughts experienced during last year were likely to stimulate the pipe trade. The country had had freshets off and on since 1886, and the freshets this year were very bad. The trouble in many sections was not in the getting of water, but in the getting away from it. This, of course, kept the pipe business back. But the droughts of last year all through the country stimulated the trade to a wonderful degree. Almost every town and available village was at this time being piped and yet in the face of all this, in spite of this enormous demand, the pipe was being supplied at very low prices, unprofitably low, in view of the fact, too, that during the depression of the last four or five years the pipe foundries had run down to a great extent. Repairs were in order and necessary, so that even if a gain was made on the poor pig-iron men, that was all that was made, as far as the cast-iron pipe trade was concerned. Whatever profit there was in the business at this time was simply taken from the pig-iron men. When foundrymen came to make repairs during the year, which they had to do at its close, they would probably be just as poor as in the beginning. Under the existing condition of things he had not much hope for the pig iron trade. They would remember that he made some predictions during the early part of the year, and some then present probably thought he was wild when he made them, but in his opinion the predictions had been more than verified, and many around him who had heard him make them could now substantiate them. They could only hope that there would be a change and the change could not come any too soon for all. There might be other causes, but in his opinion the present state of things was brought about by overproduction. In the pipe trade, the pig iron trade, the steel-rail trade and a great many other lines the same cause of depression was apparent. Mr. Wanner closed his address with some forcible remarks on protection and the silver question.

The next meeting of the association will be held July 5.

THE LETTER BOX.

Leaky Gutters.

From B. L. B., *Rockport, Ill.*—In answer to the inquiry of "H. and J." in *The Metal Worker* of May 27, would say that I am satisfied that the tin in the gutter was broken by expansion and contraction, which is considerable in some climates. I have had trouble of a similar kind here and have overcome it by making a shade for the gutter. I nailed short piece of 1 x 3 battens across the top of box, about four feet apart, and nailed to these supports boards of sufficient width to cover the gutter, taking care not to let the board touch the roof, so as to interfere with the flow of water, which in a heavy shower might cause the roof to leak. The board should not be wide enough to project over the boxing, for if so the water would drip from the boards outside the gutter.

Condensation Under Tin Roof.

From C. D. S., *Carrollton, Ky.*—There is in this place a building used for steaming and drying tobacco, with which we have had much trouble, from the condensation of moisture under the tin roof. The ceiling joists are ceiled with ⅞-inch pine boards, tongued and grooved. The room below this ceiling is used for drying tobacco, and has a temperature of 120°. This makes the garret so hot that the moisture condenses on the roof and runs down through the ceiling on to the floor below. There are ventilators in the roof, and a fan running to draw the hot air out of the garret, yet the condensation continues. We had thought of covering the under side of roof joist with some kind of roofing, which would carry the condensed moisture into troughs placed for the purpose, to which would be connected pipes leading out of the building. What scheme can be suggested for overcoming the difficulty?

Answer.—The escape of heat from the drying room to garret could be prevented to a great extent by filling the spaces between ceiling joists with mineral wool. If this did not have the desired effect, the joist under tin roof could be covered with building paper, and then with matched flooring, so as to prevent the moisture from coming in contact with the tin roof.

Overflow from Cesspool.

From S. & H., *Watsontown, Pa.*—Please tell us, through *The Metal Worker*, the best way to dispose of a cesspool which is now full. The pool is dug about 15 feet deep, the top surface for five feet being sand, and the balance through limestone, clay and rock, lined with brick. The sand appears to be cemented with grease, so that it does not waste away. Are there chemicals that can be put in that will eat their way through and form a channel, or must it be abandoned and a new one dug?

Note.—We gather from what our correspondents write that heretofore they had depended on the liquid in the cesspool leeching through the soil so as to prevent the cesspool from filling completely. Now, it appears, however, that the grease in the waste has made an impervious coating and the cesspool is filled up. Of course, our correspondents are aware that the solid matter gradually accumulates and the cesspool needs a periodical cleaning by means of buckets or pumps. To get rid of the waste water there are various plans that are made use of. One is to run a drain from near the top of the cesspool, some distance away, and discharge on the surface of the ground, at a lower level, the waste water being taken care of in that way. Another plan is to run a trench filled with broken stone, or an open-joint tile drain, from near the top of the cesspool into another pit, at a lower level, filled with broken stone and so arranged that the water alone will reach it and filter out into the ground around it. If other blind drains are run from this second pit, it will increase its efficiency and enable it to take care of more water. In either of these schemes or any other similar ones, however, it must be borne in mind that it is necessary to run the waste at or near the surface of the ground, so that the air can get at it and exercise a purifying effect. It is also necessary to remember that the waste will sometimes travel long distances underground, either in the crevices of rock or against the hard surface of a clay stratum, and in that way reach and pollute distant wells and water sources.

Moistening Furnace Air.

From I. D. A., *Flint, Mich.*—The query on "Moisture in Hot Air," from "J. H. C.," in *The Metal Worker* some time ago suggested to me that the experience of one of my customers might be interesting to some of your readers. The house was heated by a furnace and when the weather was coldest, so that it had to be fired extra hard to heat the air enough to make an agreeable temperature in the house, a disagreeable dryness was experienced on some days but not on others. What was the cause of this? was the question asked me and which I was unable to answer. It was found that the dryness always occurred on days when one of the ladies of the house was absent or specially occupied. By careful investigation in watching every incident it was found that when home and not busy, she, being fond of flowers, always visited the conservatory and arranged flowers according to her special fancy in large open dishes and placed them in several rooms, sometimes on the mantel or on a small table and always near the register. As the dishes were shallow, it was noted that it was necessary to replenish the water when the furnace was running hard. The evaporation of the water from the flower dishes was accepted as an agreeable solution of the problem. The furnace had a water pan, but on questioning the servants it was learned that, though a pipe running to it with a faucet made it easy to keep it filled, they did not use it because they thought the water wasted the heat by cooling off the furnace. Instructions were given to keep the water pan full, but, as it often got so near empty that the sediment caused a very disagreeable odor, some other arrangement was sought. Now, a clear glass globe, similar in shape to a camp kettle, is tastily suspended near each register, and, filled with water, gratifies every demand. It has a great advantage in being in sight, so that its emptiness will be noticed, while no dirt will, naturally, be tolerated.

Heating Room from Range Boiler.

From J. H., *Williamsport, Pa.*—Can you or any of the readers of *The Metal Worker* inform me whether a hot-water boiler attached to a range and set upstairs in a bathroom will keep the room at such a temperature as to prevent water from freezing during zero weather? How near must the boiler be to the stove and how far can it be removed from the stove and still circulate? Also, can a boiler stand near the stove and the pipes run up to the bathroom and connect to a radiator? Will this plan keep the room warm, and what size radiator will it take to heat a room 8 x 8 in size or thereabout, the room being on the outside of the house?

Answer.—The quantity of hot-water surface necessary to heat a room 8 x 8 feet, situated "on the outside of the house" (by which we infer that our correspondent means having one side exposed to outside temperature) and 10 feet high is 25 square feet, more or less, according to the character of the building, whether very substantially built or not. About 18 to 20 square feet will suffice to keep it warm enough to prevent danger of freezing, and a good-sized range boiler would have very nearly or quite this amount of surface. Its use would, however, compel the maintaining of fire night and day in the range. Such a boiler may be made to work well if properly connected with the water back when placed one or two stories above the range. With such a position the pipes connecting the boiler with the water back in the range ought to be 1 inch to insure good circulation. Pipes may also run from the boiler when placed near the range and supply a hot-water radiator in the bathroom. The work in either case ought to be done by a skillful man, however, one who can take into consideration all the local conditions and provide for them as they may require. We do not know that any definite limit of distance at which water may be made to circulate through a water back and the boiler of a range has ever been estab-

lished, if such a practical limit exists. If sufficiently large pipes are used for connections, it seems from general principles that circulation might be secured at a considerable distance provided a proper inclination of the pipes could be obtained. The radiation from the pipes cooling the water tends to retard the circulation, but the limit of distance to which the water would flow before becoming absolutely cold would not likely be reached in such domestic apparatus.

Core Box Plane.

From R. A. F., *New London, Conn.*—Having saved myself much labor and executed work that was correct to a hair's breadth with my core box plane, I send this description, with sketches of it, so that others may be benefited by its use. All planes of this kind that I have ever seen were made and not square, but slanting, so the point on the side when set will come in the point of the angle of the plane. The mortise in the plane, to receive the cutter and the wedge, should be so located that the cutter will cut all on one side and so that the point of the cutter will always come right to the point of the angle of the plane. From this description and the illustration I think no difficulty will be found in making the tool.

To make a core box with it, having trued up the material, take a marking gauge and lay out, in the middle of the wood, a space as wide as the diameter of the core you wish, as shown in Fig. 2, the dotted lines showing the semicircle desired, or if a taper core is wanted lay off the diameter at each end and draw the lines from one end to the other. Sink these lines in deep enough to allow a chisel to cut a gutter to start the plane on each side, as shown in Fig. 3. Now, with a gouge rough out the material in the center, as in Fig. 4, and start in with the plane. As the cutter

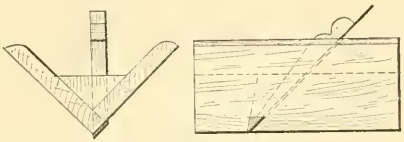


Fig. 1.—End and Side View of Core Box Plane.

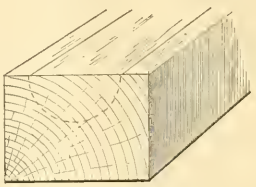


Fig. 2.—Laying Out Core Box.

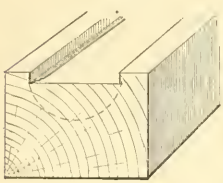


Fig. 3.—Core Box Ready for Roughing Out in Center

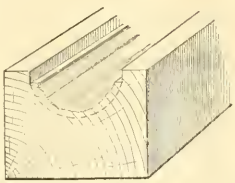


Fig. 4.—Core Box with Center Roughed Out.

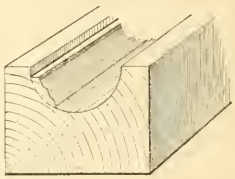


Fig. 5.—Core Box After Plane Has Been Used on One Side

CORE BOX PLANE.

by the owners, and I have never heard of any being for sale at any tool dealer's. For making an accurate box and doing it quickly for round cores for foundry use, whether they be straight or taper, it will be hard to beat this plan. A box for making round cores is generally made in two parts, each part being hollowed out to a half circle its entire length, and the hollowing out of this space by a gauge and sand paper, using a templet to test its trueness, is a tedious task for a very careful workman. With a core box plane as illustrated in Fig. 1 an ordinary workman can make a true core box in a few minutes. It works on the principle that no angle but a right angle can rest its point on any part of the arc of a semicircle and at the same time touch both ends of the arc. The construction of the plane is simple and any one needing such a tool can readily make it. Take two pieces of hard wood 1 inch thick, 6 inches wide and 8 inches long; fasten them securely together to form a perfect right angle or square. On the inside fasten another piece of wood, 1 inch square, for strength and to give more material where the cutter comes through. The cutter need not be over $\frac{1}{4}$-inch wide, sharpened only on the end like a chisel does most of its work on the point and is narrow, the gouge may have to be used again as the work progresses. By holding the plane so that the blind side of it presses against the side of the gutter, as it is pushed forward it will cut toward the center of the semicircle it forms, as it cuts down, as shown in Fig. 5. After cutting out one half it will be necessary to reverse the material and begin again on the other side. The other half of the core box is made in the same way and if the plane is sharp and only a very thin shaving cut each time it will require very little sandpapering to smooth it up ready to receive the pins when the core box is completed.

Soldering Galvanized-Iron Trough.

From H. B., *Lebanon, Mo.*—What is the proper way of soldering an old galvanized ogee hanging gutter that is broken at the seams? The gutter is on a building 40 feet high, and the owners do not wish the trough taken down. As the seams in gutter next to building are perpendicular they are difficult to solder in new work, let alone in old. Is there any kind of flux better to use for soldering than muriatic acid?

Answer.—As the trough is a hanging one, and at such a distance from the ground as to make it difficult to work at when in position, we would suggest that it be taken down in long sections and the joints well riveted, which would have a tendency to prevent their breaking apart in the future. They could then be soldered, for which purpose it is probable muriatic acid would be the most convenient flux to use, as when of sufficient strength it would render scraping of the joints unnecessary. The ends of sections, which would require to be soldered when the trough was in position on building, should be well tinned, which would render the operation of soldering much easier. If it is necessary to solder the broken joints when the trough is in position on the building, it is a question if there is a more convenient flux to use than the acid above-mentioned. When soldering with acid the coppers can be cleaned by dipping in a solution of sal-ammoniac.

Torrance Wood Furnace.

From M. M. B., *St. Paul, Minn.*—Will some reader of the Letter Box kindly give me the name of the makers of the Torrance Double Cast-Iron Drum Wood Furnace?

The new Krag-Jorgensen magazine rifle, adopted for the army, is to be made at the Springfield Armory, and the cartridges for it at the Frankfort Arsenal. It is probable that enough of the special machinery needed will be in place in time to begin manufacturing about July 1.

A crisis seems to have been reached in the affairs of the Reading Railroad Company, unless the bond and stock holders assent to the readjustment plan.

PLUMBING and GAS FITTING.

Eleventh Annual Convention of the National Association of Master Plumbers.

The annual convention of the National Association of Master Plumbers met in Milwaukee, Wis., this week. The Executive Committee of the association held a preliminary meeting on Monday afternoon at the Hotel Pfister, arranging various matters of detail in connection with the deliberations of the convention. The members of the committee present were: President, Jeremiah Sheehan of St. Louis; vice-president, Daniel G. Finnerty of Boston; recording secretary, O. J. Gerhard of St. Louis; treasurer, W. E. Goodman of Milwaukee; Robert Griffith of Chicago, T. J. Radcliffe of Brooklyn, Henry G. Gabay of New York, C. T. Paul of Los Angeles, F. E. Hopper of Cincinnati and D. F. Sullivan of Dallas, Texas.

TUESDAY MORNING.

On Tuesday morning the members of the numerous delegations assembled at the Hotel Pfister, formed in procession and marched to Lincoln Hall, led by Clauder's band. There were 306 in the ranks, a larger number than at any previous convention.

Arriving at the hall, an address of welcome was delivered by F. W. Pripps, president of the Milwaukee Association of Master Plumbers, who outlined the programme of entertainment provided by the local craft and by the Rundle-Spence Mfg. Company of Milwaukee. He was followed by V. W. Deeley, assistant city attorney, who made a formal address of welcome in behalf of the Mayor of Milwaukee, in the course of which he paid a tribute to the high reputation for honest work and moderate charges of the Milwaukee plumbers, who are so well regarded by their fellow citizens that representatives of the craft are honored with political positions. President Jeremiah Sheehan of St. Louis replied in behalf of the association, thanking the citizens of Milwaukee for their cordial greeting. He then proceeded to business by appointing Patrick Ferriter and William Halsey of Milwaukee sergeants-at-arms. A Committee on Credentials was appointed, as follows: Isaac Riley, Boston; John J. Keenan, Brooklyn; Geo. E. Howe, Los Angeles; Wm. Schwehr, Jr., St. Louis; J. J. Wade, Chicago; Geo. E. Sands, Pittsburgh; Wm. Harkness, Philadelphia. The convention then adjourned until 2 o'clock to receive the committee's report.

TUESDAY AFTERNOON.

Tuesday afternoon's session opened with the calling of the roll as made up by the Committee on Credentials. The names of those in attendance are as follows:

Members Present.

Altoona, Pa.

O. L. McCartney. J. F. Delaney.

Baltimore, Md.

John Trainor. Geo. W. Addison.
B. J. Barry. J. F. P. Carey.
P. T. Barry. E. J. Healy, Jr.
Jas. Connoly.

Bay City, Mich.

William Sullivan. Fred. Fischer.

Bloomington, Ill.

Robert Loudon.

Boston and Vicinity

Wm. H. Mitchell. Daniel Shannon.
D. G. Finnerty. P. H. Winn.
David Smith. T. J. Tute.
Isaac Riley. J. S. Boyd.
E. C. Kelly. J. C. Kelly.
James Tucker. T. H. Duggan.
J. W. French. John W. Cosden.
Chas. M. Bromwich.

Bridgeport, Conn.

H. B. Middlebrook. Alfred Hopkins.
Zalmon Goodsell.

Brooklyn, N. Y.

Thos. H. Radcliffe. M. J. Gleason.
Geo. B. Lewis. E. Macdonald.
J. W. Kelly. G. Alfred Smith.
E. Hayward. J. J. Keenan.
Wm. J. Gault. W. F. Buckley.
Jos. Zoll. O. O. Sawkius.
R. J. Knox. Geo. Cummings.
H. M. Noble. John Danaher.
T. A. McWhinney. John H. Read.
Wm. Eiermann. Paul Ayers.
Willis Gardner. Geo. W. Smyth.
Thos. Hudson. Thos. Evans.
Martin Fallon. E. S. Kelly.

Buffalo, N. Y.

C. B Huck. Jacob L. Mensch.
Charles Geiger. A. E. Stevenson.
L. P. Beyer. Louis W. Gay.

Burlington, Iowa.

Henry Ewinger.

Chicago, Ill.

Daniel Rock. C. J. Herbert.
A. W. Murray. D. Whiteford.
J. J. Wade. T. C. Boyd.
J. F. Dalton. C. C. Breyer.
Thomas Conway. P. Redeiske.
J. J. Rourke. P. J. Morrisy.
Jas. E. Breen. W. H. Cummius.
A. C. Hickey. T. P. Culloton.
J. J. Doyle. Audrew Young.
H. A. Black. Robert Griffith.
Wm. F. Geary. R. B. Finn.
M. Mandable.

Cincinnati, Ohio.

Joshua R. Gibson. Thos. Canary.
John D. Sullivan. Geo. Meller.
Jas. J. Doud. M. Burke.
David Miller. S. Krouse.

Cleveland, Ohio.

A. Schneider. W. J. Warden.
Eb. Ellen. C. C. Dewstoe.
L. Paplowsky. W. A. Kelly.

Davenport, Iowa.

Robert Clayton.

Denver, Col.

T. J. White.

Detroit, Mich.

Jas. H. Crumley. W. I. Bolt.
Jas. Menthe. George Moebs.
Samuel Dixon. Wm. McFadden.

Duluth, Minn.

Allan Black. R. J. Powell.

Evansville, Ind.

Chas. Wahnseidler. S. A. Bate.

Fort Wayne, Ind.

Robt. Ogden. Patrick E. Cox.

Grand Rapids, Mich.

F. Shriver. E. L. Schneider.

Hartford, Conn.

Jas. Ahern. Jno. S. Craig.

Henderson, Ky.

L. C. Klees.

Ionia, Mich.

Louis Mann.

Indianapolis, Ind.

Jas. McGauley. George Kirkoff.

Kalamazoo, Mich.

Jno. A. Wheeler.

Kansas State.

William Rowan, Arkansas City.
C. J Prescott, Topeka.
F. W. Doane, Lawrence.
H. Ingham, Fort Scott.

Kansas City, Mo.

J. L. Ryle. L. B Cross.
Geo. F. Kirtley. C. F. Terry.

Lima, Ohio.

J. M. McVay.

Lincoln, Neb.

Jas. H. O'Neill. F. A. Koesmeyer.

Los Angeles, Cal.

L. A. Scholes. E. L. Brugoin.
Geo. Howe. J. Crimmins.
C. T. Paul.

Louisville, Ky.

M. J. Duffy. A. M. Ramsey.
Chris O'Connor. J. B. Stickler.
W. H. Mattack. Thos. P. Watts.

Madison, Wis.

George Kraft. Wm. Owens.

Middletown, Conn.

Jas. Donovan. L. D. Mills.

Madison, Ind.

Audrew Anger.

Milwaukee, Wis.

F. W. Fripps. S. V. Hanley.
Fred. Wittig. W. Eagan
Philip Murphy. J. Hickey.
W. Halsey. W. E. Goodman.

Minneapolis, Minn.

John St. Ledger. A. W. Scott.

Norfolk, Va.

W. E. Foster.

Naugatuck, Conn

John M. Page.

New Britain, Conn.

P. J. Tormey.

New Hampshire (State.

Robert J. Donnelly, Portsmouth.

New Haven, Conn.

S. E. Dibble. Wm. H. Hazel.
Andrew J. Clerkin.

Newport, R. I.

Thos. Phillips.

New York, N. Y.

Henry G. Gabay. James Muir.
George D. Scott. Henry J. Pattison.
John Byrns. John Yule.

Thomas J. Toumey. John Mitchell.
Joseph W. O'Brien. Peter J. Carpenter.
Timothy Sullivan. Josiah S. Lindsay.
Frank Reynolds. James G. Collins.
James R. Corbitt. Isaac O. Shumway.
Thomas J. Cummins. Alexander Cameron.
William Young. Isaac J. Brown.
Edward J. Brady. Cauldwell Fraser.
Philip Smith. John Renehan.
Owen McGinnis. James Fay.
Edward Murphy. James M. Morton.
Adam Huston. Samuel Malcom.
Terence J. McCormack. Chas. H. Kronichfelt.

Northwestern Master Plumbers' Association, Wisconsin.

S. S. Hitchcock, Marinette.
W. S. Patterson, Appleton.
J. H. Ryan, Appleton.
J. F. Ahern, Fond du Lac.

North Shore, Ill.

Robert Thoroughgood, Evanston.
W. E. Goodman, Evanston.
J. J. Pickett, Evanston.

Pawtucket, R. I.

Amos B. Root.

Philadelphia, Pa.

Jno. E. Evanson. Wm. Harkness.
Geo. F. Uber. Wm. H. Doyle.
Albert M. Hicks. Wm. D. Owens.
Wm. McCoach. F. P. Brown.

Pittsburgh and Vicinity, Pa.

R. J. Bradshaw. J. J. Kenedy.
George Sands. James Hay.
James G. Weldon. John Cowling.
J. O. McGinness. C. H. Humbert.
J. L. McShane. F. P. Blythe.

Portland, Oregon.

L. H. Buddemar. F. Martin.
M. P. Fleming. R. Brady.

Poughkeepsie, N. Y.

P. H. Ward. James Mulvrein.

Providence, R. I.

Patrick Tierney. Job Fuller.
James C. Conroy. James V. Manchester.

Rochester, N. Y.

Jas. H. Maher. A. A. Dumond.
John Creelman. Jos. Barr.

St. Louis, Mo.

David Roden. Wm. Ryffel.
John McMahon. R. J. O'Brien.
John Quinn. Wm. Mc ormack.
M. J. Ward. John Grenzenbach.
Hy. Whitney. J. M. Crane.
W. H. Kuhns. Benj. Mortimer.
J. M. Life. F. W. Marx.
Wm. Schwehr, Jr. Jeremiah Sheehan.
Wm. J. Hill. O. J. Gerhard.
C. Monihan.

St. Joseph, Mo.

J. W. Powers. R. T. Connell.

St. Paul, Minn.

J. J. Dunnigan. Geo. A. Keeys.
P. W. Hudner.

San Francisco, Cal.

Robert A. Vance. Chas. I. Reilley.
Thomas A. Ford. John L. E. Firmin.

Seattle, Wash.

J. S. McLellan. D. B. Spellman.
Thomas Kearns.

Sheboygan, Wis.

Geo. L. Krause.

Sioux City, Iowa.

J. A. Harris.

Springfield, Mass.

J. C. Howland. D. D. Casey.

Springfield, Mo.

Harry Cooper. E. L. Hoke

Syracuse, N. Y.

W. S. Orr. Wm. N. Tobin.
Chas. P. Hauchett.

Texas State.

D. J. May, Galveston.
Amzi Berla, El Paso.
A. H. Shafer, San Antonio.
D. Kavanaugh, Dallas.
D. F. Sullivan, Dallas.
J. F. Osborne, Fort Worth.

Washington, D. C.

John Mitchell. Edw. J. Hannan.
D. S. Williamson. James Ragan.
James Lockhead.

Waterbury, Conn.

Thos. Barlow. Wm. T. Disbey.

Woonsocket, R. I.

Jno. T. Mulvey.

Worcester, Mass.

J. W. Jordan. J. C. Deedy.
O. S. Kendall.

Ypsilanti, Mich.

Ben. Lambert.

A question arose in connection with the Louisville delegation as to whether a State vice-president should be recognized as a delegate in addition to the number to which a local association is entitled, at the rate of one for every ten members or a fraction thereof. A decided difference of opinion was expressed in interpreting the provisions of the constitution on this subject, but the preponderance of sentiment waa manifestly in favor of the admission of the vice-presidents with the same atanding as regularly elected delegates. The formal settlement of the matter was postponed until after the completion of the calling of the roll, when President Sheehan decided that State vice-presidents had all the privileges of delegates. He also decided that the local associations that had elected a State vice president as one of their delegates were entitled to name another delegate.

Mr. Hannan moved that a committee be appointed to draft resolutions on the deaths of Enoch Remick of Philadelphia, N. B. Hussey of Omaha and M. J. Lyons of Brooklyn, occurring during the past year. The president appointed Messrs. Hannan of Washington, Griffith of Chicago, Lewis of Brooklyn, Evanson of Philadelphia and O'Neill of Lincoln, Neb.

An Auditing Committee was then appointed consisting of Messrs. Culloton of Chicago, Firmin of San Francisco and Kuhns of St. Louis.

The Boston Association presented a resolution reciting that "any manufacturer of or dealer in plumbers' supplies furnishing net prices or any discount from list prices to others than master plumbers, either by themselves, employees or agents, shall be considered as violating the Baltimore resolutions." It was referred to the committee on resolutions.

Chairman Sands of Pittsburgh next read the report of the Sanitary Committee, as follows:

Report of Sanitary Committee.

Your committee, in presenting their report, feel their inability to do justice to this question. But in looking over the reports of health officers from various parts of the country, for the past year, we, as master plumbers, should have every reason to be encouraged with the decreased death rate in the cities where they have enforced plumbing regulations, and, we trust, practical plumbers as inspectors.

While we all feel like congratulating ourselves on what we, as master plumbers, have contributed to this end, there still remains much to be done; work in which every master plumber could be a missionary in the education of the people to the dangers that beset their lives, and the lives of their children, in the matter of imperfect and unsanitary plumbing, and to show them the necessity of prompt action in removing the cause. In warning the people of such danger, we do not mean that it should be done in a mercenary or selfish way; but because we feel, as honorable men, that it is a duty we owe to our fellow men.

While we may never expect, notwithstanding the regular annual report of a decrease in the death and disease rate, to arrive at that state of perfection that we can dispense with the services of the physician and the undertaker, or the sanitary plumber, yet by a little effort on the part of each and every master plumber, we can contribute much toward bettering the sanitary condition of every city and home in the land.

A Committee on Resolutions was appointed as follows: Messrs. Mitchell of Boston, Duffy of Louisville, Hayward of Brooklyn, Trainor of Baltimore, and Tierney of Providence, R. I.

In the absence of reports from officers, Mr. Wade of Chicago brought up the question of iron pipe versus clay pipe for the interior of buildings, and invited a discussion of the subject, but it was not followed up.

The convention then adjourned to meet in executive session on Wednesday morning.

WEDNESDAY MORNING.

The session of Wednesday morning, although intended to be an executive session solely, waa enlivened by an address of welcome from Governor Peck of Wisconsin, who had not been able to attend the previous day. His remarks were liberally punctuated with applause by the delegates. He assured them that he regarded the work of the plumber of far greater importance to the health of a community than any service that could be rendered by any other profession. Referring to the arrangements for entertaining delegates, he trusted that every one would be so well treated that he would go away convinced that there was but one State —Wisconsin—and but one city in that State—Milwaukee. He discussed the perennially interesting subject of plumbers' charges, stating that a man would cheerfully pay a thousand dollars for a fine plumbing job on a new house and kick afterwards on a bill of three dollars for repair work, alleging that it had only taken five minutes' work by a boy. Therefore he recommended, to avoid all kicks, that plumbers do repair work for nothing. The plumbers cheered him to the echo, and then proceeded to active work in executive session.

Immediately after the close of Wednesday morning's session the members marched to the Exposition Building and were photographed in groups.

WEDNESDAY AFTERNOON.

(By Telegraph.)

The afternoon session proceeded to business with open doors. Financial Secretary Tute read his report, showing receipts for the year of $4915.70, which had been paid to the treasurer. Reso-

lutions were then introduced by several members and referred.

The report of the Executive Committee was read, reviewing the work of the past year and making suggestions on which they desired action by the convention. The president appointed Messrs. McCoach of Philadelphia, Weldon of Pittsburgh and Young of New York a committee to consider the suggestions and report on them.

Chairman Hannan then reported on an admirable preamble and series of resolutions on the departed members during the past year, and which was adopted by a rising vote. Chairman Murray presented the report of the Committee on Essays, giving a list of topics on which essays had been invited. The list was most excellent, being very comprehensive and covering many practical subjects. The committee had received a number of very interesting papers, which would be read to the convention at the earliest opportunity. The president's report was next read.

Following is the principal part of the very able report made by President Jeremiah Sheehan.

President's Report.

I think it would be expedient at the close of our eleventh year to pause for a moment to note our progress and how well we have accomplished the objects of our organization. As enumerated in our constitution, we are organized for sanitary, commercial and social purposes. I know of no association that has, in so short a time, advanced as rapidly as we have. We all note with pride the improvement made in sanatory appliances and the high class of workmanship to-day. In formulating wise sanatory laws and causing their enactment and enforcement we have raised our vocation from mere mechanics of old to professional men, holding the health of the nation in our hands. We all look with pride at New York's State law for the registration of plumbers and the supervision of plumbing and drainage. In our commercial interests we have made equally as important advancement. We all know the kind of competition we had to contend with before the organization of the National Association, but to-day we have an almost perfect protection against the unscrupulous practices confronting us at our birth, which caused us then to be rated as extortionists. To-day our better class of architects give the preference to men doing the best work, thus inspiring us to do good work and eradicating the fallacy that keen competition demands shoddy work. You will remember when manufacturers and jobbers jeered at our efforts of self-preservation, but to-day they recognize our motives as honorable and just, and treat your officers with that respect and consideration due the representatives of an organization like ours. Only a few months ago a Western jobbing house thought the National Association of Master Plumbers not worth noticing. In fact, our communications were not worthy of a reply, but in an incredibly short space of time this same party suddenly came to the conclusion that the National Association were after all really worth noticing, and very quickly and gladly amended its former method of business to conform to a more approved method. Fellow craftsmen, let us remain firm in unity and harmony and we hold our destiny in our own hands.

I regret to note that in several instances parties, after becoming members of the National Association, have supposed the association to be created for their individual needs, and have endeavored to use their membership to keep other practical and worthy plumbers out of the association, and by thus endeavoring to deprive them of membership have sought to prevent them securing plumbing supplies under the Baltimore resolutions, and have themselves written to the supply houses, causing your executive officer much trouble. This idea is entirely wrong. The National Association extends a hand of fellowship to all worthy master plumbers legitimately engaged in the business, or so desiring to engage, and says: "Come join with us; we can benefit you and want your aid in carrying on the work inaugurated." I do not by this mean to recommend the admission of every applicant, regardless of his ability as a plumber. This association is organized by and for master plumbers, and none but such should be admitted to our councils. The St. Louis Association has adopted a new constitution making it a necessary requisite for membership that a candidate must have served five years' apprenticeship and three years a journeyman plumber. This qualification for membership may be a little advanced for some localities, but I believe that the line ought to be drawn between practical and impractical men. Where laws are in force, as in New York State, a certificate from the Examining Board ought to be necessary for membership.

STATE ASSOCIATIONS.

I am pleased to note the extension of the "State association idea" during the year in Massachusetts, Rhode Island, Washington and Northern Wisconsin. I would recommend State associations, more especially in States where associations are small and master plumbers scattered throughout the State, sometimes but one or two in a place. Through a State organization all these can be brought together in one compact association, and, as a whole, better act on all matters appertaining to their welfare, enabling them to secure much better results than could otherwise be obtained by a number of small associations—all after the same results, but not united in their efforts. The Texas, Kansas and Iowa State associations are examples of what associated effort can achieve toward the protection and elevation of the craft throughout the State. The New York State Association has been more than paid for the trouble and expense attendant upon the formation of its association by the passage of its State plumbing law.

One of the duties of a State vice-president is to assist in organization of associations in his State. Therefore, permit me to suggest to the delegations here to be more careful in the selection of State vice-presidents, as the office is a very important one. We are but young in years, and in this vast domain there are many localities where the objects of the National Association and its influence are unknown. We want reliable and active gentlemen who are willing to devote a little of their time to organization and looking after the interests of those already in affiliation. I have mentioned the excellent results obtained in several of the States, and I am sure that the gentlemen who have been instrumental in bringing about these results will be more than repaid for their work by the improved condition of the trade in their respective States.

I would earnestly urge State associations and local associations of a State to work as a unit in formulating sanitary laws and using their combined influence in securing their passage and providing for their successful enforcement. The enactment and enforcement of wise laws will make it impossible for unscrupulous and incompetent men to bring discredit upon our profession, and as a result the public would be insured against poor work and the plumber protected against unskilled competition.

Through the energetic efforts of your vice-president and his Massachusetts colleagues a State plumbing law for Massachusetts has been passed.

State Vice-President of New Hampshire Robert J. Donnelly has been actively endeavoring to secure the passage of a State plumbing law, and it is believed his efforts will be crowned with success. A number of other associations have been following out this same line of work and have met with more or less success.

LOCAL ASSOCIATIONS.

During the year there have been 21 associations organized, representing 269 master plumbers, in the following places:

San Diego, Cal.	Detroit, Mich.
Pasadena, Cal.	Grand Rapids, Mich.
Oakland, Cal.	Escanaba, Mich.
Redlands, Cal.	Mt. Clemens, Mich.
Stockton, Cal.	Kalamazoo, Mich.
Sacramento, Cal.	Saginaw, Mich.
Atlanta, Ga.	Tacoma, Wash.
Savannah, Ga.	Spokane, Wash.
Roanoke, Va.	Shreveport, La.
Peoria, Ill.	M. P. A. of North
Joliet, Ill.	Shore, Ill.
San Francisco (re-affiliated).	Northwestern M. P. A. Wis.

Twenty-one master plumbers have affiliated with the National Association as individual members.

The following State associations have been organized during the year: Michigan, Massachusetts, Rhode Island and Washington.

We have fourteen State associations, as follows:

Colorado,	Connecticut,
Iowa,	Massachusetts,
Kansas,	Michigan,
New York,	Montana,
New Hampshire,	Ohio,
Texas,	Rhode Island,
Washington,	Illinois.

Increase in membership in old local associations	250
Increase in membership in new associations	269
Total increase in membership	519

Since we last assembled the Angel of Death has taken from our number three of our honored members who had the welfare of the association at heart and gave freely of their time and money toward its advancement.

On July 25, 1892, the sad news was received of the demise of M. J. Lyons of Brooklyn, who for five years was the custodian of the finances of the National Association. May 9, 1893, marked the departure of N. B. Hussey of Omaha, who served on the Executive Committee with ex-president Robert Griffith. Only last month the sad news was received of the demise of Enoch Remick of Philadelphia, who died on May 24. Mr. Remick was elected our first financial secretary and held the office for seven consecutive years.

I am most happy to be able to turn over to my successor the affairs of the National Association in, I believe, a better condition than ever before existed. Not a single complaint, that I am aware of, is on file.

I bespeak for my successor the same hearty support that has been accorded me during my 19 months of office.

In conclusion I extend thanks to my fellow-craftsmen and co-laborers for the efficient manner in which they have so materially advanced the interests of the National Association by their support; especially to the Executive Committee, who have eased the burden of responsibility by their unanimous support; to the State vice-presidents, who have encouraged me by the active interest manifested in their duties; and to the trade press, the molders of public opinion, for their support during the year.

Treasurer Goodman submitted his report for the year ending June 14, stating that there was a balance on hand last year of $1305.60, and receipts during this year of $4915.70, making a total of $6221.30, from which had been paid $3187.10, leaving a balance now on hand of $3034.20.

Chairman Mitchell of the Committee on Resolutions reported, recommending adoption of a resolution introduced by the Boston delegation.

Resolutions were then introduced as follows:

Whereas, The potters of the United States are using different sized threads upon their water closets, thus causing much delay and annoyance in event of repairs being necessary; therefore, be it

Resolved, That the National Association recommend that a uniform thread be adopted for such connection, to be that of standard 1¼, 1½ and 2 inch gas-pipe gauge in every respect.

The next resolution, by the Boston delegation, was as follows:

Whereas, It has become the general practice of architects to specify the plumbing fixtures required in buildings by the solicitation of manufacturers or their agents and

Whereas, It is also customary to require the contracting plumbers to warrant goods for one year or more; and

Whereas, Many of said fixtures after being put in use proved to have been defective through unforeseen imperfections,

Resolved, That it is the sense of this convention that architects who specify a cer-

tain line of plumbing specialties shall secure a guarantee from the manufacturer or his agent that such goods are as represented and that any unforeseen defects shall be made good at the expense of the manufacturer and not of the plumber.

These resolutions were approved by the Committee on Resolutions and were adopted by the convention.

A. W. Murray of Chicago then read his paper on sanitation, which is printed in another column.

Secretary Gerhard read the essay submitted by the Milwaukee Association, entitled "Education of the Craft," the joint production of Messrs. Pripps and Plum.

Chairman McCoach next presented report on State vice-president's reports from Massachusetts and Indiana. The reference in the Massachusetts report to Vice-president Finnerty was unwarranted, and the complaint in the Indiana report with regard to changing the place of meeting of the eleventh convention was uncalled for, as the Executive Committee had power to change the place of meeting should they deem it desirable. The convention approved this report. Mr. Hayward of Brooklyn then read a paper on the benefits to be derived from master plumbers' associations.

Resolution by J. J. Wade of Chicago was also favorably reported, that the National Association exert their powerful influence toward the abolition of the prevailing custom among master plumbers of supplying labor or materials on buildings on which another plumber is engaged, either as contractor or day worker, without first consulting the latter and obtaining his permission; when such permission is obtained the successor in such work will refuse to furnish labor or materials until his predecessor has received payment and satisfactory compensation for the work performed.

The committee also recommended the adoption of resolution introduced by Mr. Wade to do away with the use of clay piping for drainage purposes inside of buildings, and recommend the exclusive use of extra-heavy cast-iron pipe, and that even then every pipe so used shall have received thorough test at the factory and be marked tested for house-drainage work.

The resolution introduced by Boyd & Culloton of Chicago also recommended that front page of report of national proceedings in the future be reserved for the names and addresses of past presidents. The convention approved all the recommendations.

Reports of State vice-presidents were then read for Pennsylvania, Ohio, California, Rhode Island, Kansas, Connecticut, Missouri, District of Columbia, Michigan, Wisconsin, Kentucky, Illinois, New Hampshire, Maryland and Texas, after which the Auditing Committee reported the officers' accounts correct. The meeting then adjourned till Thursday morning.

We print below several reports from the State vice-presidents:

District of Columbia.

BY JAMES NOLAN.

As State vice-president of the District of Columbia I beg leave to submit the following report:

The growth of the local association since the close of the last year has been steadily increasing. We had last year a membership of 33; we have now on our rolls 40, an increase of seven for the year. The attendance at meetings has been good. We make our meetings as interesting as possible by discussing different practical questions that arise in our business, and, by this means, endeavor to make improvements on old methods and thus reach the highest sanitary standard. Our meetings are always very pleasant and interesting to members, and we hope in our next annual report that the membership will be much larger than at the present time.

The dealers here have, to some extent, conformed with the Baltimore resolutions, but there are a few outside dealers and manufacturers selling to parties not in the trade. Names and particulars will be submitted in executive session. After a long struggle, and with the assistance of the National Executive Committee, we have had new plumbing regulations enacted by Congress, which were adopted February 15, 1893, by the Commissioners of the District of Columbia, a copy of which was forwarded to your Executive Committee. These regulations are now being strictly enforced by competent inspectors, and we thereby hope to elevate our business to a much higher standard, and we trust we will be able to stop the "snides." We have had no strikes, nor do we expect any. Our association, by unanimous vote, decided to give the journeymen working for them eight hours a day from June 1, 1893, with the same pay, without having received any request from them.

Work is steadily improving this season; we had a good fall and winter work, and the prospects of the future, under the capital new regulations, are very bright.

Rhode Island.

BY PATRICK TIERNAY.

As the heart of the unhappy son, who has been absent for many years from the fold of his father's family, leaps with joy when upon his return he is received with open arms, so feel the hearts of Rhode Island sons, as upon their return, after years of absence, united and determined to uphold that mighty bulwark of protection, the National Association of the United States, you have received them with joy and happiness.

It is not my intention to present to your minds the unhappy experiences which your brothers of Rhode Island have encountered, but rather my most pleasant duty to direct your minds to a most happy condition of things in our little State. We have three of the four cities in the State strongly organized, each having its local association. These are Providence, Pawtucket and Woonsocket. Words from me cannot express the united, whole souled and brotherly feeling now existing in these three associations.

We have strong expectation of organizing next year a good local association in the city of Newport.

We have a uniform retail price-list, one of which accompanies this report, which hangs in the office of each master plumber, and which, I am pleased to say, is being followed to the letter.

Our feelings and relationship with the three jobbing houses, it is gratifying to be able to say, are of the most harmonious kind, we having their signatures to an agreement embodying the spirit of the Baltimore resolutions. Signs are displayed in their stores such as "No goods at retail," "Goods sold to master plumbers only." They all have signified their willingness and desire to help build up and elevate the plumbing business to that position of honor which shall be second to no other business in the building trades of this country.

We also have a State association, whose protecting influence is second only to the National Association.

To the vice-president and financial secretary of the National Association, Daniel G. Finnerty and Thomas J. Tute, and the following members of the Boston Association: James F. Devlin, David Smith, Isaac Riely, Daniel Shannon, J. W. French, M. J. Keane, J. C. Kelly, Dennis Hargan and J. R. Tully, we feel greatly indebted for their assistance, rendered on several occasions, the first being on March 30, when Mr. Finnerty called a meeting of the master plumbers of the State together at Narragansett Hotel. Although our Providence Association had healed up little differences of opinion, and reorganization on March 10 has strongly cemented the members together in our local association, still the above meeting indirectly resulted in the organization of our State Association, and at which the presence of the same gentlemen was strongly felt.

I take this opportunity, on behalf of our local and State associations, of thanking our Boston brethren for their assistance; and we do not forget also that our Worcester friends rendered valuable assistance by their presence at the formation of our State Association.

In conclusion, I feel warranted in promising for the next year, from Rhode Island, a true spirit of fidelity to the National Association, and good work from our local and State associations.

Maryland.

BY WM. H. ROTHROCK.

As vice-president for the State of Maryland, it is my pleasant duty to report that our association is in a prosperous condition and has a bright prospect for the future.

Through the united efforts of members, we anticipate a large augmentation in the near future to our membership, owing to the conservative and beneficial arrangements we are about closing with our local dealers.

We were cognizant that illegitimate sales were being made by some indifferent dealers, who sold indiscriminately and in conflict with our interests. Happily, we are effecting an agreement with all the houses, and expect to enjoy the benefits accruing from our efforts shortly, and believe the arrangement we are entering into will not only stimulate our membership, but will save the vexatious friction and wrangle that invariably result from the existence of such circumstances.

New Hampshire.

ROBT. J. DONNELLY.

I take pleasure in submitting my annual report for the State of New Hampshire for the past year. Within the last year considerable has been accomplished by our association, through the efforts of our members and the assistance of the different Boards of Health. New rules and regulations have been submitted by our State association, and I am pleased to say have been adopted by some of our largest cities. The rules and regulations, so far, have been of immense advantage in improving the standard of work and elevating the trade, and we hope before another year they will be adopted by every city and town in our State. There has been no interruption of business from strikes or labor troubles, and everything now is working harmoniously.

We have added eight new members to our association during the past year. The number of master plumbers in the State association, at the present time, is 19. We have some good material now in the association, and promise well for the future.

Our relations with the manufacturers and dealers in plumbing supplies, with one exception, are satisfactory, and this slight grievance we hope to overcome very soon.

I am sorry to say that the essay submitted to our State association by the National Committee was received after our last meeting in April, and, consequently, we were unable to do anything with it. The subject was of too much importance to write up in a hurry.

In conclusion, I wish to thank the officers of this association for their friendly feeling and kind assistance rendered me in the performance of my duty.

Connecticut.

BY S. E. DIBBLE.

As vice-president for the State of Connecticut I respectfully submit my report for the year ending June, 1893:

The local associations throughout the State are in a flourishing condition. They are mostly confined to the larger cities in the State, though efforts are being made to induce the plumbers in the smaller cities and towns to form associations in their several localities. In the furtherance of this object I have recently prepared a letter to be sent to every worthy master plumber in our State who is not already a member of the State association, and I trust that it will have the effect of creating a wider interest in our State organization, and thereby materially increase our membership. This letter briefly calls attention

to the objects which the association has in view, and the privileges which its members enjoy. I confidently expect that much good will come from its distribution.

As near as I can ascertain, I am led to believe that the manufacturers and wholesale dealers in plumbing materials are holding strictly to the spirit of the Baltimore resolutions, and it is the desire of our State association to make them feel that it is for their interest to continue so to do.

The last annual convention of the State association was held in the city of New Britain on February 9, 1893. It was a very pleasant and agreeable feature of that convention to find so large a number of new applications. Questions of considerable importance were brought up and discussed and referred to the Executive Board of the association to consider and report.

The convention elected the following officers—viz.: President, S. E. Dibble, New Haven; first vice-president, James Ahern, Hartford; second vice-president, J. B. Wetant, New Britain; recording and corresponding secretary, A. J. Clerkin, New Haven; financial secretary, R. H. Stothart, Middletown; C. S. Eames, Bridgeport.

The next convention is to be held in Hartford The cordial manner in which the members of the convention were met by their fellow members in New Britain, deserves special mention.

As in New Haven, where, largely through the efforts of the local association, a new set of ordinances for the better regulation of the sanitary condition of the city has been passed by the city government, so in New Britain, guided by the inspiration of the recent convention and largely through the efforts of the State association and the local association there, much is being done toward the improvement of the sanitary laws of that city, which, I am informed, are incomplete and defective.

The executive officers of the State association are rendering much assistance in carrying on the good work throughout the State, and in educating the members of the trade to a better understanding of its work, and in advancing the cause of sanitary improvement. And I would here take the liberty of expressing to them my thanks for their help and my appreciation of their kindly consideration, and I would also extend to the officers of the National Association my grateful acknowledgment for the aid which they have at all times given me in the performance of my official duty.

I append a copy of a letter which it is proposed to send to every master plumber in the State who is not already a member of the State association.

(Copy of letter).

NEW HAVEN, CONN., June 1, 1893.

DEAR SIR.—The Connecticut State Association of Master Plumbers was organized in 1891 with these objects in view, viz.: To advance and enforce sanitary laws; to protect the public health; to promote the intelligence and influence of the master plumbers of the State in matters relating to their trade; to protect them against the encroachments upon their rights and interests in the purchase of supplies; to cultivate mutual good feeling among themselves and confidence in each other.

These objects, to a large degree, have been secured. To extend these privileges to all the master plumbers of the State, is the purpose of this letter.

As every good citizen should help to support the government that protects his life and property, so should every good master plumber help to support the organization that protects his business interests. The State Association of Master Plumbers is doing this to-day, therefore, why should not you, master plumber, become a member of the State association by applying to its Executive Board, and upon the payment of $2 per annum you will be entitled to all its benefits.

The National Association of Master Plumbers was organized in 1883, and is protecting and advancing the interests of its members throughout the United States.

Will you kindly give this your earnest consideration and bear in mind the fact that in becoming a member of the local and State association you not only benefit yourself, but also your family, your business and the public at large.

Nebraska.

BY JAMES H. O'NEIL.

It is with the highest feeling of personal gratification and the keenest appreciation of the good things of life that I am privileged to be present at this meeting and partake of the "food for thought and action" resulting from the practical experience of our wide-awake, intelligent master plumbers.

To me these conventions have been seasons of great profit, and I would that the same inspiration to increased zeal and unfaltering intrepidity along the lines discussed here which comes to me through this medium might fall upon my co-workers in the fair State of Nebraska; then I should not have to undergo the deep sense of wounded pride and humiliation which is forced upon me by the presentation of this unfavorable report.

For the legitimate master plumbers in Nebraska, the past year has been a very discouraging one, inasmuch as a condition of things is in existence which seems to set at naught the higher ideals which exist in the true master's mind. Lincoln—and I can also safely include Omaha and many other minor points in the State—has been for the past year, and still continues to be, a rich field for the "pirates" and incompetent ones who assist the alleged jobbing houses and cheap manufacturers to dispose of their goods direct to the consumer. During the last three years I have come in personal contact with at least six of this class of people—it would be an indignity to the name to call them master plumbers—who grew tired and quit under the enormous weight of profits derived from contracts taken of $400, $600 or $1000 jobs for $200, $300 or $500, and many more just such calculators throughout the West, especially in my own city, are now in the same dilemma. Perhaps this is too plainly spoken, but why varnish or conceal the true facts as they are found, when it is impossible to calculate the disastrous effects upon the legitimate business?

When a man can engage in some enterprise entirely foreign to the plumbing trade this year, and next year come out a full-fledged "consulting sanitary engineer," competing with those who have grown gray in the business, what are we to expect or hope for? And yet, in the face of all this, many of the most able fellow masters of Nebraska rest upon their oars, or dream at their post, instead of uniting their brain and their brawn with that of this National Association in their untiring efforts to crush the insidious foe. "Where there is unity, there is strength," could never be more appropriately applied than to the work in which we engage; and until we are one in aim, in effort, and in design, we shall ever be weak. As I can frankly say from my own experience, individual effort alone availeth but little. I have prayed and begged the master plumbers of Nebraska to join the National Association, but with what unflattering success I deplore to mention. I have sent solicitous communications hither and yon—all over the State—which in but few instances have won replies. Could they but partake of the incomparable benefits to be derived from this source, they would no longer withhold their effort and encouragement.

Should any crisis be evolved resulting from a strike or the cutting off of all purchasing power of the legitimate master plumber by these alleged jobbing houses who sell direct to the "pirate" and consumer, methinks these now indifferent masters will then hasten to seek the protection of this National Association and the Baltimore resolutions. Without the prophetic vision of the seer, I can see the little cloud in the distance, although now no larger than a man's hand, which may, ere long, burst over our heads, engulfing us in dismay and ruin.

In conclusion, gentlemen, permit me to freely and frankly express the hope that this association may name some other man to represent the master plumbers of the great and grand State of Nebraska for the ensuing year—some one possessed of the ability to imbue my fellow-masters with a greater degree of fraternity and a more concentrated effort in action. Most respectfully submitted, JAMES H. O'NEIL.

Kentucky.

BY THOS. P. WATTS.

In making my report as State vice-president for Kentucky I beg leave to say that the past year has been one of extreme quietude, pleasure, and, I hope, profitable to the fraternity in our well beloved State. I am sorry to state that the State is not blessed with many very large towns and cities, and, therefore, not very many water companies and plumbers.

However, I have written a number of letters to the various plumbers throughout the State, and urged them to join the National Association. To one of the larger towns I made a personal visit, and hoped to accomplish some good results, but they did not all get together while I was there, and afterward let the matter drop, failing to see the wonderful benefits arising from local associations.

As to the Louisville Association, I will say that it is enjoying unqualified success, as it numbers every master plumber in the city who is desirable; and in the matter of protection, we have the utmost protection awarded us by the supply houses, being only sorry that this report is not of a character to encourage the National Association by the addition of membership.

I will close by saying, "Long live the National Association of Master Plumbers."

THURSDAY MORNING.

(*By Telegraph.*)

Thursday morning's session was opened by the reading of a communication from the Milwaukee Builders and Traders' Exchange tendering the use of their rooms to the Association, which was received with thanks.

Report of the State vice-president of Indiana was then read. The writer was evidently not pleased with the manner in which affairs in his State had been going, and dwelt at some length on differences of opinion among the local members, winding up with a complaint regarding the selection of cities for the annual convention. The report was heard with expressions of disapproval from members and it was referred to the Committee on Reports of Officers for such disposition as they deemed advisable.

The report for Washington was next read, after which Chairman McCoach handed in the report of his committee on the recommendations of the Executive Committee.

The recommendation for local conference between master plumbers' local associations and journeyman plumbers' associations was reported favorably and approved by the convention. The suggestion of the Pittsburgh delegation that the basis of representation in the national convention be changed from one for every ten members to one for every 20 members was reported unfavorably by the Executive Committee and was also unfavorably reported by the special committee, and their action was indorsed by formal vote of the convention.

The question of representation in the national convention then came up through the favorable report on the recommendation of the Executive Committee, that three members at large should be elected by State associations to represent scattered members in a State not connected with local associations. An animated discussion was precipitated, in which Messrs. Trainor, Hayward, Gabay, Dewstoe, Tobin, Hannan, Wade, Boyd, Mitchell, Firmin and Murray participated.

The Rossman amendments to the constitution submitted last year, changing representation in the National Associ-

ation to representation through State associations alone, were offered as a substitute for the committee's recommendation. The substitute, however, was defeated by a very heavy vote, and the committee's report was approved.

The recommendation of the Executive Committee to consolidate the offices of financial and recording secretary was reported unfavorably by the special committee, but the convention, after some discussion, refused to accept their views, and approved the recommendation of the Executive Committee.

The report of the State vice-president for Massachusetts was then read. Exceptions were taken by Massachusetts delegates to some of the statements made, and the report was referred to special committee for consideration.

THURSDAY AFTERNOON.

Thursday afternoon's proceedings began with an executive session, after which the doors were thrown open. The Committee on Resolutions reported unfavorably on the resolutions offered for the consideration of the convention as a part of Alex. W. Murray's paper on sanitation, and the report was adopted.

A communication was then read from the Master Steam and Hot-Water Fitters' Association of the United States on the subject of consolidation with the National Association of Master Plumbers, as follows :

We would recommend that the Executive Committees of the two associations confer together with regard to matters affecting the two associations and be governed by the combined action of this joint committee, the same as each association would be by their own Executive Committee, but we do not recommend the amalgamation of the two associations any further than this. The two trades are so distinct and so separate that the steam contractors would have very little interest in the reports on sanitary questions, and the plumbers would have very little interest in the reports on heating and ventilating, so that instead of being a benefit it would be a detriment to both associations to have any closer connection than the above. We recommend that a committee of three be appointed to wait upon the National Plumbers' Association next week and report to them our action taken in this matter, and that said committee report to the incoming Executive Committee the action taken by the National Plumbers' Association.

(Signed)

EDWARD GRASSLER, Milwaukee.

D. M. QUAY, Chicago.

WM. P. THOMPSON, Philadelphia.

Committee of Master Steam Fitters' Association.

The communication was referred to the Executive Committee.

The convention then took a short recess, after which they proceeded to the election of officers for the ensuing year. The only name presented for the position of president was that of Daniel G. Finnerty of Boston, who was accordingly declared elected unanimously amid great applause.

The honor of the vice-presidency was not won so easily, as the following candidates were named: Thos. H. Radcliffe of Brooklyn; J. J. Wade, Chicago; John Mitchell, New York; Zalmon Goodsell, Bridgeport, Conn.; Philip H. Murphy, Milwaukee; John L. Firmin, San Francisco. Mr. Murphy withdrew his name with thanks. The chairman appointed Messrs. Mitchell of Boston, Trainor of Baltimore and Hannan of Washington tellers. They announced 223 votes cast, of which Radcliffe received 96, Mitchell 66, Wade 60 and Goodsell 11. There being no choice, Mr. Goodsell's name was withdrawn and a second ballot was ordered, with no choice; the third ballot was also without result. The fourth ballot being ineffective, the Chicago delegation withdrew the name of J. J. Wade, leaving the contest between Messrs. Mitchell and Radcliffe. The former received 98 and the latter 95 votes. Mr. Mitchell was, therefore, declared elected, and acknowledged the honor in a most excellent speech.

W. E. Goodman of Milwaukee was elected treasurer unanimously to serve for a third term.

President-elect Finnerty announced that he had selected David Smith of Boston for financial and recording secretary, and the convention ratified his choice.

The selection of a city for the place of meeting next year was then taken up, and the attractions of Philadelphia, Brooklyn, Detroit and San Francisco were eloquently portrayed by their respective representatives. The vote was taken by ballot, and Detroit won by an overwhelming majority. The date will be fixed hereafter. The respective State delegations handed in the following names as their choice for State vice-presidents.

STATE VICE-PRESIDENTS.

Ohio, David Miller, Cincinnati.
Wisconsin, Ferd. Wittig, Milwaukee.
Minnesota, Allen Black, Duluth.
Maryland, Jas. F. P. Carey, Baltimore.
Nebraska, Jas. H. O'Neill, Lincoln.
Indiana, Geo. F. Kirkoff, Indianapolis.
Connecticut, Jas. Ahern, Hartford.
Illinois, Wm. T. Geary, Chicago.
Iowa, Henry Ewinger, Burlington.
Kansas, Jas. Foley, Leavenworth.
Michigan, Fred. Shriver, Sr., Grand Rapids.
Missouri, J. M. Life, St. Louis.
Massachusetts, John C. Deedy, Worcester.
Texas, F. J. Madden, Sherman.
Kentucky, Thos. P. Watts, Louisville.
New York, Wm. Tobin, Syracuse.
Pennsylvania, J. L. McShane, Pittsburgh.

The president was then authorized by the convention to appoint vice-presidents for other States represented in the National Association, but which have made no choice of a vice-president, including two for California, one for the Northern and the other for the Southern part of the State

John L. Firmin of San Francisco then presented President Sheehan with a magnificent badge as a testimonial of the regard in which he is held by his fellow-members of the association. Mr. Furmin's speech was worthy of the occasion and was suitably responded to by President Sheehan. The badge is of solid gold decorated with diamonds and having the initials of the association on the pin bar.

The essays remaining unread were ordered to be printed in the proceedings. D. F. Sullivan of Texas moved that a committee of three be appointed to prepare a suitable emblem for presentation to each of the past presidents, but the convention voted in the negative.

The new Executive Committee was announced as follows:

Daniel Finnerty, Boston.
John Mitchell, New York.
W. E. Goodman, Milwaukee.
David Smith, Boston.
Jeremiah Sheehan, St. Louis.
Thos. H. Radcliffe, Brooklyn.
J. J. Wade, Chicago.
H. G. Gabay, New York.
James G. Weldon, Pittsburgh.
M. J. Duffy, Louisville.

The convention adjourned, *sine die* after the usual resolutions of thanks to the local committee and the press.

The National Association.

At a social review of trade history
Was born the union of the like mind;
"They builded better than they knew:"
With hopes known to but a few,
They would labor for all mankind;
In this pledge lay their glory.

'Midst penury and pestilence they strove
To realize their noble aim;
To elevate and protect their trade
From poachers and unjust tirade
Upon skillful labor, and little gain,
Though great the obstacles, yet they throve.

Upheld thro' all their struggles, hopes and fears
By vision of victory to come—
Despite knavish ridicule and blame
And slander of a purpose to defame:
Theirs the reward of work well done,
As the praise of craftsmen greet their ears.

A rallying cry was then heard
From the East to the West;
Soon from the South the same came forth,
To be echoed in the far off North:
Then hope filled their breast,
And grateful were the prayers offered.

And this day in debate assembled
We meet, our work and counsel to review.
Strong in the faith and defense of right,
To protect the home from miasma's blight;
Enthused with courage, brothers new,
And praise those to be remembered.

Let over us a voice proclaim:
"Be earnest, just and true;
Let your lamps forever burn
The wiles of foes to discern;
To fraternal laws the pledge renew,
And yours the reward of well-earn[ed]
fame."

"ORPHAN BOY"

Syphonings.

— THIS CONVENTION will undoubtedly be known as the biggest on record, over 300 delegates having shown their interest in the welfare of the association and all sections having been well represented.

— THE NEW FACES at this gathering made the old regular as much of a stranger as though it was his first appearance, but as water seeks its level, so good fellowship finds affinity with equal rapidity and all reserve melts in the warmth of the greetings.

— THE PACIFIC COAST was well represented, Executive Committeeman C. T. Faul heading the delegation from Los Angeles, with E. L. Burgoin and wife, L. A. Scholes and wife, John Crimmins and Geo. E. Howe.

— SAN FRANCISCO sent representatives for the first time, John L. Firmin and T. J. Ford of Ford Bros. showing a reflection of the Golden Gate in the sunny smiles that beamed on every new acquaintance.

— THAT the knight of the pot and ladle is gallant is not to be controverted; the number of ladies present and the courteous attention they received clearly showing that a gentle heart guides his great right arm.

— THE MILWAUKEE PLUMBERS have a strong local association. There are only five firms in the city not actively connected with the organization. The good results of the association are keenly appreciated by the members, who have not lost hope that in time they will be able to gather in those who still linger outside the fold.

— PRESIDENT SHEEHAN was as popular after he became an "ex" as he was when clothed in the full powers of the office he graced. Although not a big fellow, his true greatness is shown in the achievements of his administration.

— E. L. BURGOIN, manager of the plumbing goods house of L. M. Perry & Co. of Los Angeles, was there and everybody was glad of it. He seemed to know everybody and helped everybody else to enjoy the same pleasure.

— JAMES RAGAN seemed to have a fatherly care over the Washington delegation, who will take in the World's Fair before returning to aid Grover in keeping the country in a sound hygienic condition.

— C. F. GESSERT of 42 Dey street, New York, left radiators and all heating and ventilating talk at home and greeted his many old friends at the convention in the best of humor. He will make a flying visit to the World's Fair before he returns.

— C. F. WIELAND, General Manager, Bignall & Keeler Mfg. Company, St. Louis, was in town on a business trip relative to their pipe threading and cutting machines, but talked as interestingly to the plumbers as if lead pipe was the only kind of pipe in existence.

— LINCOLN HALL was decorated with flowers, potted plants, festoons of evergreens and flags, while above the stage a large banner with "Welcome Master Plumbers" on it greeted the visitors as they entered.

— THE BADGES were, as usual, a characteristic of the convention, Connecticut having the most unique, a red ribbon with gilt letters and a silver-plated pin to which are attached a solder pot and a wooden nutmeg. Philadelphia had a dark-blue button of large size with the lettering in gold. New York had a blue ribbon and a gilt pin. Boston had a dark-blue ribbon, to which was attached a pure gold plumbers' tool bag. Chicago had a ribbon of the accepted terra-cotta color with the typical triangular division in silver with a Columbian medallion attached to a g . . . pin (gilt, good or gold, as the reader prefers). The other delegations had equally appropriate badges, but they so dazzled our eyes and were in such number that we couldn't remember them.

— MAJOR FOSTER of Norfolk, Va., is the father of the association, having been its first chairman. He became free and a full-fledged "jour." in 1846. He is well known, and enjoys telling a good story, many of which he has accumulated in his pilgrimages to the different conventions.

— DENGEL & DIGSBY, a local plumbing house on Grand avenue, had their windows trimmed with flags in honor of the association, and other association shops had made it a point to make a fine display in their show windows.

— J. D. STILES stopped at the Pfister House, and Jenkins Bros.' valves were not by any means the only theme of his conversation. Mr Stiles and Mr. Jenkins rendered a grateful service to the steam fitters in Chicago in entertaining the overflow from the tally-ho coaches while they secured another and arrived in time for both the photo and the banquet.

— R. D. REED of the H. B. Smith Company of Westfield, Mass., was on hand to greet the cold-water fitters, and with his handsome presence probably left a yearning in the hearts of the susceptible to try steam and hot-water fitting as a means of heating and ventilation.

— THE EASTERN DELEGATES to the convention traveled to Milwaukee over the Baltimore & Ohio route, occupying eight Pullman cars. On the way a car lamp fell, igniting the dress of Mrs. Lewis, wife of a Brooklyn delegate, but she fortunately escaped serious injury. This was the only accident.

— THE CALIFORNIA DELEGATION had more to talk about with regard to their trip than any of the other travelers. They came near drowning in Missouri, traversing a flooded district, where they saw houses floating off their foundations.

— N. C. BUTTERFIELD was glad the convention was in Milwaukee; so was his wife, as his home was there, and the Boynton Furnace Company had an exhibit in his charge. Their hard coal hot-water apparatus was shown by a No. 23, and the soft coal hot-water goods by a No. 104, while for smaller work they showed a No. 18 Niagara.

— THE APPLE of the convention was A. (J.) Sweeting, from Auburn, N. Y., who represented the Roll Paper Cutter Company of Richford, N. Y., and displayed Hilt's adjustable chain pipe wrench. No trouble is experienced in making it take hold of a pipe, as the lever screws down on the jaw, pinching the pipe firmly. Wisconsin is a fruit State, but it takes a high tree to top this Sweeting, who stands 6 feet 3 inches.

— THE CONNECTICUT DELEGATION was 11 strong, under the charge of Major Middlebrook, who is one of the oldest men in the profession. After the convention they proceeded to Chicago, where they had secured an entire house and will do the fair at their luxurious ease.

— A PLUMBER with a ruling disposition is Zalmon Goodsell, ex-Mayor of Bridgeport, Conn., also president of the local plumbers' exchange, of an athletic association and of the Springfield Emery Wheel Company, nevertheless he follows the lead of Major Middlebrook.

— A LARGE OIL PAINTING ornamented the walls of Lincoln Hall showing a kitchen with stove and boiler, with a leak in the supply pipe and the gay and charming plumber holding the cook, while the modest cat jumped out of the window, and a dog and the plumber's kid who was heating the solder looked in. In the center is "Bridgeport, Conn., 1893" and in one corner a poem, as follows:

The Giddy Plumber.

Behold the plumber with smiling look,
Soft soldering the handsome cook.
Her chin he pinches and laughs at will,
For every item is sundries in the bill.
Lightning fitter of water, steam or gas,
He's composed of solder, cheek and brass.

This, we learn, is to be hung in the art gallery at the fair after the convention.

— WHEN the convention took its first recess the joke was on A. W. Murray, secretary of the Chicago Master Plumbers, who had a boutonniere and an overcoat all right, but no hat. He asked everybody, "Where did you get that hat?" until he transferred the joke to the junior Heatherton by espying the lost tile on his curly locks, whence he dislodged it and proved property by extracting his card. Heatherton found a dilapidated substitute, but will not be happy till he gets his own tile.

— BERT LAMBERT, representing the Clayton & Lambert Mfg. Company of Ypsilanti, Mich., does not have to say gasoline fire pot once; the boys all know that the old wood fire for melting solder is a thing of the past, and swear by the gasoline fire pot.

— A GRACEFUL COMPLIMENT it was that President Sheehan paid the press by crediting it in his report with having rendered substantial service in the elevation of the plumber to his present high position.

— THE TITLE of orator of the convention indisputably belongs to Brother Cross of Kansas, whose full, rich tones and correct enunciation made the reports of the State vice-presidents, which he read, seem a series of poems.

— A CARD calling attention to the qualities of the Shea patent removable glass seat ball cock was found in every chair at the convention after dinner on Wednesday. It is made by the Duluth Brass Works of West Duluth, Minn.

— A HANDSOME leather-covered memorandum book was presented to the delegates by the Brooklyn Master Plumbers' Association. The book contained a pocket for papers, a calendar, and portraits in halftone of the officers. It is the official book of the association, and in addition to a list of the officers and ward committees it has a list of the licensed plumbers in Brooklyn revised to date, the completion of the book having been delayed as long as possible to be finished in time for distribution as a souvenir. It also contains a list of the city officials and of the dealers who have signed the Brooklyn agreement, with several pages of advertisements and a suggestion to patronize the dealers who patronized the book.

— BERRY BROS. of Indianapolis, Ind., distributed a neat catalogue of their Simplicity tanks and seats. Special features of the tank, they claim, are that it is noiseless and the valve will not leak, having been tested to a pressure of 250 pounds.

— THE CARD of Geo. L. Bottum of Chicago was the only evidence of shop he brought with him, though from the many warm greetings exchanged both the Lanston Lead Works and the American Plumbers' Supply Company are likely to profit by his visit.

— THE LOYALTY of the plumbers to the National Association and their disposition to avoid even the appearance of a lack of harmony among them, were manifested by a little episode on Tuesday afternoon. After the convention had adjourned, a meeting was called of those interested in the formation of State associations. Wm. H. Mitchell of Boston was elected chairman and C. J. Prescott of Kansas City, secretary. The formation of State associations was advocated in a speech by Wm. Tobin of Syracuse, who gave his views at length, speaking in favor of local associations being made subordinate to State organizations, and the latter to elect delegates to the National Convention. Others followed, when suddenly the idea was suggested that the subject was one to be treated in its proper place, at a session of the convention. This view prevailed overwhelmingly and the meeting quickly adjourned.

— IT WOULD take a troop to properly represent any big house at the biggest convention on record, and E. W. Blatchford & Co. of Chicago, knew it. They sent H. B. Troup to do the honors of the house and if necessary to talk lead pipe and oakum, soil and solder and anything else a plumber might want to know about in a first rate line of plumbers' supplies.

— HENRY EWINGER of Burlington, Iowa, was introduced by Treasurer Goodman as the longest sleeper at the convention, but "Big Henry," as he is familiary known, was always wideawake when the fun commenced.

— MRS. TUTE says she is a plumber, too, and the worthy financial secretary from Boston will always retain the greatest treasure he ever had in his keeping, even when time finds some other worthy plumber in the office he now holds.

— TO SAY THAT NICHOLAS SPANG represented the L. Wolff Mfg. Company of Chicago would cast a reflection on his colleagues, H. E. Whitney and Chas. A. Ford, but that any desired information could be had from either of them about high grade rare sanitary goods was a foregone conclusion.

— AFTER tea Tuesday night an orchestra discoursed rare music from the balcony of the Pfister House, and there was no lead in the heels of the plumber lads as they threaded the mazy dance with the lassies. The music and the example in the balcony were too much for the boys who had long since served their time, and the handsome tile floor of the rotunda was cleared and resounded with the footsteps of the stag-waltzers.

— DURING an interesting discussion at the convention on the first day the ladies entered Lincoln Hall in a body and were greeted with clapping and cheers that disposed of the question promptly, and the disposition that had been felt to adjourn prevailed at once.

— ON ASSEMBLING at the ball for the Tuesday afternoon session a representative of the Keystone Mfg. Company of Buffalo, N. Y., exhibited something entirely new in a combination monkey wrench and ratchet drill, which secured him several orders.

— FREDERICK HOLMES, secretary and treasurer of the Milwaukee Gas Stove Company, exhibited a Perfection gas cooking range and a Perfection water heater, which greatly interested the plumbers. To not a few of them the connecting of the return pipe from the water heater to the top of the boiler was new, but some old hands verified its advantages and many others caught the idea at once, although some still believe the old way best

— A. B. PIERCE, representing the N. O. Nelson Mfg. Company, St. Louis, left shop at home and yet could not help stating that the town of Leclaire, Ill., is almost entirely composed of their workmen, as it is there that they make all of their bathtubs and cabinet goods. At Mound City, Ill., they have their wood pump works. These, with their plant at St. Louis, where they make plumbers', gas and steam fitters' supplies, give them an enormous producing capacity.

— THE JOLLIEST of all the convention meetings was held Tuesday evening in Parlors 6 and 7 of the Pfister House. A card in the rotunda notified all to call on the American Radiator Company. By the way, A. R. C. stands for American Radiator Company, and spells arc, the most brilliant of all electric lights, and, appropriately in this case, the most brilliant of all entertainers. C. K. Foster and S. L. Hopper were aided in dispensing hospitality by the valve man, J. D. Stiles of Jenkins Bros., R. D. Reed of H. B. Smith Company, F. W. Somers of A. A. Griffing Iron Company, W. J. Kelly of the Kelly & Jones Company, and F. W. Herendeen. The star of brightest magnitude was A. E. Hyde of J. B. Clow & Co., who will long be remembered by all the plumbers who called, for his dialect recitations. Every guest was presented with an American Radiator Company catalogue and a handsome souvenir paperweight, and the chunk of lead, or old brass fitting will, in consequence, disappear from many a plumber's desk.

— S. S. BREWER says the plumbers were an appreciative audience when he talked of the "Joy" that was prepared in Titusville Pa., and as a radiator of warming cheer its presence was a joy wherever it had circulation. By the way, he represented the Chicago house of T. C. Joy & Co.

— PRESIDENT MEAD and Secretary Schneider of the Grand Rapids (Mich.) Plumbers' Association had a system of tramping that permitted no good fellow to escape their genial smile.

— THE PRIDE of Eastern plumbers and the grace of the convention was a charming little lady from Boston, the daughter of Financial Secretary Tute, who was the object of much chivalrous devotion from the old war horse from Connecticut, Major Middlebrook.

— JAMES H. O'NEILL from Lincoln, Neb., is an ardent supporter of the association, firmly believing in it as an institution to elevate the craft. He states that the plumber in his town is much annoyed by the jobber selling direct to the consumer, and in consequence the plumber is kept busy figuring on work that he never gets.

— THE MILWAUKEE MASTER PLUMBERS ASSOCIATION presented every delegate with a souvenir of the convention, which had been prepared by F. J. Murphy. It was an elegant volume of some 76 pages, containing the programme of the convention, names of officers, names of the local committees, views of the principal Milwaukee buildings, points of interest about Milwaukee and quite a large number of advertisements apposite to a plumbers' convention. It was handsomely bound in dark brown cloth, with a gilt title.

— JAS. H. CRUMLEY spent one evening in trying to find a Detroit paper to get some home news, but being unsuccessful fell in line with the boys and helped to make things lively.

— BARLOW BROS. COMPANY of Waterbury, Conn., were represented by J. Barlow, who will stop at the Fair, and no exhibit will interest him more than the plumbing in his State building, which they sent some "kids" to do.

— AMONG those who were at the Fitters' Convention at Chicago last week, and at Milwaukee this week, are John A. Wheeler of Wheeler & Pitkin, Kalamazoo; C. C. Dewstoe of Dewstoe & Snyder, Cleveland, Ohio, and many other familiar faces.

— THE STANDARD MFG. COMPANY of Pittsburgh, Pa., was ably represented by George W. Young, who found many old acquaintances and as many new listeners to his descriptions of the superior sanitary goods made by the house.

— JOSEPH GUTZEIT of San Antonio, Texas, discourses enthusiastically on the superior climate of his city, claiming 100° is the highest ever reached, and even then a cool night refreshes the weary plumber.

— DANIEL J. FINNERTY, who has just been elected president, is 45 years old, having been born in Boston, August 12, 1848, of Irish parents who had made America their home twenty years before. He was educated in the Boston public schools, and for one year attended a commercial college. When 15 years old he was apprenticed to James Chambers, one of the best plumbers who ever did business in Boston. During his apprenticeship he was an active member of the Mechanics' Apprentice Library Association. After serving his apprenticeship he worked as a journeyman for several years, and was president of the Journeymen Plumbers' Union. In 1874 he went into business for himself at 25 Charles street, as a master plumber, and in 1888, he opened a branch at 478 Boyleston street, in the famous Back Bay district, where he has one of the finest plumbing shops in the country. His well-known skill and ability have brought him the patronage of some of the oldest and wealthiest citizens of Boston. He has been State vice-president of the National Association of Master Plumbers; also an executive officer and vice president of the association, and has always been an active and earnest worker for the trade's interests.

— ON MONDAY, before leaving for Milwaukee, steps were taken at a meeting of Illinois plumbers, held in the rooms of the Chicago Association, to form a State association. State vice-president Wm. T. Geary assisted in the movement. A temporary organization was effected as follows: President, Robert Loudon, Bloomington; secretary, Joseph Neuerberg, Chicago; treasurer, J. R. Scanlan, Elgin. The Executive Committee consists of the foregoing officers and Messrs. A. W. Murray of Chicago, C. B. Robinson of Park Ridge, and David Whiteford of Chicago. Letters were read from 18 firms expressing their willingness to co-operate in forming a State association.

— THE PLUMBING FIXTURES in the Wisconsin Building at the World's Fair all come from the Rundle-Spence Mfg. Company, as well as the fixtures in the Pfister House, which was plumbed throughout by Spence & Foley, a firm of local plumbers who bought out the old stand where the manufacturing house got its start.

— S. RESEK was just the alloy to mix properly with the plumbers to make the Farnan Brass Works of Cleveland, Ohio, shine out as a fixed star among the purveyors of plumbers' brass goods.

— THE UNITED STATES HEATER COMPANY of Detroit, Mich., find that it is all grist that comes to their mills when they meet the fellows who install steam and hot-water plants.

— THE EXTENT of Milwaukee's hospitality abounded in carriage drives for the ladies. An entertainment of a varied theatrical character on Thursday night at the Exposition building was also thoroughly enjoyed by the plumbers at Milwaukee's expense.

— TREASURER W. E. GOODMAN invited from the platform everybody and their ladies to attend a picnic on Friday at Lake Pewaukee, stating that he would be at the St. Paul station to give everybody a ticket at 7.30 a.m., and emphasized to the many visitors from a distance that it would be Milwaukee local time and that 7.30 did not mean 7.40.

— A PRINCE of good fellows is Edward O. Geran, the hydraulic and sanitary engineer of the Rundle-Spence Mfg. Company, who rendered yeoman service to the Milwaukee boys in spreading welcome amidst the visitors.

— J. B. FRYER displayed the Simplex system of mains for hot-water heating to many interested plumbers, and those who were not there to see it can get full information by addressing him at 1906 Cora place, St. Louis, Mo.

— A. F. BLESCH of the Columbus Closet Company, Columbus, Ohio, and C. H. Mackenheim of the Detroit Sanitary Supply Company, were in attendance, as members of the third house.

— IT IS NOT STRANGE that the boys should want D. G. Finnerty of Boston for the next president, as long as the honors are passed around. He would make a rainy day bright by his presence.

— A WELL-MEANT ATTEMPT was made during the convention to confer a deserved honor upon J. J. Wade of Chicago by making him a life member of the National Association, in recognition of the act of his life in getting up the famous Baltimore resolutions. It was found, however, that under the constitution it was impossible to so reward the esteemed member. The presentation of such a resolution in open convention was in itself a high compliment to Mr. Wade, showing the regard in which he is held.

— ALL of the seats at the convention at one session had a card calling attention to the exhibit of the Boynton Furnace Company at the Pfister House and a catalogue of the Columbian edition of the Milwaukee Gas Stove Company, showing their Perfection line to perfection.

— THOUGH they talk of 25 years as of as many minutes, the fire in their eye and the active interest they took in the entertainment of the plumbers shows that both Rundle and Spence, of the great plumbers' supply house they have built up, are still boys with the boys and broad-gauge men in any company.

—We were handed several leaves of parchment paper secured by a ribbon of "baby blue" on which, in gilt letters, was a monogram R. S. M. Co. On opening we were greeted by a smiling yearling plumber enjoying a buff bath in an old-fashioned tub and learned that a Fête Champêtre to the National Association of Master Plumbers was to be given at Schlitz Park on Wednesday evening by the Rundle-Spence Mfg. Company of Milwaukee. The programme was made up of vocal and instrumental music. The closing pages say "Good night, good! parting is such sweet sorrow that I shall say good night till it be to-morrow." To-morrow "I remember a mass of things, but not distinctly," and in the last page is a picture of a "busted" boiler with the query, "Should auld acquaintance be forgot?" and the unanimous answer was "*never.*"

— J. A. Harris of Sioux City, Iowa, was once an Eastern lad, and his eyes kindle in recollection of the days when he was an active member of the Hook and Ladder Company in Newark, N. J.

Convention Droplets.

Little drops of solder
Melting in a pot
Are not so awful little,
Handled when they're hot.

Little drops of tallow
Dropping from a joint
Are apt to make you hallo!
If they your hand anoint.

Little drops of rosin
Kick up quite a smoke,
If the fire they fall in
From a careless stroke.

Little drops of water
Falling in hot lead
Are apt to treat the plumber
To a jolly spread.

Little drops of wisdom,
Gathered every day,
Make the lad a plumber,
If he's built that way.

Chicago Hospitality as Dispensed by Local Plumbers.

A hearty welcome was accorded the plumber on Monday when he arrived in Chicago on his way to Milwaukee by the Chicago plumbers, and no matter where he hailed from he was cordially invited to their rooms at 197 Madison street. Here he had an opportunity to refresh himself by using their lavatory, and to regale himself with a light lunch from a variety of fruit and some of the liquids which cheer the weary wayfarer that were cooled to an agreeable temperature in a tub of cracked ice.

On the table was a register in which all were invited to leave their autograph. A large blackboard had full information as to the time of trains, how to reach them, where to get tickets and which were the hotels selected. The Chicago delegation went in a body on the five o'clock train with many guests and had a very jolly time.

Their rooms in Chicago are very nicely furnished, many pictures adorning the walls, of which that of Alexander Rafter, a plumber of 1850, is of more than passing interest. Well-filled bookcases of standard works on hydraulics, hygiene and other "byly" scientific subjects afford a fine opportunity for the aspiring sanitary engineer to acquire the necessary knowledge to the profession. Several works of high grade fiction will serve to put a polish on the substantial. In the secretary's room are catalogues of goods from many manufacturers, and no doubt our friend A. W. Murray would be willing to accept all the trade literature that will be sent to his care at 197 Madison street. Among their visitors were many of the gentler sex, and if some girl from a distance should one day find a home in Chicago it would not be strange, and would reflect credit to her taste, for the hospitality sampled is too genuine to be for exhibition purposes only.

Sanitation.*

BY ALEX. W. MURRAY, CHICAGO.

1 Should sanitation be fostered by legislation?
2. Should legislation precede education?
3. The extent of municipal or State authority in sanitary matters.

To properly portray the advancement made in sanitary matters during the progress of civilization, would demand the efforts of a greater mind than that possessed by the writer.

Were the field of literature to be reviewed and analyzed as to its relation to the purity of expressions of thought, or an examination made into the results of calisthenics upon the development of the human frame, or the wonderful truths related that have been discovered in the laboratory of the chemist, as to the purity and adaptation of food products to the sustenance of life, or the attention drawn to the efforts of the disciples of religion to perfect a moral law (consistent with the will of the all-wise Creator), or the debates of legislators upon this theme be repeated while urging the passage of statutes insuring to mankind a perfect hygienic government, with the end in view that the children of poverty would be at least surrounded by that which is essential to their growth to perfect manhood—were a discourse upon these phases of sanitation entered into, it would be overtaxing your patience, and, I judge, not the intention of the Essay Committee in their selection of the subject.

The alchemists of old, in their search for a universal remedy, overlooked the fact that the same was within their grasp, and partook of the nature of giving to the people pure water, pure air and pure food, and also the observance of the moral and natural laws; and instead of a fruitless search for the secret of converting baser metals into gold, had they devoted their talents for the enforced obedience to the fundamental principles of sanitation, they would have been the means of saving to the world human lives, more precious than gold; for the gatherers of health statistics have proved beyond a doubt that millions are lost to the nation which might have been saved by a strict enforcement of the laws of preventative medicine.

In summing up the meaning of the word "Sanita'ion," it means a realization of a condition of a perfect human existence, moral, mental and physical, and which is practically subservient to a sufficiency of pure and wholesome food and water, an atmosphere free from deleterious matter or gases, and a faithful adherence to a moral law harmonizing with nature.

The intelligent reader will observe that the work of the plumber takes a prominent and important part in the drama of life; for it is he who brings to hand the water supply, and when impure provides the filter, or in instances where it is not under sufficient pressure, supplies the sanitary appliances for its procurance, storage and methods for heating it. He caters to the artistic eye in the splendidly equipped lavatory and complete bathroom of to-day, and prevents the pollution of the atmosphere by perfect systems of house drainage and ventilation.

It is evident that the various applications of the plumbing art economize time, and add comfort and enjoyment to human life.

Many of the most approved plumbing apparatus owe their origin to some suggestion or to the inventive genius of members of our profession; so true is this, that in every department of the mechanical field of sanitation some device of the practical plumber may be found.

A truthful history of the progress of the world will prove that wherever the work of the craft is most appreciated there is found the highest grade of civilization.

While the fact is lamentably true that in general conversation and publication the trade is not given the credit that is its due nor in many cases paid what is its due), yet the individual patron does unconsciously murmer peans as to his ability when he consults him as to the merits of this or that plumbing fixture, system of drainage, heating, illuminating or ventilation; but, brothers of the round iron, solder and dresser, we must not stand still, but be marching onward, adding glory to our motto: "Hygiea Excelsior," being always on the alert to improve the fortunes and customs of our trade.

"In the elder days of art,
Builders wrought with greatest care
Each minute and unseen part;
For the Gods see everywhere."

"Let us do our work as well,
Both the unseen and the seen;
Make the house where Gods may dwell,
Beautiful, entire and clean."

Leaving to the medical fraternity the healing of the sick and wounded, the moralist the social problem, the bureaus of health the disposal of garbage, and prevention of adulterations of food, we have now arrived at the question:

SHOULD SANITATION BE FOSTERED BY LEGISLATION?

The correct answer to this question plays an important part in the well being of humanity. The writer answers emphatically, yes; for what other means in this age could be employed for enforcing the sanitary reforms that may from time to time be discovered and developed for the benefit of mankind. Is it to be expected that the parsimonious landlord can be relied upon for the sanitary renovation of his building? Or that the avaricious merchant will let his conscience prevent him from adulterating or counterfeiting goods in order to make an exorbitant profit? Or the medical quack from practicing upon the credulity of the unsophisticated? Or the dishonest contractor from omitting the essentials required by the department of health? Or the penurious manufacturer to make the necessary improvements to insure to his workmen an atmosphere free from dust and contagion? It would, indeed, be trying to the patience of humanity and the sufferer to wait for the much needed reform to come voluntarily from the sordid hearts of such vampires of society. It would need more than the sight of crape and the lamentations of their victims to prick their consciences to a realization of their duties to their fellow man; it requires the strong arm of the law, supported by an intelligent people, to compel their obedience to the principles of sanitation.

Inasmuch as the people at large are benefited by improvements made in sanitary appliances and modes, legislators should foster their introduction by appropriations for the practical demonstration of their utility, and if proved to be beneficial and capable of general adoption, they should legislate accordingly. Sanitation should also be fostered in the following manner: By lending legislative aid for the special instruction of the inspectors who are employed in the various departments of governmental sanitation. Each applicant for such a position should have to pass a rigid, practical and theoretical examination at a high average upon subjects relating to the particular position he desired, the board of examiners to be elected from among the acknowledged experts of the professional and mechanical industries of this particular field. In this branch the Master Plumbers' Association must take a leading part and unceasingly agitate for the necessary reforms. Although having been but comparatively a few years in the plumbing business, the writer is thoroughly convinced that good results from tenement and plumbing inspection can only be attained by having practical plumbers, who have also a good theoretical education, appointed as inspectors. And if this be true from the standpoint of the plumbing, it must follow in the other departments of building inspection. Were this principle faithfully carried out and a rigid accountability demanded of each department of building construction, there would be less victims of falling walls and polluted atmosphere and water.

SHOULD LEGISLATION PRECEDE EDUCATION?

Is the next division of the subject. This could be properly answered either in the affirmative or in the negative. In the affirmative when speaking of mankind in a general way, for it is well known that discoveries and inventions are generally made by single individuals or associations of men combined for mutual benefit; and that it takes years of persistent agitation to educate the public to a proper appreciation

* Prize essay presented by the Chicago Master Plumbers' Association at the Milwaukee Convention of the National Association of Master Plumbers.

of the benefits of an invention or discovery; and arguing from the standpoint that the inhabitants of a village or country town have not, as a rule, the opportunities for general observation as those of the larger cities, nor that one reared in ignorance is as well qualified as the educated to as properly judge of the benefits to be derived from a new innovation, nor that childhood has the discretion of manhood, nor that the insane have the intelligence of the sane. And, furthermore, the average life of man is but of short duration, while wise and beneficent laws remain on the statute book for centuries. Thus, we of to-day have the benefits of wise laws made by our forefathers. Again, presuming that legislators are selected who are men of ability and probity; if an evil custom exists it is their duty to find a remedy and to enact a law for its enforcement.

What a herculean task the department of health would have, were they compelled to educate every person intended to be benefited by the enforcement of health measures. In this view of the subject, it is claimed legislation should precede education. But were the argument to be made in an individual sense—man learns only by experience and research; and in instances where legislators are venal and not of a high order of mental ability, and who proverbially enact class legislation and cannot be induced to act for the general welfare, it becomes necessary to educate the public to the necessity of the reform measures and to the character of their representative—in this light education should precede legislation. And it is incumbent upon all legislators who have not made a special study of a proposed amendment or addition to the laws of the country, to seek advice from men whose experience and study best qualify them to give the required information; for this reason the writer holds that in matters pertaining to legislation upon plumbing the Master Plumbers' Association should be heard before the framing of new laws or mendments to old ones effecting changes in the customs or practices of the trade are made. It is but the right that belongs to them and they should not hesitate to assert it, being a duty they owe to their patrons, themselves and posterity. State vice-presidents and presidents of State associations should be invested with such power and means that they may be able to give the warning when adverse legislation is contemplated, or to aid in the passage of a general State law, affording to the inhabitant of the village the same blessings of sanitation that the citizen of the metropolis enjoys.

THE EXTENT OF MUNICIPAL OR STATE AUTHORITY IN SANITARY MATTERS,

in the opinion of the writer, should be absolute, presuming that the laws have not been enacted in the spirit of class legislation, but in proper accord with the most approved methods known. Human life should not be jeopardized through ignorance or cupidity, without the culprit being as amenable to the laws as he who takes life in malice, frenzy or hatred. It should not be necessary to wait until the fever sign or crape is placed on the door in order to know if a building is in a sanitary condition. Inspection of buildings, new and old, should be compulsory and periodical—say every year—and certificates given as to their condition. It must be apparent to the reader that the time to remedy an evil is to do it before harm is done, and not when one is a sufferer from defective construction.

In localities where the health of the residents is endangered from the miasma of swamps, polluted waterways and unwholesome odors from factories and chemical works, power should be granted the authorities to abate the nuisance. They should have power, as far as practical, to prevent the extension of epidemics, to insist upon the inspection of food products and condemn the same when unwholesome, to close buildings for public assemblage that have not approved methods of ventilation, to inflict fines for the overcrowding of public conveyances, to test the sources of water supply for domestic use, and last, but not least, to arrest all cigarette fiends. Believing it to be your desire to assist in matters relative to sanitation, and that it is the duty of the National Association to do so, the following resolutions are offered:

Whereas, The daily experience of the plumbing fraternity in their labor of repairing defective work affords evidence that protection to the health of the people would be more complete were buildings periodically inspected; therefore,

Be it Resolved, That the Sanitary Committee of the National Association have full power to prepare a proper form of statute covering this phase of sanitation for general adoption, which, accompanied with reasons for the necessity of its passage, shall be printed in a sufficient number to serve the purposes sought to be accomplished, and sent to the State presidents where State associations exist, or the State vice-presidents where there are no State associations; and be it further

Resolved, That it shall be the duty of such State presidents or State vice-presidents to urge the passage of such a law, and that it is the duty of each member and association to lend their influence when called upon; and be it further

Resolved, That the sum of $200 be appropriated for the printing and distribution of such printed matter; and be it further

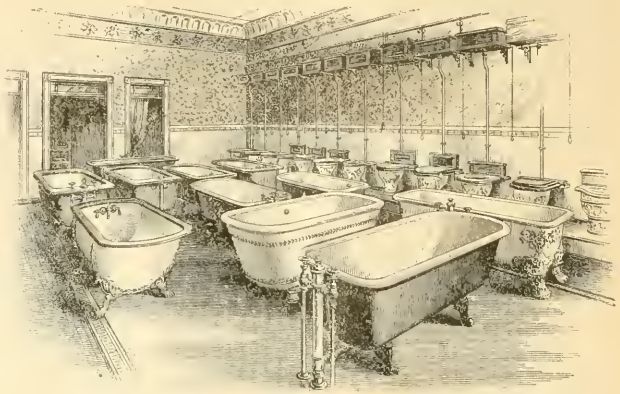
Resolved, That the National Association hereby pledge itself to diligently and with untiring zeal continue to advocate the passage of such legislative measures until they have been adopted in every State in the Union.

ALEX. W. MURRAY.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until June 29, for the labor and material required for the plumbing and gas piping in the United States post office building at Ashland, Wis., in accordance with drawings and specifications, copies of which may be had at the office of the Supervising Architect, or at the office of the superintendent, at Ashland, Wis.

Henry McShane Mfg. Co.'s Washington Showrooms.

The Henry McShane Mfg. Company of Baltimore, Md., manufacturers of plumbers' and steam fitters' goods and bell founders, commenced the manufacture of plumbers' goods in 1856, since which time their business has increased to such an extent that they now have branch houses in Boston, New York, Brooklyn and Washington.



The Henry McShane Mfg. Company's Washington Showrooms.—Fig. 1.—Main Room, South Side.

It was not until 1873 that they commenced making church bells. Mr. H. McShane, who for many years had been interested in the sale of church bells, decided to start a bell foundry in connection with his business, and the McShane Bell Foundry thus instituted enjoys to-day a universal reputation.

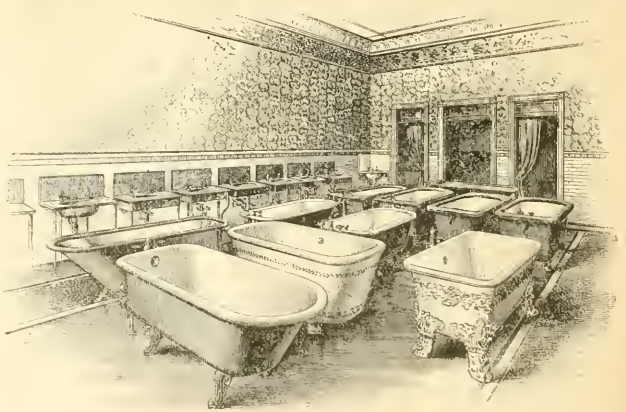


Fig. 2.—Main Room, North Side.

In fact, it is claimed, there is not a country on the globe that does not echo the sound of a McShane bell.

At their New York house they some time ago fitted up a permanent exhibit covering a line of their plumbers' goods, which exhibit has always attracted much attention. This exhibit, however, has been eclipsed by the elegant and costly show room and bathrooms recently completed at their Washington house. The Washington display is contained in their new five-story brick building situated at 423 Tenth street, N. W. The building is a handsome one, with an interior admirably

planned and fitted to meet the requirements of their business. The basement is occupied by machines for cutting and threading iron pipe of all sizes up to and including 8 inches, the machines, as also the elevator, being run by a 12½ horse-power gas engine, in close proximity. The greater part of the first floor is devoted to store purposes, and the remainder in the rear contains the offices. The show rooms are on the second floor front, and the rest of the building is reserved for stock.

The accompanying cuts, Figs. 1 and 2, illustrate the main showroom. As will be seen, the greater part of the floor space is utilized to show a complete line of bathtubs. Conspicuous among them is a large Pompeian porcelain tub, with marble feet, and fitted with the Harvard low-down bell supply combination fixtures. The special feature of these fixtures is the easy latch principle for instantly opening and closing the waste. A prominent position is also awarded to a Madeline porcelain enameled iron bath, with

Fig. 3.—Ivory and Gold Bathroom.

rolled rim, decorated iron feet, and pond lily decorations. This bath is fitted with the Yale combination waste. A number of enameled iron tubs, with rolled and wood rims, fitted with all the modern combinations for supply and waste, are assigned to positions admitting of easy inspection.

Ranged along one side of the room, as shown in Fig. 1, are 14 closets under water supply, and covering a complete line, from the short hopper and trap vent to the finest Ejector syphon closet. The Ejector is a popular closet, controlled exclusively by this company. The closets shown are mostly for open work, in plain, embossed and decorated ware, in the latest designs, and the seats and tanks cover a variety of woods. The water used in the service is supplied from a Hyatt filter, thus insuring perfectly clean water.

On the opposite side of the room, as shown in Fig. 2, are ranged a number of lavatory washstands, in all kinds of marble, some very rare, including Italian, St. Baume, Numidian, Egyptian black and gold, Algerian and Mexican onyx. The washstands are fitted with round, oval, square and recessed basins, and Harvard and Yale fittings. They are all of the open pattern, mounted on brass and nickel-plated legs and brackets in choice designs. The traps used are of the Richmond, Hopkins, Star and Columbus patterns. The room, which is 33 x 24, is richly and handsomely decorated. The walls are finished partly in Lincrusta-Walton and partly in Aniglypta, with a wainscoting of cream tiles, a handsome wall piece in Lincrusta, representative of "Hope," adding materially to the effect of the decorations. The floor is of unglazed tiles, with Mosaic center. Combination gas and electric light fixtures of a late design, in rich gold, and very heavy, provide for six gas lights and six electric, 32 candle-power lights, on each fixture.

BATHROOM NO. 1.

To the right of the entrance to the show room is Bathroom No. 1, as illustrated in Fig. 3. This room, which is of the ordinary bathroom size, 13 feet long by 7 feet wide, is very handsome, and most complete in all its furnishings. The prevailing colors of the decorations are ivory and gold. The wainscoting is of cream tiles, the walls are of plastic in imitation of old ivory, and the floor tiled. To the left, immediately on entering is a rolled rim foot bathtub, not shown in the cut, decorated in ivory and gold and fitted with the Harvard combination fixtures. A polished brass towel rack is attached to the wall near the tub. Next the foot bath is a lavatory sink of Algerian onyx, with polished brass legs and fittings, brass soap dish and oval basin, decorated in gold. The bath is an imported porcelain one of the French pattern, mounted on four marble feet, with brass Harvard combination fixtures and a suspended shower bath of brass, having brass flush pipes and brackets. A brass towel rack and sponge holder are attached to the walls, handy to the bath. At the end of the room, to the right of the bath, is an Ejector pedestal closet of ivory ware, with full gold decorations. It has a bird's-eye maple seat and tank. On the right of the entrance is a rolled rim sitz tub, decorated in ivory and gold, and having Yale fixtures of polished brass. Rugs, towels, and a cuspidor, all in colors matching the decorations, with a small gilt chair, complete the furnishings.

BATHROOM NO. 2.

This room is on the left of the entrance to the showroom, and is 12 feet long by 6½ feet wide. The prevailing color here is old pink. The wainscoting is of pink tiles, and the walls are treated in leather effect of a tile pattern. The floor is of white vitrified tiles, of a brick pattern. The room contains a lavatory washstand, with top and back of St. Sylvester pink marble, and an oval basin decorated in pink and gold, low-down Fuller pattern faucets, nickel-plated legs, octagon-shaped trap nickel plated; a washout closet, decorated in pink, with natural cherry seat and tank; a Madeline enameled iron bathtub, with iron feet and skirting, decorated with tiger lilies on pink ground, and fitted with Yale combination fixtures and nickel-plated shower bath, towel rack, sponge basket and soap dish; rugs, curtains and towels in colors harmonizing with the decorations, and a small chair of natural cherry.

BATHROOM NO. 3.

This room is entered from No. 2, which it resembles in size, excepting a recess in which the washstand is fitted. The prevailing color here is blue. The wainscoting is of blue tiles, with a fancy border, and the walls are finished in leather effect to match the tiling. The floor is composed of vitrified tiles, octagon in shape. The room contains a lavatory washstand of Birdelia marble, with basin to match, and nickel-plated legs and fittings; an Ejector pedestal closet, blue and gold decoration, with seat and tank of quartered oak and nickel flush pipes and brackets; an Albion enameled iron bath, with rolled rim and plain feet, ivory, brown and gold decoration, combination fittings of the Yale pattern, nickel-plated soap dish, sponge basket and towel rack; rugs and towels in colors to match the decorations, and a small chair in quartered oak.

The bathrooms are all lighted by electricity.

TRAPS AND VENTS.

ROSENFIELD BROS. are a new firm just starting in the plumbing, gas fitting and steam and hot-water heating business at Rock Island, Ill.

E. M. LANG & CO., Portland, Maine, have a novel and attractive exhibit in a full-rigged four-mast schooner, with five jibs. The feature of the exhibit is best illustrated by a "bull." Every rope on the vessel, with the exception of the ratlines and lanyards, is made of solder. The boat is loaded with miniature pigs of lead and tin, coils of wire and rolls resembling tin plate. The hatches being off, she seems to be loaded below deck with solder drops of various sizes and shapes. The house makes a specialty of wire, drop and stick solder and general supplies for can-goods packers. All the various shapes of solder shown are stated to be made by the firm's patented machinery.

THE PLUMBING FIRM of Williams & Cunningham of Schnectady, N. Y., has been dissolved. James T. Wasson of that city will hereafter be associated with Delos H. Williams and the firm will be known as Williams & Wasson.

THE PLANT OF DAWES & MYLER, at New Brighton, Pa., which was destroyed by fire last November so completely, has been entirely rebuilt, and is now in full operation in every department. In rebuilding, the lessons of past experience and a careful study of their requirements have been used to secure what they claim is a perfect plant for making white enameled iron bathtubs and sanitary iron goods. Having lost all of their cuts, photographs and catalogues in the fire, they are now busily engaged in the preparatory work of getting out a new catalogue, which will be of interest to the plumber who does high-grade work.

THE RETAIL STORE.

The Blue Band Tip-Top Can.

The cut herewith shown is of an oil can being put on the market by the Youngstown Stamping Company, Youngstown, Ohio. The can is described as being made of heavy material, suspended on a strong frame, and so balanced as to be readily tilted for filling lamps or gasoline reservoirs. The outlet is controlled by a spring, which is designed to close the instant the thumb is removed, to render evaporation or leakage impossible. The can is made only in 5-gallon size, and combines, the manufacturers claim, all requirements in simplicity, durability and neatness.

The Blue Band Tip-Top Can.

Wilde's Twine Cutter.

A. L. Wilde, 252 Friendship street, Providence, R. I., is introducing the twine cutter, as illustrated herewith. It consists of a screw hook, with a slot on the inner side of the curve, in which a sharpened steel cutting blade is secured. The cutter is designed to be screwed into the counter or other woodwork, near the place where packages are tied, or string to be cut. Drawing the string across the blade severs it at any desired place. The advantages claimed for the cutter are the saving of string, neatness in the appearance of the packages and the fact that the device is always where it is placed.

Wilde's Twine Cutter.

Economy Shovel.

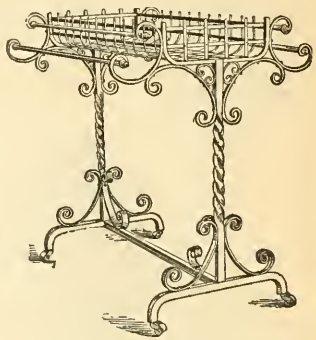
A. M. Rosa & Co., Ilion, N. Y., is offering the shovel illustrated herewith. The shovel is made to meet the demand for a narrow bowl scoop shovel, with long handle, 4½ feet, nearly on a straight line with the bottom of the bowl. The shovel is recommended for feeding coal in furnaces, boilers, &c., and for taking ashes from pits. It is referred to as being useful for a variety of work, being light, strong, serviceable and cheap.

Economy Shovel.

The first report of the Board of Equalization and Assessment of Cleveland, Ohio, shows a gain in the city's tax valuation of $4,079,896 for the year.

Toilet Table.

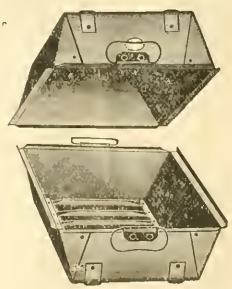
Ludlow-Saylor Wire Company, St. Louis, Mo., are manufacturing a toilet stand, as shown in the accompanying illustration. The holder is designed for sponges and is provided with towel racks on each side. The sponge holder or receptacle is of brass, the mesh being sufficiently large to allow the air to circulate through it freely, thus thoroughly drying the sponge. The table is regularly made in nickel-plated brass, but will be made to order of any metal desired.



Toilet Table.

The Columbia Roaster and Baker.

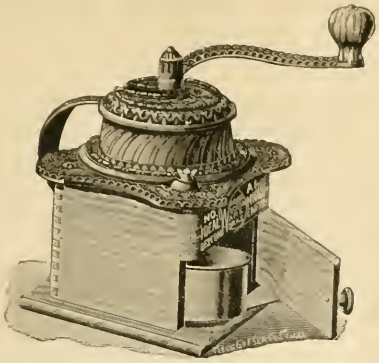
The Star Baker Company, Bellville, Ohio, are offering this article as shown herewith. The lower pan has a rim on the sides upon which the top pan rests, when in use, which holds the top pan from slipping sideways. The handles on the bottom pan form a clasp at each end, holding the pans together. The manufacturers claim the pan is made of excellent material, well constructed, easily adjusted and that it does good work.



The Columbia Roaster and Baker.

Ideal Coffee Mill.

Waddel Wooden Ware Works, Greenfield, Ohio, are placing a new line of box coffee mills on the market, one of



Ideal Coffee Mill.

which, the No. 1 A, is shown in the accompanying illustration. The strong features claimed by the makers of the mill are the large bronzed hopper, artistic grasping handle, rapid grinding burrs, and round tin cup with automatic ejector. The burrs, it is stated, are so constructed as to draw the coffee berry into the grinders. The manufacturers state that a large amount of coffee can be ground with comparatively little labor.

P. & A. Royal Lamp No. 835½

The Plume & Atwood Mfg. Company, 18 Murray street, New York, are putting this lamp on the market, as

Fig. 1.—P. & A. Royal Lamp No. 835½.

shown herewith. The lamp is of the central-draft pattern, while the wick is raised by lifting the wire which projects above the font at the right-hand side of the cut. A feature of the burner is the lighting lift, shown in Fig. 2, which lifts on a spiral movement and remains in position while lighting. The part of the burner in Fig. 2 is removable from the lamp to make it easy to clean. It is held firmly in position by notches at its base, into which lugs fit to prevent its turning when lifting for lighting. The manufacturers claim that the lamp

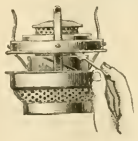


Fig. 2.—Spiral Lift.

gives a proportionately larger amount of light for the oil consumed.

Globe and Monarch Oil Cans.

The accompanying cuts represent cans put upon the market by the Winfield Mfg. Company, Warren, Ohio. The Globe can and lamp filler, as shown

Fig. 1.—Globe Oil Can.

in Fig. 1, is manufactured in all tin, and in galvanized iron with tin tops. It is explained that the can has an extra-large-sized filling hole to accommodate large-sized funnels, while the filling hole and pouring spout are located at opposite sides of the top to avoid having the oil run from the can screw when filling a lamp. The flutings are referred to as adding to the general appearance of the can, as well as to the strength of the top, and the spout as being reinforced.

The Monarch can for oil and gasoline, Fig. 2, is described as being made of heavy galvanized iron, hung in a frame of bar iron, finished with japan. The can is removable from the frame

Fig. 2.—Monarch Oil Can.

when taken to be filled. The stream, when passing through the large outlet, may be regulated by pressure on the spring valve.

Ideal Double-Acting Spray Pump.

The accompanying illustration represents a pump offered by the Deming Company, Salem, Ohio. In use the double-wing oscillating piston is described as being operated by a lever connected to a shaft, passing through the hub in the center of the cylinder cap, thus rendering the pump double acting. The pump is made in both iron and brass, the suction of both being fitted with 2½ feet of 1-inch iron pipe, with strainer on the end to prevent leaves or other foreign matter from getting in the pump. It is stated that an absolutely constant stream is produced by the pump, and that it can be

Ideal Double-Acting Spray Pump.

placed either on the end or side of a barrel. The pump is especially recommended by the makers for grape growers, and the suggestion made by them, that for spraying with Bordeaux, ammoniacal mixtures, &c., the all brass pump should be used.

ROOFING AND CORNICE.

Laying Steel Roofing.—II.*

BY L. S. BONBRAKE.

PATCHING ROOFS.

If through accident, or from whatever cause, a large hole is made through the body of the roof, it can be repaired by cutting out the damaged part in a square or oblong shape, as shown in Fig. 2. Notch the corners ½ inch in from the edge, as at B, Fig. 2, and form a flange on all the sides at right angles to the sheet, except at the bottom, which should bear outward, so to lock under the flange on the patch F, Fig. 2.

The piece of metal F is cut to fit into the space, with ¼-inch edges turned at a right angle, except at the bottom, which edge should remain flat. This is inserted into the space formed by the flanges of the sheet, and the bottom edge of F is turned over and pinned under the bottom flange. Use flat pliers to do this. When pinned under mallet the bottom down solid, after which use the pliers to fold the high flanges over the lower ones, when all the sides can be malleted down solid, forming a secure water-proof patch, Fig. 3, without the use of cement, except, possibly, a very little at the corners. When finished the water will run over the seams and not into them.

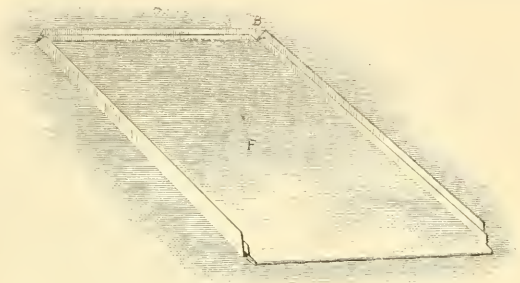


Fig. 2.—Patching a Roof.

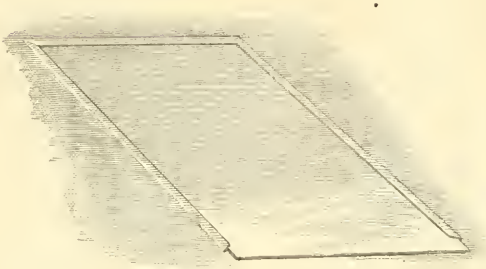


Fig. 3.—Roof Patch Completed.

FLASHINGS FOR FIRE WALLS.

In forming flashings for fire walls the corners should be seamed and the same treatment should be given the corners of chimneys when the chimney extends out from the fire wall into the body of the roof, as is oftentimes the case. In Fig. 4 is shown the sheet in the flat, with the corner cut out and ready for forming the flashing. Fig. 5 shows the flash formed, and the corner edges formed ready to seam, which may be finished by malleting over a square block.

STANDING SEAMS.

When the pitch of the roof will allow of a standing seam, it is preferable to a flat malleted seam, inasmuch as it provides for the expansion and contraction of the metal used, and prevents "buckle" (raising of the sheets in the center), and will not crack or break. The surface for a roof made with a pitch of from 1 to 1½ inches to the foot has been found more desirable than with less, and a "one-fourth" pitched roof is preferable, although, by the use of double lock cross seams, Fig. 6, the metal has been used for roofs with less than ½ inch pitch, and has given very good satisfaction. However, a pitch of ½ inch or less to the foot is dangerous for material of any kind, and should be avoided when possible. The roof may prove fairly good for a time, or while the building is new, yet the natural tendency of timbers is to shrink, and of the building to settle and create depressions, or sinks, to hold water and catch dirt, all of which tend to destroy the life of the metal and in a short time result in leaks.

Fig. 4.—Sheet Cut for Flashing.

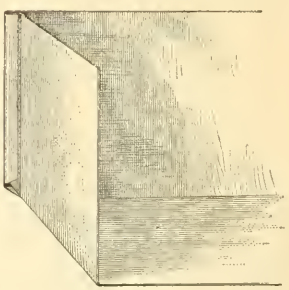


Fig. 5.—The Flashing Formed.

LAYING STEEL ROOFING.

* Copyrighted, 1893, by L. S. Bonbrake.

DOUBLE-LOCK CROSS SEAM.

The double-lock cross seam, Fig. 6, used for pinning or connecting the sheets of steel, as mentioned in this article, has been known and used for years in terne roofing when seams were not soldered; yet it is a comparatively new departure for steel roofing manufacturers, and has entered into the construction of this style of roofing to a very limited degree until of late years. A want of the proper tools or machines for speedily and perfectly turning the hem and fold (double edge) on the ends of the sheet, and the necessity of using very soft material to avoid cracks and breaks, have barred it from general use. However, American genius has been at work, and machines have been invented that fill every requirement for this character of work. This is a long stride in the right direction, as sheets thus joined are free from danger of leaking at the cross seams, and long strips of material may be handled on the roof as roughly and carelessly as terne roofing with soldered seams, with no danger of coming apart or being injured. A double lock is formed by first notching the end of the sheet on the edge which is to be formed for the high edge of the seam. This notch will vary in size to accord with the width of the high flange and width of the seam. After notching the first fold on the end of the sheet is then made, usually $\frac{3}{8}$ inch wide; the edge of the opposite end is turned on the reverse side of the sheet in like manner. Twelve sheets are usually treated in this manner for a roll of steel containing material for covering or laying 200 square feet. After the edges have been formed as described, the sheets are slipped together, interlocking one edge in the other. The seam is then pressed close and firmly together. The slight space allowed between the edges (one being folded $\frac{3}{8}$ and the other 4-8 inch) provides for the contraction and expansion of the seam and obviates all trouble and occasion for complaint at this point of the roof.

Fig. 6.—Double Lock Cross Seam

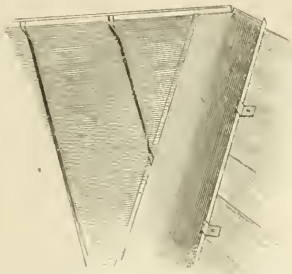


Fig. 7.—Joining Roof Strips and Valley Sheet.

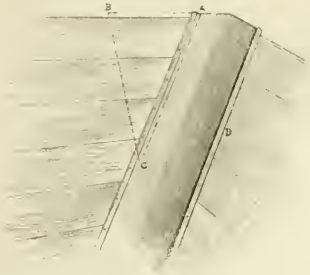


Fig 8.—Measuring for Miters

GUTTERS AND VALLEYS.

The terms gutters and valleys are at times confounded one with the other. In the Eastern States a built-in trough, in any part of the roof, is known as a "valley," while in other sections the term "valley," as applied in connection with a roof, is used only as defined by Brande—viz.: "The gutter or internal angle formed by two inclined sides of a roof." Webster defines a roof gutter as "a channel at the eaves of a roof for conveying away the rain."

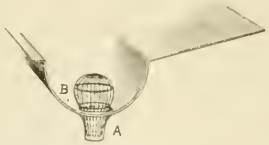


Fig. 9.—Gutter Outlet with Strainer.

Fig. 10.—General View of Gutter.

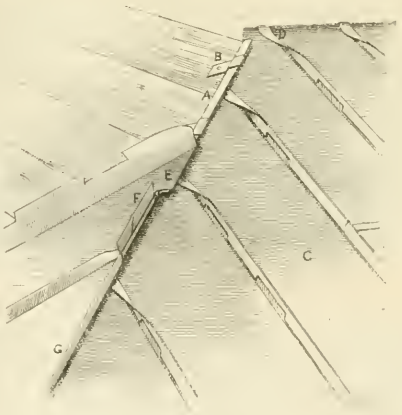


Fig. 11.—Laying Sheets at Hip.

LAYING STEEL ROOFING.

In laying a roof with valley we find the most essential point to observe is the proper connection of roof strips to the valley sheet.

Large, wide seams are to be avoided. While they are more readily fastened together than if narrow, they invariably spring at the outer edge, and, though they may not leak, form a recess for the retention of dirt. This is prevented by using a narrow, $\frac{1}{2}$-inch, edge, which can be malleted down solid, and to stay. The valley sheet should be bent to conform to the angle of the roof, and with a $\frac{1}{2}$-inch edge, or hook, formed to receive the edge or end of roof strip and laid to place and secured by anchors, as in Fig. 7, instead of nailing under edge, as shown at D, Fig. 8.

It must be remembered that in laying the roof down the

valley the roof strips gain in length. By reason of an edge turned up for seaming, the roof strip is taken up the valley the width of edge turned, and hence is longer. In laying up the valley the strips shorten, hence must be cut longer than measurement before edging.

It is unnecessary to lose or waste stock in cutting miters, as with a little care and turning all corners can be used except possibly the pattern. To cut the first miter, supposing the roof strips to be 27 inches wide and the first edge for seam 1 inch, measure from joint A, Fig. 8, of valley sheet at comb, extending 1½ inch over turned edge for strip to hook on to valley, out on comb to B 27 inches, then square down the roof to C and allow 1 inch projection over comb line for comb seam on first side laid.

Equal care should be taken with roof gutters as with valley, for a poorly constructed gutter in a building entails manifold annoyances and the destruction of property. Poor workmanship leaves its trade-mark in black streaks from the top to the bottom of the building, defacing and marring the beauty of the paint. If copper or sheet lead is too expensive, the best quality of extra-coated terne plate should be used. It will cost more than common material, but is the least expensive to the builder when wear is considered, and will redound with credit to the mechanic who insists on working it. If double-lock cross seams are used, and thoroughly soaked with solder, there is no danger whatever of seams breaking or bursting in the coldest weather, as they will stand the most severe tests of freezing and thawing.

Care should be taken to have the outlets sufficiently large and at frequent intervals, firmly secured. A countersunk outlet, A, protected by wire strainer, B, Fig. 9, is recommended. The width of material is determined by the width of ledge or top board, B, Fig. 10, depth of gutter, C, and the pitch of roof. The back edge of gutter sheet, A, should in no instance be less than from 4 to 5 inches higher than the level of the gutter, as shown from D to A, Fig. 10, and, if convenient, more stock should be used. This point should be especially observed when shingles form the main part of the roof, as capillary attraction tends to draw the water above the base of the shingles, and is often the cause of water pouring down on the inside wall of building.

The angle or pitch to cut the roof strips for hips can be obtained by following the rule given for valleys, except to take the eave for the base of measurement. The gain and loss in lengths of roof strips working up and down hips is the same as in valleys, and should be taken care of. In laying the first side of hip the material should project over hip line 1 inch. When the entire side C has been laid, with seams finished, mallet the seams down a few inches back from hip line, with the open side of the seam turned under, as at D. Then the 1-inch tongs are used to turn the edge A, Fig. 11, overlapping hip line back upon the sheets laid. The line is then secured by nailing the anchor B between the seams. The adjoining edge E is laid projecting over edge A ¾ inch. When the line has been laid with seams formed they are malleted in the same manner as first line, and the wider tongs are used for turning both edges perpendicular, as at F, when the higher edge is seamed over the lower, as at G, making a firm and secure finish. The roof comb is formed and finished in a similar manner.

(To be continued.)

Slip-Joint Eave Trough.

The Fostoria Steel Roofing Company, Fostoria, Ohio, are calling the attention of the trade to their new style of eave trough which they are placing on the market. They especially allude to the slip joint, which they say is watertight and which they guarantee to be particularly strong and easy to put together. The lap of the slip joint is cut away in such a manner as to allow the outside lap to extend around and over the bead, which is thoroughly fastened on the inside of the trough, making the bead where it slips together three thicknesses of metal and thus giving it great strength. The accompanying illustration shows the appearance of the trough and indicates the construction of the joint. The tong of the bead is entirely cut away, leaving it open to admit the next joint of pipe. This feature is especially alluded to by the manufacturers. The trough is made in lengths of 10 feet 2½ inches, so that when placed on a building they make full 10-foot lengths. They are made with two sizes of beads, ½ inch for 3, 3½, 4 and 5 inch trough, and ¾ inch bead for larger sizes. The troughs are made both right and left hand.

Slip-Joint Eave Trough.

FLASHINGS.

According to the annual report of the Saginaw Board of Trade for 1892, which has just been issued, several firms are engaged in the manufacture of galvanized iron cornice, and other similar work in the city of Saginaw, Mich. The principal shops are those of J. C. Albright, Alexander Jacobi, and Morley Bros. A new concern which is reported to be doing a rapidly growing business in that city is the Asphalt Roofing Company.

Scott & Co, Cincinnati, Ohio, having added cornice and sheet-metal work to their iron roofing business, have leased the premises adjoining their present quarters and will be in position to give all orders, in the line mentioned, prompt attention.

The Berger Mfg. Company, Canton, Ohio, issue a handsome illustrated catalogue and price-list of cornices, finials, window and door caps and crestings of their manufacture. The catalogue measures 11 x 14 inches, is bound in tinted paper and contains a variety of handsome goods. The first seven pages show different designs of cornices which they manufacture. Next come window and door caps of galvanized iron of various shapes and styles. Several pages are devoted to finials, and galvanized iron crestings are illustrated in many different styles; also creating blocks and finials. Along with the catalogue is sent a supplemental sheet to their 1893 catalogue, illustrating Berger's imperial steel pressed brick, rock-face brick, rock-face stone, sheet-metal ceilings, &c.

M. Hass, cornice maker and tin worker, 2628 Carlson street, Pittsburgh, Pa., has recently brought out a device for hanging pictures on in rooms fitted with sheet steel or iron ceilings. The device consists of a molding some 4 inches deep, formed out of sheet metal, and which makes a cornice around the ceiling of the room. The lower edge of the molding is curved around so as to give a ledge, to which picture hooks may be readily attached.

We are indebted to the American Wire Glass Mfg. Company, Tacony, Philadelphia, for a pamphlet issued by them giving particulars about this new material and the uses to which it is applicable. The large works which have recently been erected by the company for the manufacture of wire glass have been in operation for nearly a month, and everything is reported as working very satisfactorily. The present output is about 3000 square feet a day, but the works will shortly be running to their full capacity of 5000 square feet. Orders and inquiries for their products have been received by the concern from all parts of the world, and customers to whom deliveries have been made are said to be very favorably impressed with the merits of the wire glass. A large number of orders are in hand, and the outlook for this material appears to be very promising. The American Wire Glass Mfg. Company have an exhibit of their goods at the World's Fair in Section H, Block I of the Manufactures and Liberal Arts Building, where samples and full information in regard to their productions can be obtained. The glass is made of any grade, from rough skylight up to the best polished plate.

The report is current that Jones & Laughlins of the American Iron Works, Pittsburgh, propose to make important improvements in their facilities for rolling steel billets. It is stated that the plans aim at rolling direct from the ingot billets down to 1½ inches.

TIN PLATES.

The Tin Plate Report.

Our Washington correspondent sends us the following letter under date of June 13:

Ira Ayer, special agent of the Treasury Department relative to the production of tin and terne plates in the United States, was at the department to-day looking after the final touches to his special report on that subject. The report has been referred to Assistant Secretary Hamlin for analysis and examination, which process hitherto has been a sort of perfunctory affair at the hands of Assistant Secretary Spaulding.

This sudden change of tactics naturally creates considerable comment and speculation and diverse conclusions and has also led to the allegation that Col. Ayer's report is to be suppressed by the departmental free traders who have gotten into place under the wing of the new *régime*.

Secretary Carlisle said to your correspondent to-day: "The charge has been brought to my attention that we are purposely delaying, and, in fact, suppressing the report on the production of tin plate in the United States made in pursuance of provisions of the act of 1890. The statement, which has also been given currency in certain newspapers, is not true. The report has been referred, and when Assistant Secretary Hamlin shall have had time to give it a careful examination it will be made public."

An inquiry in another quarter elicited the significant and important fact that it might be some weeks before the report could be examined, in other words, visible to the naked eye of the public. The parties who are interested in the data contained in this report are now surmising everything and are interrogating themselves and each other inwardly and outwardly as to whether there is to be any doctoring of the report or the application of other occult arts of departmental or official methods or political mathematics. At any rate, the suspicions which have been aroused are sufficient to keep the eye of scrutiny riveted upon Assistant Hamlin and the output of his sifting of Special Agent Ayer's statistics. Every one who is booked on schedule C knows that the existing duty of $2\frac{2}{5}$ cents a pound on tin or terne plates, to take effect July 1, 1891, as prescribed in the act of 1890, is subject to certain limitations, to the effect that on and after October 1, 1897, tin plates and terne plates lighter in weight than 63 pounds per 100 square feet should be admitted free of duty, unless it should be made to appear to the satisfaction of the President (who should thereupon by proclamation make known the fact) that the aggregate quantity of such plates lighter than 63 pounds per 100 square feet produced in the United States during either of the six years next preceding June 30, 1897, had equaled one-third the amount of such plates imported and entered for consumption during any fiscal year after the passage of the act and prior to October 1, 1897. The law provides that the amount of such plates manufactured into articles exported and upon which a drawback shall be paid shall not be included in ascertaining the amount of such importations, and also provides that the amount or weight of sheet iron or sheet steel manufactured in the United States and applied or wrought in the manufacture of articles or wares of tinned or terne plates in the United States, with weight allowance as sold to manufacturers, or others, shall be considered as tin and terne plates produced in the United States within the meaning of the act.

These are the obligations of Congressional legislation to the manufacturers of tinned and terne plates in the United States, and under which capital embarked in these enterprises. Any attempt of the Congressional and executive free trade tariff reformers to break the faith of the Government embodied in this solemn and binding enactment would be an outrage upon every sense of public honor.

On the first day of the coming October four years will remain of this period of limitation as to duty, and when it will be determined whether tin plates shall pay duty or go on the free list.

The report of Colonel Ayer for the six months ended December 31, 1892, showed a total of production in the United States:

	Pounds.
Tin plates	9,750,106
Terne plates	20,959,110
Total	30,709,216

Of that amount 13,963,531 pounds being made from American and 16,745,685 pounds from foreign black plates. It is learned that the ratio of increase of production for the six months which will end on June 30 will be much larger. The aggregate importations of tin and terne plates and taggers' tin for ten months ending April 30, 1893, is given at 480,777,931 pounds, as against 315,102,936 for the same period in 1892. There was a decrease, however, in the April, 1893, importations as compared with April, 1892, the latter showing 70,489,102 pounds and the former 66,498,618.

Sheet Iron and Tin Plate.

The regular monthly meeting of the Iron & Steel Sheet Manufacturers' Association was held in its headquarters in the *Times* Building on Tuesday the 6th inst. J. G. Battelle of the Piqua Rolling Mill Company, Piqua, Ohio, was chairman, and John Jarrett secretary. After considerable routine business had been disposed of the wage scale question came up for discussion, and occupied the attention of the members during the balance of the meeting. A conference committee of seven sheet manufacturers, with J. G. Battelle as chairman and John Jarrett secretary, was appointed to meet a similar committee from the Amalgamated Association. We are advised that the manufacturers will ask that some of the extras in the scale now in force be eliminated, and also that clause 2 in the sheet-mill scale, reading as follows, be stricken out: "Ten (10) per cent. added on all steel by whatever name called, No. 22 and lighter." A meeting of these two conference committees will be held at an early date.

On the next day, Wednesday the 7th, the semi annual meeting of the Tinned Plate Manufacturers' Association of the United States was held at the same place. Routine business covering operations of the association for the past six months was disposed of and the wage scale governing tin house labor was then taken up. The manufacturers had previously been informed that the washmen would ask an advance of 25 per cent. over present rates, equivalent to 15 cents per box, instead of 12 cents, the present rate. It was the sense of the meeting that the scale of wages now in force was satisfactory to the manufacturers and would be signed by them for another year, but any advances asked over present rates by the workmen would be vigorously opposed. A Conference Committee of three, consisting of Wm. Banfield of Wallace, Banfield & Co., Limited, Irondale, Ohio; W. C. Cronemeyer of United States Iron & Tin Plate Mfg. Company of Demmler, Pa., and W. B. Leeds of the American Tin Plate Company, Ellwood, Ind., was appointed to confer with a similar committee from the Amalgamated Association. No time has been arranged for a meeting of these two committees, but they will come together at an early date. An election of officers of the Tinned Plate Manufacturers' Association to serve for the ensuing year was also held, and resulted as follows: W. C. Cronemeyer, president; Clarence Britton, vice president, and John Jarrett, secretary.

SCRAP.

The Locust Point Iron and Steel Works Company, Baltimore, Md., have their tin mills and tinning plant in full operation, turning out an average of 1000 boxes of IC coke brights daily.

The black plate mill of the Cumberland Steel and Tin Plate Company, Cumberland, Md., which recently went into a receiver's hands, is reported as running steadily, with a good demand for their output of black sheets for tinning purposes.

The works of the United States Iron and Tin Plate Mfg. Company at Demmler, Pa., will be closed down on July 3, and remain closed for three or four weeks. Some extensions and improvements will be made during the shut down. As announced before, this firm are renewing their boiler equipment and have adopted the plan of placing the boilers over the furnaces, utilizing the waste heat from the furnaces for making steam.

At the regular monthly meeting in June of the Chamber of Commerce of New York a resolution was adopted expressing the opinion of that body that the Sherman silver-purchase law should be repealed by Congress at the earliest possible date.

STEAM AND HOT WATER.

Circulation of Steam Without Pressure Above the Atmosphere by the Andrew G. Paul System for Removing Air.*

BY A. B. FRANKLIN.

At the last Master Steam and Hot-Water Fitters' Convention, held in Boston, May, 1892, a paper was read by O. L. Breckenridge, which gave a description of the application of the Andrew G. Paul system to two heating plants. One description was of a house heating apparatus in which the circulation of steam could be automatically controlled at temperatures ranging from 150° to 212°. The other was of an office building plant where the system had been applied, the exhaust steam from an elevator engine being used in the radiators without any back pressure.

Mr. Breckenridge's paper was, I judge, received with considerable interest, but looked upon, perhaps, as advancing a patent system of steam heating, which introduced more theoretical than practical advantages. . . .

Knowing it will be to the advantage of the master steam fitters to become as thoroughly acquainted as possible with the workings of the system, I take pleasure in describing some of the work we have done and the results obtained.

DESCRIPTION OF A PLANT.

One of the first plants to which we applied the system was in two adjoining buildings, used for retailing custom and ready-made clothing on the first floors, and for the manufacture of the goods on the other floors. The buildings, which were heated from one steam plant, are respectively 30 x 220, four stories high, and 45 x 220, five stories high, and contained about 30 radiators and pipe circulations, with a total radiating surface of 5600 feet, which amount is rather scant for the space to be warmed. There was in the basement one engine for power and lighting that was developing an average of 30 to 40 horse-power in the morning and nearly twice as much in the latter part of the day, and one engine for each carrier of about 10 horse-power, also one steam pump for running a passenger elevator. The steam was generated in three horizontal tubular boilers, two of which were generally run high pressure for power and one low pressure for heating. The exhaust was made use of for heating feed water and also, under back pressure, in the heating system at such times as a low pressure would maintain sufficient circulation in the radiators. The piping in these buildings is in fair shape, but, as I said before, the radiating surface is scant, and previous to the application of the air-removing system they found it necessary on cold mornings to carry 10 to 15 pounds pressure for several hours to force the air out and establish a proper circulation, at which times they could not afford to have that much back pressure on their engines, so the exhaust steam would go to waste. After the air-removing system was attached, the exhaust from both engines and the pump was used at all times, and a reducing pressure valve was applied between the yoke of the high-pressure boilers and the heating main, and this valve was set to work at the atmosphere, so that at all such times as the exhaust was insufficient for the building, live steam would automatically feed in to supplement the exhaust without the slightest back pressure.

ADVANTAGES OF THE SYSTEM.

The advantages and economy of the air-removing device were made manifest not only in the use of exhaust steam, but also in the morning before the engines were started, when by starting the air exhauster air would be drawn from the radiators to an extent that would establish a perfect circulation in much less time than formerly, and that at atmospheric pressure, against 10 to 15 pounds that was previously necessary. I should be pleased to give you the number of pounds of coal saved on this plant by the use of the system, but am not able to do so exactly, for the reason that we offered to take the job and furnish the license to use the system, on the basis of two years' saving, or the owners should pay us our price at the end of 30 days' trial. They discovered in that time that they could dispense with the heating boiler at nearly all times, and thus save the expense of one fire, so the owners, evidently not caring to give us the savings, sent a check for the stipulated amount.

This opinion was given last winter, so, to make sure how they felt after the entire season's trial, we a few days ago sent a stranger to them to inquire if they could recommend the system to one owning a heating plant, and the manager of this clothing house answered him in this way: "If I was the owner of a steam heating plant that was without the Paul system of removing air I would not sleep to-night till I had ordered the application of the system."

By the Paul system in a corset factory we took the exhaust from one 15 horse-power and one 10 horse-power engine that were brought together and taken through a grease extractor and then made use of in 2400 feet of 1-inch pipe circulations and 300 feet of surface in a Sturtevant heater to which was attached an 80-inch fan with fan engine that was designed to distribute 600,000 cubic feet of air per hour warmed to 70° throughout the factory for ventilation. Of course live steam was connected to heating main through a reducing pressure valve, that would make up any deficiency of exhaust. Here the results were very satisfactory, the exhaust was made use of without a particle of back pressure, and a perfect circulation was obtained.

Another building where we installed the system was a five story wooden shoe factory, 40 x 160, also one 210 x 110, one story in hight. Here they had a 50 horse-power Corliss engine, from which the exhaust, after passing through the feed-water heater, was circulated without any back pressure in connection with live steam if necessary by a reducing valve through a Sturtevant heater containing 4300 feet of 1-inch pipe and through 300 feet of 1-inch circulations which were placed on walls under the benches. The peculiar feature of this job was that several of the circulations were four-branch, of 1-inch pipe and 330 feet long, and that by use of the system here exhaust steam could be circulated throughout these long coils without the slightest back pressure.

APPLIED TO INDIRECT HEATING.

There is one other job that I wish to describe on account of its size and because of some actual tests which I will mention shortly. The buildings in question are owned and occupied by a concern manufacturing silver ware. The buildings are three stories high, and, I am told, cover over 4 acres of ground, and the heating of these immense works is accomplished almost entirely by one Sturtevant heater. The heater is composed of three stacks of 1¼-inch pipe placed in such a position as to form three sides of a square, the cold air being taken through the heater in three directions into the central heating chamber, where it is taken by two fans (each run by its own separate engine) and delivered to the different parts of the buildings. Each of the three stacks is made up of seven sections. The bases of three sections in each of two stacks are fed by the exhaust from the fan engines, and the remaining 15 sections are supplied by the exhaust from a Corliss engine.

The entire heater contains 24,150 feet of 1¼-inch pipe, or a little over 4¼ miles, or 10,500 feet of radiating surface. The Corliss engine was developing last winter from 300 to 400 horse power, the variation being on account of the engines furnishing power for the dynamos for the electric lighting. A card taken from this engine shortly before the system was applied to the heater showed 400 horse-power, the initial pressure being 100 pounds and the mean effective pressure 41.7 and the back pressure 4 pounds. All that was necessary to apply the Paul system to the Sturtevant heater was to drill a ⅝-inch hole in the return end of each sectional base and from each tapping to run a ⅜-inch stand pipe about 5 feet high, put a Jenkins' automatic air valve on the top of each, then yoke all the automatics together and run a ¼-inch air pipe to engine room and thereon place the exhauster, which was supplied with a ⅝-inch live steam connection.

The exhaust pipe from the engine is 10-inch, and goes into the basement under the engine and then about 10 feet through the basement wall and up about 30 feet on the outside of engine house to the atmosphere. Just before going through the wall there was on this exhaust a 10-inch back-pressure valve with the handle extending through the floor to be regulated by the engineer.

The pipe that carried the exhaust to the heater, which was about 175 feet away, was 6-inch, well covered and hung in an underground duct till it entered the heater house. On this pipe was a grease extractor. It might be well to say that the heater was well piped before we started to apply the system and they were getting good results with from only 2½ to 4 pounds back pressure. . . .

When the work of applying the system was completed and we were ready to start the exhauster it was about four o'clock one afternoon in January, after they had put the dynamos to work, at which times they always run the pressure up on the engine to from 80 to 100 pounds and the back-pressure gauge showed at this particular time 5 pounds. We first started up the exhauster and then opened the back-pressure valve as wide as possible, but we still had about ¾ pound due to the weight of the valve, so we found it necessary to take the insides of the valve out altogether and then the back-pressure valve was merely a coupling on the pipe. But the steam continued to flow 175 feet through a 6-inch pipe to the heater and filling the 4¼ miles of 1¼-inch pipe, in preference to going 30 feet to the atmosphere through a 10-inch pipe.

Now, the question arose in the mind of the master mechanic in charge as to the amount of heat he would get working on this lower pressure, and, consequently, lower temperature, and he remarked that, although we removed all the back pressure from the engine, if the coils of the heater were not as hot as before he would not accept the system, as they had nothing to spare before. So he made a test the next day with 4 pounds back pressure and without the aid of the system, taking the air from outside at 18° above zero, passing through the heating coils and delivering it to the fans at 130°. Then a test was made without any back pressure by the system, and the temperature of the air was raised to 148°, a gain of 18°. In other words, in using steam at atmospheric pressure, a temperature of 212°, the air that passed through the heater was warmed 18° warmer than when steam was used at 4 pounds pressure, a temperature of 225°, showing conclusively that the air-removing system made the surface enough more effective, or made enough more of the surface effective, if you please, to make up the difference in temperature and 18° besides. Other tests were made afterward which did not show such a large gain, but the air had been removed by the system shortly before, and even then there was a gain of 8° to 10° for the respective tests.

SAVING IN STEAM PRESSURE.

It was noticed also at once that where it had been necessary to carry 100 pounds pressure on the engines before, 90 pounds only was required with the back pressure removed. Another point of economy on this job came in at night, when they were always in the habit of carrying 5 pounds of steam on the heater through a reducing pressure valve. Since the application of the system the reducing valve has been set

* Read at the Chicago Convention of the Master Steam and Hot-Water Fitters' Association of the United States.

to work at the atmosphere, feeding steam to the heater without pressure.

The question will probably arise as to how much steam it requires to run the exhauster, so I will say that a satisfactory test, made by condensing the discharged steam from the exhauster, gave us in ten hours 300 pounds of water, which, if figured 10 pounds of water per pound of coal, would give 30 pounds coal, or about one shovelful for ten hours, which amount is, of course, extremely small in comparison to the saving.

The system is also applicable to all kinds of drying cylinders, slashers, &c. I have already attached the system to several paper machines, keeping them free from air and water, and in each case the work has given a large saving in fuel or an increased production on the same amount of fuel, and giving a better quality of paper on account of the evenness of temperature which can be maintained. I have no doubt that the Paul system will in the near future be extensively adopted throughout this and other countries as an attachment necessary to complete most any heating plant, and that each application will show benefits, both in saving and circulation, corresponding to the conditions of the plant to which it be applied.

A Look Ahead.

We reprint the following extract from a paper read by H. J. Barron at the Chicago convention of the Master Steam and Hot-Water Fitters' Association of the United States:

In the near future direct radiators will be designed that are poems in art; I would not by this state that there are not pretty radiators at present, or that a radiator is a hideous but necessary monstrosity. The radiator specialist has done well in the last ten years; we will encourage him to do better. The radiator of the near future will encircle the fire place; it will be the fire place mantel; it will have its gas logs and its ventilating flue, and air will be admitted back of it, either from the room or from outside; it will be connected with the steam or hot-water boiler in the cellar, with one pipe, not exposed in the room, and regulated with a foot valve, having also connection, of course, with the thermostatic regulator. (This is simply a Backus or similar heater in the room connected with an ordinary heater in the cellar.)

The days of the old style handle valve are over. In fact, the days of all globe valves or globular valves are about over; the straight-way valve is now perfect for all purposes and pressures. This radiator I speak of will, with its gas logs, waste but very little heat, as the gas heat will be utilized in re-evaporating steam or reheating water. Let the radiator man study beauty; his business is an artistic one.

The gate valve is the valve of the future, and exposed pipes on buildings will not be tolerated in an artistic age unless they are also made beautiful. The natural development of architecture will lead to hot-air heating by indirect steam or water and by the use of fans with the indirect heating. Hollow walls will soon become a necessity of architecture, and these we will utilize for sending up to the rooms fresh warm air. It is a curious thing that we guarantee to heat rooms to 70° in zero weather and never do it uniformly. Let any one make the experiment by taking a dozen thermometers, first testing them for uniformity and accuracy, and place one outside the window, another one inside the window, one at the ceiling, one on the floor, another at the vent flue and others at the inside and outside walls, and one just above the radiator or register. It will probably be 10° above zero outside, 80° at the ceiling of the room, 60° at the floor, if it is a first floor and the ceiling is about 11 feet high; 69 to 72° at the exact center of the room; and this will be also about the average of the different thermometers, and it will be probably 65° at the vent flue, and just above the radiator or register, of course, will be found the highest temperature in the room. This difficulty will be overcome by hollow walls and hot-air heat.

In general pipe fitting, I think cast fittings will disappear and be succeeded by malleable and wrought fittings, and also steel fittings. Screw joints will to a great extent disappear, and be succeeded by electric welding and new fittings, and new methods of connecting will dispense with both flange and screwed joints. Progress in the use of new metals and alloys will make many changes; for instance, in the use of aluminum or of alloys of it. And the exhaust steam from engines that is now thrown away in cities will be saved by having one large central main pipe, say 15 to 20 feet in diameter. All engines will have to exhaust into this. Steam for heating will be taken from this whenever required, and the hot water will be used for boilers. Central heating plants will increase; they are only in their infancy. The boilers in these plants will be vertical water-tube boilers, working at 1600 to 1500 pounds pressure. They will not be set in brick work, but have iron casings. Our present practice of setting boilers in brick illustrates our poverty of expedient. A true engineer is a worker in metal, and leaves bricks to the architect. The feeding of coal to these boilers and the removal of ashes will be entirely automatic. Mechanical conveyors will take the coal to the automatic stokers, and, later, the use of petroleum or gas for fuel will become general. Water will, of course, be fed automatically and heated by high-temperature heaters. Boilers will then become complicated machines, worthy of the engineer. There will be no patents on these boilers; we have passed the age of patents. There is not to-day, in my opinion, a valid patent on a boiler or radiator, or on any other article connected with heating or steam engineering. Their value depends on how much litigation the owners can stand. Take boilers: there is hardly a form made to-day that is not shown in Burgh's treatise on boilers to have been introduced 40 years ago. Robert Briggs advocated the abolition of patent laws, and, I believe, claimed that they were never of benefit, as engineers would devise the necessary machines when there was occasion for it. Events seem to point to the fact that patent laws were once of some value, but to-day, as applied to steam engineering, they are only of use to tickle credulous stockholders.

A Successful Heating and Power Plant Furnished for the Cleveland Arcade Company's Building, Cleveland, Ohio.*

BY SAMUEL I. POPE.

The building for which this plant was furnished is located in Cleveland, Ohio, fronting 132 feet on Euclid avenue by 64 feet deep, 11 stories high, fronting on Superior street 180 feet, 64 feet deep and 10 stories high, with a building connecting the two, 5 stories high, 200 feet long, 132 feet wide, with a skylight over same. The ground floor and first floor is used for stores and the balance for offices. The instructions to bidders were to provide an ample power plant for warming the building; elevator service, with surplus of 200 horse-power for electric-light plant, with additional boiler for cleaning.

Four firms were invited to submit plans and specifications. The accepted plans and specifications provided for five tubular boilers 60 inches in diameter, 16 feet long, with 54 4-inch flues 16 feet long of 5-16-inch Otis steel. Twenty thousand square feet of radiation, two duplex boiler feed pumps and separate house pump. The main steam pipe is run to furnish the steam to heaters on the ground floor and first floor and one for the heaters above this floor. This was done to provide for warming the lower floor until 10 o'clock p.m., as the offices would not be used after 6 p.m. The mains are run on the continuous main system, with one pipe connection for each radiator. All mains in basement are covered with asbestos cement covering; the exhaust pipes are run into an expansion tank and through a grease separator before entering the heating apparatus.

The plant has been in operation two years and is furnishing steam and power as follows: Six hydraulic passenger elevators, two hydraulic freight elevators, one hydraulic freight elevator (private), two boiler feeders (duplex pattern), 20,000 square feet vertical tube radiators (only about 13,000 feet in use) at a pressure of 2½ to 3 pounds to the square inch, 225 horse-power electric-light plant 20 hours a day, using 30 arc lights and 1500 incandescent lights.

The elevator pumps are the Gordon & Maxwell make, compound, working under a pressure of 54 pounds to the square inch, and are in use 20 hours per day. The amount and cost of fuel used during the months of November, December and January are as follows: November, 1891, 330 tons of slack at a cost of $464; December, 1891, 337 tons of slack at a cost of $470; January, 1892, 4.0 tons of slack at a cost of $573.

Warming the entire building with a maximum pressure of 3 pounds (most of the time less than 1 pound), we think this is a very economical plant.

* Read at the Chicago Convention of the Master Steam and Hot-Water Fitters' Association of the United States.

Wasted Heat.*

BY H. W. HEATH, LYNN, MASS.

The province of the steam engineer to bring together the many products of nature, and to unite, change or separate them, has led to the display of much ingenuity, such as feed-water heaters, dampers, governors, regulators, pumps (complicated or otherwise), smoke consumers, patent settings for boilers, condensers, vacuum systems, exhaust heating, &c.

Nearly all of these appliances can be traced to some steam-fitter engineer, who saw that something better was needed, or a part of what was before considered a necessary waste could be saved, or made available in saving somethiog else. So much has been done in certain directions that it sometimes seems impossible to make a further saving.

LOSS OF HEAT FROM BOILERS.

The object of this paper is to point the attention of the present company to the heat contained in the products of combustion after leaving the boiler. A writer on the subject of heating makes this assertion, that scarcely 45 per cent. of the value of the coal is utilized, even in the best set boilers, and no less an authority than Prof. Elihu Thomson said recently in a lecture that in transmitting power by electricity, probably not more than 10 per cent. of the value of the coal was available. This coming from so high an authority in a company which uses many, if not all, of the modern steam-saving appliances gives weight to the thought that something can be gained by some appliances that can be attached between the boiler and the chimney. Two experiments of this kind have been made by the writer, both of them heating water: The first in connection with a hot-water heating plant, in which a small box trombone coil, consisting of four rows of 1-inch pipe, 24 pipes high and 3 feet long, was used, the water to be heated being introduced at the bottom and distributed to two radiators from the top, the hot gases entering a brick chamber surrounding the coils at the top and being carried to the chimney as direct as possible from the bottom at the opposite end from the point of entrance, the whole being a part of a system heated by a steel tubular boiler of the upright pattern, and it has been in use six years; an addition of two large rooms on the northeast side of the house being sufficiently heated by this device.

The other experiment of placing some 70 feet of 1¼-inch pipe in the flue from a nest of boilers gives such results as to justify the belief that steam engineers cannot afford to let this matter pass unnoticed for a very much longer time, yet, sufficient data have not been obtained in either of these cases to warrant placing them before you, other than to show that something can be gained in this manner, the exact amounts still being an uncertain quantity.

THE HEAT IN COAL.

If theoretically, 1 pound of coal contains from 13,000 to 14,000 thermal units, and 55 per cent. or 7000 to 7700 thermal units are lost, the most natural conclusion is that the excess of heat goes up the chimney and can be utilized in heating water; yet this is probably not true, as in most cases the temperature of the gases will be very little, if any, above the temperature of the steam. Let us suppose that the gases pass into the flue or chimney at a temperature of 400°, or slightly above the temperature of the steam in the boiler at 60 to 65 pounds pressure, or 307° to 312°, with a grate surface of 1 square foot, capable of burning 12 pounds of coal per hour; then we should be able to impart 4800° or units of heat to water, or some equally good conducting substance for every square foot of grate surface used, or enough to raise the temperature of about 25 cubic inches of water from

* Read at the Chicago convention of the Master Steam and Hot-Water Fitters' Association of the United States.

40° to 212° of sensible heat for every pound of coal burned.

In other words, 45 per cent. of the heat of the coal is transmitted through the iron of the boiler into the water, 25 to 30 per cent. is used in igniting new or fresh coal and burning itself, and 25 to 30 per cent. passes into the chimney as waste, or to maintain the draft, and 15 per cent. of the last 25 or 30 ought in some way to be utilized.

If we remember that 1½ square feet of heating surface in a feed-water heater using exhaust steam from an engine will raise the temperature of 1 cubic foot of water per hour from 40° to 210°, and, as the engine exhausts through the heater into the atmosphere, the temperature of the steam cannot exceed 320°, as was the result of a test made on a new heater about six years since, why may not some part of the hot gases passing into the atmosphere from one or more boilers be made available?

The writer of this paper desires to leave this question open at this point, trusting that future experiments and practice may demonstrate or evolve some points for future economy in the use of coal, by using the ideas herein suggested.

Early History of Wrought-Iron Gas Pipe.*

BY R. T. CRANE, CRANE COMPANY, CHICAGO.

The demand for wrought-iron pipe began with the invention of illuminating gas, but the introduction of illuminating gas at first was very slow in consequence of prejudice and want of appreciation of its importance. About the time of the invention of illuminating gas, which was in the latter part of the seventeenth century, the long war between England and France was drawing to a close. It had made a great demand for gun barrels, which were largely made at Wednesbury, England, and at its close it left a large amount of this stock on the market, which (there being no other demand for it) was used for the small gas tubes by screwing the small end of one tube into the large end of another. This supply apparently covered the demand for small tubes for some time and the larger ones were made in the same manner.

In order to understand the invention of gas-tube welding it is necessary to describe the welding of gun barrels. This consists of taking a properly prepared piece of iron of the right dimensions, drawing the edge down thin, heating it, then rounding it up until the edges lap one over another. In this form it is called "skelp." It is heated in a forge fire, a few inches at a time; then a bar of iron is put on the inside, to give support to the iron while it is being hammered down on the outside and the weld made. Then it will be seen that only a few inches could be welded at each heating of the iron, making the process a very slow one, and the barrel, when the welding was completed, was left in a very rough and unfinished state.

EARLY GAS TUBING.

It appears, from the best information we can get that about the year 1825, and in order to meet the largely increased demand for gas tubing it became evident that some better mode of manufacturing gas tubes should be sought for than the process of welding gun barrels. James Russell, in company with his brother John (who had been gun-barrel and gas-tube makers at Church Hill since 1811) appreciating this fact, set about making an improved gas tube. He concluded that it should be of a uniform thickness of iron, and also, as the pressure of gas was merely nominal, that there was no necessity of so strong a weld as that of the gun barrel. He conceived the idea, and patented it, of welding his tube by butting the edges of the iron together instead of lapping, as in the case of the gun barrel. This invention was a great step in advance of this art, and enabled him to make his tubes much more cheaply and rapidly, and also of vastly superior finish. Still, compared with a later process, a description of which will follow, this production was very slow, as he was obliged to heat and weld it only a few inches at a time, after the manner of welding gun barrels.

To make this gas tubing complete it was necessary to have a device for connecting pieces of pipe, as the method employed in the case of the gun barrels was not practicable in this case, the iron being of uniform thickness. He now invented the socket, which is a short piece of pipe with a thread on the inside to fit a corresponding thread on the outside of the gas tube, the pipe being screwed in each end of the socket, thus making any desired length of pipe. The effect of this improved process was to so cheapen and beautify the article as to greatly increase the demand for it, and it seems that the invention made a great sensation in England. But this particular process of manufacturing must have been very short lived, it being patented in January, 1825, since it was followed by the patent of Cornelius Whitehouse in February of the same year for butt-welding tubes by drawing them through a die. This method of welding tubes being brought to the attention of James Russell, he saw its importance, bought it and immediately proceeded to manufacture his tubes under this patent.

BUTT WELDING.

Mr. Russell recognized the principle of the strength of a circle—that is, when the iron for a tube is rounded up any amount of pressure may be brought to bear on the outside without danger of collapsing the iron, and this pressure was necessary to force the edges of the iron together in making the weld. His process of doing this was to heat a small piece of the iron, then place it between two semi-circular dies smaller than the iron which necessarily forced the edges together, thus making the weld.

To return to the Whitehouse patent, and to make clear the principles involved in it, it may be stated that he takes such dies as Russell used, makes one end of them bell-shaped and fits them in a pair of tongs. He then takes a piece of the rounded-up iron called "skelp" and puts about half its length in the furnace, heating it to the welding heat. The die is then pressed on the iron, and by means of an endless chain the iron is pulled through the die. The die being smaller than the iron crowds the edges together, thus making the weld.

The principle involved in the Whitehouse method consists in the manner of applying the pressure to produce the weld; that is, he produced it by drawing the iron through the die, and Russell by compressing the dies. So, to give proper credit for these advances in the art, it should be said that Russell is entitled to the credit of discovering that a tube with a butt-weld is sufficiently strong to stand all ordinary pressure, and that a sufficient pressure can be brought to bear upon the circle of the iron to produce the weld. Mr. Whitehouse is entitled to the credit of discovering that the pressure to produce the weld can be obtained by drawing it through the die, which is simply an improvement upon the principle that Mr. Russell discovered; yet it was an invention of very great importance, as it enabled him to make tubes a hundredfold more rapidly, and also of a superior weld and much longer. Strange to say, this process has never been improved upon, and is the one in universal use for the manufacture of the small tubes at the present time.

The result of the Russell and Whitehouse improvements is the production of an article of great utility and beauty at an exceedingly low cost.

As an evidence of the importance of the advanced process of Russell and Whitehouse it may be stated that they paid as much for welding the gas tubes under the gun barrel principle as the finished, vastly superior product, is being sold for to-day.

LAP-WELD TUBE MAKING.

The above mentioned events took place in the early days of gas engineering, and, while engineering was also being developed, steam it had not, up to this time, reached any great degree of magnitude. But now its importance began to be more particularly recognized in connection with the building of railroads and locomotives, and through the discovery by Stephenson of the tubular boiler. This created a demand for a larger and different line of tubes, for which the butt-weld was not adapted, as the tubes were required to be much larger, and stronger in the weld.

It was evident that the only way to produce an iron tube suitable for these demands was to make it with the lap-weld, as in the case of the gun barrel, and while it would have been possible to make lap-weld tubes of uniform thickness and moderate length by the methods employed in gun-barrel making, it is evident that the process would have been too slow and expensive in operation, and the product too limited in length to meet the demands of steam-engineering.

At this time—which must have been in the neighborhood of 1830 or 1835—the Messrs. Russell appeared to have appreciated the importance of manufacturing a new line of tubing, and set about making the machinery necessary for it. To accomplish this was quite a different task from that of producing the butt-weld tubing, as it called for the highest order of mechanical skill and ingenuity, and there is no doubt that it cost the Messrs. Russell a large amount of money in experimenting before they perfected their machinery. They must have met with untold difficulties and annoyances in perfecting the machinery and furnaces, which only persons who have gone through similar ordeals, though having the benefit of their experience to commence with, can appreciate. They were certainly men possessing extraordinary courage and perseverance to contend successfully with apparently insurmountable difficulties.

THE JONES PROCESS.

About this time, or a little later, Martin Jones commenced experimenting in the same line. He also encountered many difficulties, exhausting his own and his wife's fortune, and in order to save something from the wreck, placed his invention in the hands of a friend, who betrayed him, appropriating it to his own use, improved it by continued experiments and patented it in his own name. He then took into partnership with him two gentlemen of large means, named Lindsam and Bowers, of Birmingham, where they established their works and produced the tubes on a large scale, there appearing to be at once a great demand for them. It is said that this purloiner of the "Jones" idea received for it during many years more than $100,000 royalty annually.

The difference between this and the Russell process appears to be only that the Jones made use of four rolls in the welding machinery and the Russell only two. The firm of Lindsam & Bowers, who were working under the Jones idea, brought suit against Russell for infringement of their patent, which developed into a bitter contest, involving the expenditure of $2,500,000 and resulting in victory for the Russells.

MODERN LAP WELDING.

The process of lap-welding is as follows. The sheet of iron is rolled to the desired thickness, width and length. The edges are then scarfed, as in the case of the gun barrel. It is then drawn, while red hot, through a bell-shaped die, by means of an endless chain, which rounds it up and laps one edge over the other. The whole length is put in the furnace and heated to the welding heat, afterward pushed out of the furnace at the opposite end into grooved rolls of a size corresponding to the size of the pipe. The inside lap is supported by a ball attached to a long bar of iron which holds the ball in position in the roll. The ball and the iron and the groove of the roll all correspond, so that the roll exerts a sufficient pressure upon the iron and the ball to force the laps of the iron firmly together, thus producing the weld.

The entire process must be perfect in order to insure success; that is, the bending and lapping of the iron, the heating of the furnace and the adjustment of the rolls and balls must all receive the most scrupulous attention. This operation is one of the most beautiful in all the mechanical arts.

After the process of welding, the crude piece of pipe is passed through other rolls to give it the correct diameter, and again through others for the purpose of straightening it.

If the tubes are to be used in boilers they are only cut off the desired length and tested, being then ready for use. If the tubes are to be used for steam pipe, the ragged ends are cut off, screws cut on both ends and a socket put on one end. The tubes are then tested and are ready for the market.

Probably the production of no other line of goods has ever created such a sensation as this, and never were manufacturers so harassed by pirates in the trade as were the Russells. It is a satisfaction to know that they successfully combatted all oppression and were successful in maintaining their patent, and that finally success crowned their enterprise, invention, skill and perseverance. The firm conducted business for many years, through different combinations of the Russell family, under the name of the Crown Tube Works, Wednesbury, Eng-

* Read at the Chicago Convention of the Master Steam and Hot-Water Fitters' Association of the United States.

land. As to the magnitude of their business, it is stated that in 1824 they made but 3000 feet of tube, while in 1871 the number of feet supplied by the same firm reached the enormous figure of 6,700,000. This may give some idea of what the output must be of the 35 or 40 mills existing at the present day.

HEATING NOTES.

THE KOHLER FURNACE & STEAM HEATING COMPANY, 24 Union street, Boston, Mass., will remove about July 1 to 93 Union street, occupying the basement and street floors.

HERENDEEN MFG. COMPANY, Geneva, N. Y., have their exhibit at the World's Fair in working operation in the greenhouse annex to Horticultural Hall, four No. 8 Furman boilers doing the work. The plant was installed by the Chicago house, who endeavored to make it a model of greenhouse heating. The overhead flow and return under bench system is used.

W. H. WRIGHT, who is attending the exhibit of the Powers Duplex Regulator Company at the World's Fair, is showing visitors a new pipe wrench, for which he is taking out a patent. He claims that its simplicity, strength and efficiency make it the "Wright" one to buy.

THE AMERICA HOT-WATER HEATER COMPANY, formerly of Beloit, Wis., are now thoroughly installed in the "water power" at Rockford, Ill., and, under the efficient management and superintendence of G. A. Houston, are busily engaged in the production of their heater. A comprehensive catalogue of their new apparatus is now in preparation.

IN ADDITION to the well-known Plummer steam heater and Leader hot-water heater, the Putnam Foundry & Machine Company, Putnam, Conn., are putting on the market a new sectional boiler for steam or hot water. This apparatus is called the Putnam, and has capacity from 800 to 1500 feet of radiating surface. It has not as yet been shown to the trade at large, but a number of them are in operation in the locality. The plant of the Putnam Company has recently been largely re equipped, new engine, boiler and machinery having been added and a new building erected.

L. H. CHUBBUCK & CO., Boston, Mass., publish a catalogue describing hot-air furnaces, ranges, boilers, &c. The hot-air furnace is said to be made for use and abuse, its solidity, weight of material and durability being its particular features. The steam and hot-water heating apparatus made by this firm is a boiler consisting of vertical sections, comprising front, back and intermediate sections, all of which are connected by screw joints to secure safety from leaks, and it is further pointed out that all the connecting pipes can be removed and replaced without disturbing the brick work. The catalogue shows the forms of the different sections, and descriptive text explains very fully their special features.

RUSSELL WHEELER & SON, Utica, N. Y., issue a greeting to the trade in the shape of a pamphlet containing numerous testimonial letters showing what the Palace King boilers have done and are doing. Along with the circular is also a revised price-list for insertion in their hot-water catalogue. The pamphlet is of oblong shape and the testimonials are printed on thin paper on one side of the sheet only, each letter being neatly inclosed in a border, giving a pleasing effect. The testimonials refer to the record of the Palace King during the winters of 1890, '91 and '92.

WHETHER steam pipes will set fire to wood or not is, observes an English exchange, one of the questions which will never wear out. It seems clear that as long as no change occurs in the wood a steam pipe would scarcely set it on fire, as the temperature required to ignite wood is much higher than steam is commonly used at. But the danger lies in the fact that by continuous exposure and contact with the heated pipe the wood undergoes a slow but sure change in its condition, and becomes very little better than tinder. In that state, while it would perhaps not take fire from a steam pipe, a sudden rusting of the pipe might possibly generate enough heat to set fire, as is the case in rapid oxygenation of linseed oil, for instance, when mixed with waste or sawdust. But the danger from a pipe passing through a partition in plain sight would not seem to be imminent.

THE BELKNAP MFG. COMPANY, Bridgeport, Conn., issue a tasteful catalogue and price-list of brass goods for steam, gas and water, which they manufacture. The pamphlet is of convenient size and contains some 60 pages, bound in green paper, the front cover being decorated with a graceful scroll in gilt and the name of the Belknap Mfg. Company, together with a representation of a valve. The first goods noted in the catalogue are radiator valves of various sorts, check valves, elbows, air valves, &c. Then come globe valves and angle valves, straightway check valves, safety valves and other goods, followed by steam whistles, steam cocks, gauge cocks, water glasses, oil cups, unions, hose couplings, hose clamps and other goods. The whole is got up in a neat fashion and will be valued by the trade.

THE WILLIAM H. PAGE BOILER COMPANY, Norwich, Conn., favor us with a batch of circulars and other advertising matter that contain many points of interest in the steam and hot-water heating line. Two of the publications are small illustrated and descriptive circulars of the boilers made by this concern. One relates to the Volunteer in forms adapted both for steam and hot water. The apparatus is very thoroughly illustrated by means of sectional and other views, and complete descriptive text accompanies the cuts. An interesting heater shown in this book is the No. 1 Volunteer, which has only one section and is designed to be set up in a back shop for heating that room, and also a front or sales room by means of radiators. It can also be used for heating small cottages containing three or four rooms, as well as brooder houses for raising chickens. This boiler is adapted for work about which many inquiries are made. A similar circular to the one above mentioned illustrates the All Right boiler made by the same concern. The firm also issue little pamphlets of testimonial letters, as well as a *fac-simile* testimonial reprinted from the Norwalk *Gazette*.

The establishment of new cotton mills goes along at a merry rate in the South. *The Manufacturers' Record* says that the activity displayed in this direction during the past 12 months is unprecedented, and that if the number of new concerns continues to be augmented at the same ratio as in 1892 the present year will see a still greater development of the industry. From January 1 to June 1, this year, there have been formed in the Southern States 60 new cotton-mill companies, many of whom have the erection of their plant well under way, while a number are already in active operation.

Aspects of Trade in the Northwest.

From the Loyhed Tinware Mfg. Company of Seattle, Wash., we have received the following interesting information in regard to the present conditions and future prospects of trade in that section of the country. Writing under recent date, they say: Aside from the salmon packing, most of the other canners in this Pacific Northwest are just beginning, but so far have been uniformly prosperous, and their output is constantly increasing. This is particularly true in the line of canned fruits, for while California stands far ahead of us, there are many here who are starting in an exceedingly small way, and they are in the business to stay, because we grow many fruits of as fine quality and flavor as any other locality can possibly produce. Popular opinion in the East does not coincide with this, but facts must eventually overcome a mistaken idea, and the time is not remote when certain Washington fruits will be regarded as standard.

The spice trade is also doing well, because we are nearest the Pacific Islands that produce so many spices. Trade in general has not been for some time up to the standard of former years among the retailers, but the local jobbing trade has gained steadily for the past five years, which goes to show that the dullness has been caused more by overcrowding in the retail ranks than by a falling off in actual consumption. Our fisheries are being slowly developed—notably cod and halibut, which are paying extremely satisfactory returns to those who have invested in that industry. The competition arising from the building of the Great Northern, which now gives Puget Sound three transcontinental railroads, places it in a commanding position as regards freight rates, and the steady development of the coal and lumbering industry seems to indicate that we are to be a commercial people, not confined to one or two staples or to narrow lines.

While trade depression is general throughout the country, we do not believe it is as great in Washington as in many other places. Not all our Seattle banks are in the clearing house, but those that are have a capital of over $2,000,000. The last bank statement shows that their reserve was 40 per cent. in the average, which is sufficient argument as to their condition. While croakers here and in the East are gleefully prophesying a disastrous future for our corner of the United States, conservative business men are satisfied both as to the present and the future, and their opinion is entitled to weight.

The weather in the South has not been favorable for the cotton crop. The planting season opened much earlier than last year, but owing to the unfavorable weather the advantages gained have been generally lost and crop conditions at present are about on a par with those at this time last year. Taken as a whole, however, the prospects are somewhat better than they were a year ago.

STOVE TRADE NOTES.

Exhibits at the World's Fair.

Heating and Cooking Apparatus.

WROUGHT IRON RANGE COMPANY

of St. Louis make a very good display of their Home Comfort steel ranges. The pavilion is inclosed with a white and gold railing along two sides, the other two sides being solidly paneled to a ceiling which is laid off in panels of a geometrical outline. A conspicuously painted sign informs the passer-by that 258,460 Home Comfort ranges were sold up to January, 1893. The goods shown comprise a variety of the company's products, such as a double hotel range in natural steel finish, a charcoal broiler, a full nickeled family range, a 7-hole range with double oven for boarding house or restaurant, a plate warmer large enough to supply a 200 room hotel, a four-door sand oven for the purpose of cooking pastry or roasting meats; an egg boiler with four baskets and two and a half and three minute glasses; a combined steam table and carving table, used principally for keeping food warm, manufactured of 22 ounce copper instead of galvanized iron as has heretofore been customary; and a battery of urns for hotel and restaurant use, composed of a central urn, to be connected directly with a steam pipe, in which water is heated, which is syphoned as needed into a tea urn on the left and a coffee urn on the right, the whole outfit being handsomely nickel plated and resting on a polished Tennessee marble slab. The company had intended to make a very elaborate exhibit of their goods, expecting to get a space 36 by 82 feet, but were cut down to 10 by 11 feet, which was afterward increased to 11 by 25 feet, and on this contracted area they have managed to do very much better than was expected. A range was sold last week to the Commissioner-General of the United States of Colombia, to go to Bogota. It will have to be packed in three packages for carrying 200 miles on muleback. The visitors to this pavilion were favored with a miniature malleable cast skillet as a souvenir.

THE ROUND OAK STOVE WORKS,

owned by the Estate of P. D. Beckwith, at Dowagiac, Mich., have a space of only 11 x 15 feet, very much less than they should have for an adequate representation of their line. It affords merely room enough for a row of oak stoves round three sides, nine in all. A gold-plated oak stove will shortly be in position in front, work on it not having been completed at the time of the writer's visit. This stove is one of the company's standard stoves, No. 16. The beauty of the plating will attract attention. This establishment, as is well known, makes nothing but oak stoves, and makes them well. The display, therefore, lacks the variety of most stove exhibits, but is nevertheless interesting for this very fact. Heavy circular columns support a silk canopy for a ceiling. Large portraits in oil of Mr. Beckwith are on three sides of the top of the pavilion. An oak stove in flowers is to be a permanent feature of the exhibit.

THE BOON RANGE COMPANY

of Cleveland and Galion, Ohio, have evidently not yet completed their arrangements. They have a row of steel plate wrought ranges, consisting of a six-hole range with incloased hot-water reservoir and elevated hot closet; a six-hole range with charcoal broiler and elevated hot closet; a plain six-hole range with elevated hot closet and a four-hole gas range with elevated hot closet. The oven doors in these ranges are made to drop, but they are then firmly supported by hinged brackets, which automatically fall into place, giving very rigid support. The hot closets have revolving doors, lifting up from the bottom, opening the whole interior at once.

A. A. GRIFFING IRON COMPANY

of Jersey City, N. J., have managed to make a very creditable exhibit in rather cramped quarters. As a background they built a rack of heavy lumber with three shelves, covering the whole with black cloth. Radiator loops and valves in graded sizes occupy the extreme top; small radiators, in square patterns principally, flanked by cans of Bundy radiator enamel, come on the next shelf below; a glass case of samples of Bundy Bavarian bronze powder has the central position on the next shelf, with radiator loops, radiator feet and radiator fittings in graded sizes on the left, and three and four flued ornamental patterns on the right, with valves and other fittings strewn about. Nickel-plated escape cocks decorate the fronts of the shelves. The floor space is then devoted to a varied assortment of radiators, embracing square loops with roughened surfaces, oval-topped, floral-topped, beaded-topped, plate-warmers, corner radiators, circular radiators, &c. The

S. B. TRAUB RANGE COMPANY,

manufacturers of the World's Best steel ranges, 435 State street, Chicago, show a large double oven French range, with some notable special features. The fire box is rectangular, with revolving grate bars, each operated separately. The feed door is made with diamond-shaped sides, overhanging the lower part of the supporting extension, so that when open the sides are brought firmly in contact with the front of the range, the lid thus making a straight chute or feed pouch into the fire box. The ovens are furnished with tile bottoms, finished in a pleasing design, while the drop oven doors are not only supported by an automatic bracket but also have a stiff spring to assist the closing of the door in place of a counterbalance. A charcoal broiler is also shown.

EDWIN A. JACKSON & BRO.,

50 Beekman street, New York, make an excellent display of their heat-saving and ventilating grates. One of them is shown set on an elevated platform, so that the method of admitting air from below can be demonstrated. Others are exhibited in tile setting, with tiled hearths, just as they would be placed in living rooms. Unmounted castings are also shown of the ventilating grate and the combined grate and furnace, intended for heating more than one room.

THE HUETTE-BARLER MFG. COMPANY

of Chicago make a very showy display of Barler's Ideal oil heater. The space used is small but judiciously handled. The company's name in raised gold letters on a black velvet atrip appears on a light blue background, forming a rear wall. In front are two rows of stoves, some in plain sheet iron, some in full nickel and one in full brass. Barler's roller base is shown in various styles of finish, and also Barler's shoe-blacking outfit. A convenient post enables a couple of oil heaters to be placed on high on brackets, attracting more attention.

KELSEY FURNACE COMPANY

of Syracuse, N. Y., exhibit Kelsey's corrugated furnace, the display being devoted exclusively to warm-air and hot-air heating. For the purpose of more thoroughly explaining the construction of this furnace to visitors a section of the side of one has been cut out. The principle upon which the furnace is constructed is that of bringing the air through numerous flues in as close and continuous contact with the heat of the fire as possible. For this purpose vertical flues are used, cast with corrugated sides, placed round the combustion chamber. The flues, are almost V-shaped in cross section, so as to stand closely together in the circle. The upper parts of the flues overhang the combustion chamber somewhat. The lower interior parts of the flues form the combustion chamber or fire pot. The amount of heating surface secured by the corrugated flues is evidently much greater than in ordinary constructions, while the flues can, if desired, be coupled directly to pipes leading to separate rooms, so as to force the distribution of heat. Ordinarily the heated air is accumulated in the common air chamber at the top of the furnace and sent thence to different rooms. Several sizes of this furnace are shown, one being finished with a planished iron jacket.

EDWARDS PARLOR LAMP STOVE COMPANY

of Chicago show a number of varieties of their lamp stoves. Among them is a double heater, having two lamps, one on each side of a frame having a top with two cooking holes. When not used for cooking, the top is covered by a lid with holes for the escape of heated air. It is claimed that this heater will warm a room 30 feet square, 10 feet high. Lamp stoves for barbers' use, student lamps for heating and lighting at the same time, and other lamp stoves for heating ordinary living rooms are shown. These lamps can be taken from below the circulating stand and set on top of it, thus forming a piano lamp.

JAMES STROUD,

1263 Broadway and 529 Sixth avenue, New York, exhibits Stroud's self-basting roasting pan. There are two pans used for this purpose. The lower one is partly filled with water, from which steam arises, passing through holes in the sides of the upper pan, thus doing the basting automatically which is usually done by hand. The upper pan is made of steel, full enameled in blue and white. Corrugations on the bottom of the pan enable the contents to be surrounded by hot air for browning, while a depressed bowl collects the gravy in one corner of the pan.

THE NORTHWESTERN STOVE REPAIR COMPANY,

Chicago, who make repairs for 70,000 stoves and ranges, show a large assortment of parts of stoves, indicating what they are prepared to supply to their customers. Fire pots are built up in pyramids, running from very large ones at the bottom to very small ones at the top. Range fire pots are shown on racks built step fashion. A huge frame decked with scarlet cloth stands as a background to the exhibit, covered with flat parts of stoves.

THE LAURA NEVINS RANGE & HEATING COMPANY

of St. Paul, Minn., exhibit three of their curiously shaped Laura Nevins ranges. These ranges are construced with a circular front and a square extension in the rear. In the center of the front part is a circular fire pot surrounded by cooking holes. The rear contains two ovens. A duct, opening at the floor, supplies air to the range, which can thus also be used to heat other rooms.

DANGLER STOVES AND RANGES.

A glittering sign advises, "Use the Dangler Gas and Vapor Stoves," over a display of the Housekeepers' Delight and Volunteer vapor stoves made by the Dangler Stove and Mfg. Company of Cleveland, Ohio, and sold by D. S. Cook, Chicago. The steel tops and trays are finely japanned and ornamented with flower designs and landscapes, the frames being handsomely nickel plated. The burners are of the needle-valve character, provided with a stop to prevent damage by unskillful operation, and the air mixer has a governor. This display is a very fine one, showing all the varieties of stoves made by the company, and fully illustrating the high state of development reached by the gas and gasoline stove trades at this date.

THE TUTTLE & BAILEY MFG. COMPANY,

New York, by the combination of a triangle and a diamond, form a column with many sides for the display of their registers. It is finished in white, with gilt trimmings, having a ground of garnet silk plush. The registers for heating and ventilating make an attractive show, finished in gold, silver, various tints of bronze and black and white enamel. Of the designs used some are massive and elegant, while others are delicate and beautiful.

THE J. F. PEASE FURNACE COMPANY of Syracuse, N. Y., have recently made a contract with the Onondaga Dynamo Company for the installation of a complete electric lighting outfit, which will take the place of some apparatus which was installed in the company's foundry when the building was erected in 1887. A complete electric lighting plant is also to be installed in the company's works on Willow street.

The Manufacturer and the Jobber.

BY EUGENE W. BELSON, PHILADELPHIA.

The question is often asked whether it is more profitable to engage in the manufacture of stoves or to become a jobber.

At the first glance this question appears to the average reader one of very easy solution, with the advantage, if any, greatly in favor of the manufacturer; but to be as brief as possible without going deeply into figures, the writer, who has had some experience in both branches (from a financial point of view) is inclined to favor the jobber, for the following reasons: In the manufacture of stoves, with its large amount of invested capital, from the erection of the plant, its completion and in complete running order, the manufacturer's life is anything but rosy. His associates must be men of thorough practical knowledge, sound judgment and good readers of human nature.

The necessity of keeping in stock a large assortment of his product, in and out of season, ready at a moment's notice to meet the demands of the dealer, requires large amounts of capital, which is practically sunk until fall. He at times (not always) relies on the suggestions made by his traveling men for such alterations and improvements in patterns which from their observation and judgment are warranted. He is, or should be, careful not to sell directly or indirectly to the consumer, else the dealer stigmatizes him as a robber. In fact, a thousand and one complaints and annoyances fall to his lot, which require judgment, skill and tact to surmount. But aside from the above facts, the manufacturer is supposed to have sufficient safeguards thrown around him by his association, which fixes and regulates his prices to meet all necessary requirements, yet from the very formation of his association it has been known to be unstable. Outside competition, no doubt, is an important factor in the above complication, but it can undoubtedly be traced to self-interested zeal among the different members themselves rather than to any outside influence. The position of the manufacturer appears to be getting more and more uncertain. It is quite noticeable to the jobber that the tendency of the manufacturer is to enter into competition, noticeably in gasoline, oil and gas stoves, thus showing a want of stability in the manufacture of his own product.

But the jobber, outside of his original investment, situated as he is with an open market from which to select his numerous wares, has none of the above obstacles to contend with. His judgment in the selection of marketable goods must be broad and liberal, a man of far-reaching capability, quick to grasp and hold a good thing when he sees it. It must be borne in mind that it is an utter impossibility for the jobber to handle with profit stoves exclusively. In the selling of stoves, side lines form an important adjunct. They are, in fact, the bulwarks of his business, for what he loses on one he gains on another. Besides, he has four seasons in which to dispose of his wares, whereas the stove manufacturer has only one. His stock must be kept constantly replenished, for in this, one of the most important essentials, rests his success. With his various and unlimited resources at command, his position when placed as an antagonist to the manufacturer becomes formidable. His position in the market becomes more tenable in proportion to any weakness displayed by any association or combination. There should be the utmost reciprocation, as far as mutual interests are concerned, and closer ties binding manufacturer and jobber for mutual benefit.

A Degreeless Doctor.

It was several years ago that the title M.D. was conferred upon E. B. Doolittle of the Richardson & Boynton Company, and it came about in this fashion. On one of his autumnal trips, Mr. Doolittle struck the town of Salem, N. J., and was invited by a hospitable dealer to attend the Woodstown Fair, which is one of the best of the annual agricultural exhibitions and is famed throughout that end of the State. People come for miles around to view the prize cattle and gaze with wonder on the woolly pig, the hairless dog, two-headed calves, &c., and to participate in three-shots for-five-cents or the wheel of fortune, and sometimes to investigate the mysteries of a little entertainment called the plate game. Added to the other attractions that go to make up a county fair, there was the usual horse trot, in which old Bill Brown's gray mare led all competitors in the event for 16-year-olds. Perhaps it was during the crush to see the finish of this heat that the accident occurred which brought our friend Doolittle into prominence. Going back a little in the narrative it is necessary to state that the host of the occasion was somewhat of a wag, and on their arrival at the grounds Doolittle was introduced to a number of ladies and gentlemen as Dr. Doolittle from Mt. Vernon, N. Y., and the title was let pass without contradiction as one of the host's jokes. However, this was a fatal mistake, as subsequent events prove, and, as we said before, it was probably during the excitement attending the victory of the gray mare, that a man had a fit and everybody rushed to render assistance and every other body called for a doctor, whereupon one of the ladies who had been introduced to Dr. Doolittle spied him in the crowd and sent her husband for him post haste, at the same time assuring the crowd that everything would be all right, as her husband had gone after a physician, who would be there in a few seconds. By this time Doolittle had gotten wind of his predicament and had turned heel to, with toes pointed toward the refreshment tent, whither he directed his steps with vehemence. It was no use, for the messenger sent caught up with him and insisted upon his returning to render professional services to the unfortunate individual in the center of the crowd. Doolittle endeavored to explain the joke and protested that his degree was not regular and that his specialty was not fits. In the meantime he had been hurried against his will toward the crowd and with each step nearer the patient he was growing more excited, all the time endeavoring to explain to his captor the true situation. Just here is where Doolittle's great luck stood him in good stead, for as he reached the point where it was do something or run, the crowd fell back and disclosed the sufferer pulling himself together and rising to his feet completely recovered. Our physician here breathed a suppressed sigh of relief, and put up a large and elegant bluff, feeling the patient's pulse and assuring the crowd

that he would be all right if he kept out of the hot sun and avoided excitement. Refusing a fee and retiring gracefully, Doolittle started off on a search for the man who had unconsciously gotten him into such a scrape. What passed between them is not reported, but it is known that Dr. Doolittle and party soon left the grounds and after a visit to the hotel drove away in the direction of Salem. In that part of the country he still has fame as a specialist on fits.

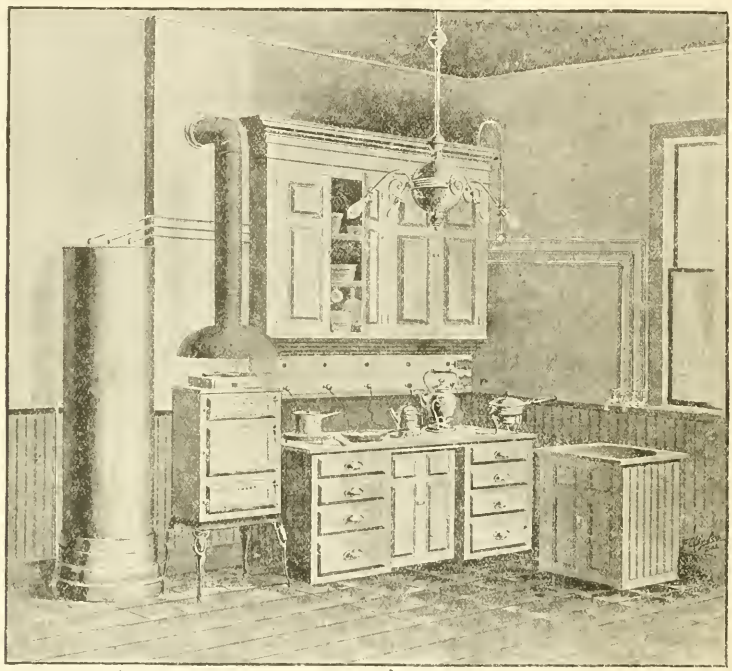
Rathbone, Sard & Co.

A substantially bound and well-arranged stove catalogue, covering an extensive line of specialties, is that which has recently been issued from the press by Rathbone, Sard & Co. of Albany, N. Y. It is a volume of 156 pages, printed in black ink upon a good quality of calendered paper, and bound in flexible covers of red, carrying side titles in silver. The corners of the pages are rounded and the edges finished in bright red, giving to the volume a rich and finished appearance. The opening pages are devoted to a statement of terms, some remarks about Acorn free advertising material, a comprehensive index, views of the company's foundries at Albany, N. Y., and Aurora, Ill., and of their warehouses in Albany and Chicago. Sectional views of stoves are given, showing the system of oven ventilation employed, and also the fire box of the National Acorn range, which has proved very popular with the trade. The line of ranges shown are made under the generic name Acorn, with such prefixes as National, Magnet, Puritan, Penn, Duplex, Pacific, King, Prince, &c. We also notice the Eureka, Senator, Citizen and Home ranges, made in various sizes and the usual styles. The cook stoves embrace a large assortment and are offered under such names as the Iron, Live, Regal and Beech Acorns. The heaters are illustrated and described in the closing portion of the catalogue, the leading place being occupied by the Art Westminster, well known to the trade. The Acorn Art Parlor, a handsome construction made in two sizes for hard coal; the Royal Acorn of graceful proportions; the Princess Acorn for hard coal; the Mohawk base burner; the Eastern Acorn, an attractive, revertible flue surface burner; the Square Oak Acorn, made in several styles and sizes; the Glen Oak, a new low-priced heater of attractive appearance; the Floral Acorn, a cottage parlor stove for wood, and an interesting line of Todd box and cylinder stoves, are among the other constructions to which attention is invited. One page is devoted to the Tropic Vapor stove, provided with removable cartridge in the stand pipe, and in connection with which a price-list is given of Junior stoves and ovens. The catalogue is neatly gotten up and carefully arranged with a view to meeting the requirements of the trade.

WE UNDERSTAND that the Detroit Stove Works have purchased a strip of land fronting 200 feet on the east side of La Salle street, south of Twenty-ninth street, in Chicago, for the purpose of erecting thereon a five-story warehouse of brick and stone. The building will cover an area of 200 x 112 feet in size, and is estimated to cost about $50,000.

Heating and Cooking by Electricity.

The American Electric Heating Corporation of 274 Purchase street, Boston, Mass., have recently brought to the attention of the public a number of electrical appliances for heating and cooking purposes. A few of the applications of electricity for the purposes named are illustrated in the engravings presented herewith. Fig. 1 represents a model kitchen, fitted with boiler, roasting and baking oven and various cooking utensils, the heat for which is supplied by electrical currents; Fig. 2 represents what is known as a plate stove, while Fig. 3 is a coil heater. The ovens, hot-water circulating boiler, and some of the other continuously operated apparatus are so constructed that "the temperature can be varied within wide limits without the use of exterior resistance." In referring to the electrical oven the makers state that the heat, which is largely radiant and of great intensity, is produced evenly all around the oven, the effect being so perfectly uniform that it is unnecessary to baste the meat or turn the bread or cake while cooking. The electrical broiler is so constructed as to meet the requirements of the case, and it is claimed that steaks and chops can be cooked in the usual time with entire satisfaction. All the apparatus made by this concern are constructed for operation on either direct or alternate circuits having a potential of from 25 to 118 volts, with the exception of that for heating air. Electricity is also employed in connection with a variety of apparatus for industrial purposes, such as soldering irons, tailors', dressmakers' and hatters' use, &c.



Heating and Cooking by Electricity.—Fig. 1.—Kitchen Fitted with Electrical Appliances.

The system of electric heating for street cars which is being introduced by the American Electric Heating Corporation consists of a generator divided into heat and chemical chambers, to

Fig. 2.—An Electric Plate Stove.

which is attached a coil of pipe for supply and return, which is screwed on the front of the riser in the seat. In this electrical apparatus is a coil composed of an alloy of high resistance, and having a high fusing point. This coil is placed within a compound which stores the heat for a long period. The heat generated in the heating chambers is absorbed by the chemical solution that fills the generator and is transmitted through the pipes, that present large area of radiation. Thus by circu-

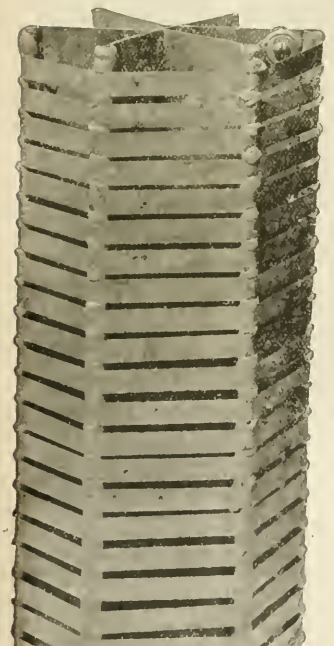


Fig. 3.—Coil Heater.

lation the chemical parts with its heat in the car, returning to the generator as it cools, to be again charged with thermal units, and once more diffused into the car. The makers claim that the use of this apparatus results in a uniform temperature throughout the car, which is comfortable, despite the steady influx of cold air incident to the constant opening of the door. The running expense of the system is said to vary in each locality, being governed by the price of coal and the efficiency of mechanical and electrical apparatus employed in conversion.

Traveling Salesmen.

We have before us a letter from an enterprising dealer in the Empire State who discusses some of the points touched upon by C. S. Prizer in his paper read before the stove manufacturers at their recent convention at Chicago. Among other things he says:

I have been much interested in Mr. Prizer's article published in *The Metal Worker* of June 10 entitled "Traveling Salesmen." My interest is not so much on account of the salesmen as it is in that portion of the article under the head of "Marketing Goods," and from there on to the end. Mr. Prizer says that general savings cannot increase general profits because of general competition. He also says that interest and profits rise and fall together. Inasmuch as profits are simply wages contingent instead of wages fixed, he might have gone further and stated the fact that interest and wages of all kinds have, on the whole, declined together. He says also, that too much productive ability is not possible while there exists a class of human beings whose wants are not supplied. Does he not see the cause of this strong competition for business or work. It stares him in the face. It is plain to whoever will look for it. Competition for work tends to decrease wages—competition for business tends to decrease profits. Competition of capital for a chance to use it tends to decrease interest. No work can be done, no business can be carried on, no capital can be created or used, without the natural raw material to use, which material cannot be made by men, but which is furnished to mankind free of charge by the Creator.

But this material under our infernal system of private ownership of land is absolutely controlled by a part of the people, and the same competition which decreases wages, profits and interest, increases the price of natural materials. Just as land values go up so must wages, profits and interest go down. The more capital and labor must pay for materials the less there will be left for capital and labor to divide between them. When a part of the people are allowed to own and control all the raw materials out of which all the people must get their living, that part of the people will own all the rest. Great fortunes will grow up without work, while the laborers will barely get a living. They who own the land need do no work, while those who have no land must work for both; and just as inventions and discoveries increase the demand for material so do they decrease the demand for labor. If the total wealth be expressed by $1, it is plain that capital and labor can have only what is left after the landowner is paid. If the ground rent is 40, the rest can be only 60. Now, if this private ownership of the people's means of living is right there is nothing to be done, but if it is wrong let us look into it and see whether or not a better way can be found.

New Works of the Joseph Bell Stove & Range Company.

The Joseph Bell Stove & Range Company commenced operations in their new works at Muncie, Ind., on Wednesday, May 31, with about 40 hands in the molding department. The buildings are of brick, constructed in a substantial manner and conveniently arranged. The foundry is 145 x 135 feet in size and has a capacity for 100 hands. There are two cupolas—one of 20 tons and the other of 4. The cleaning and mounting rooms occupy a building 200 x 60 feet in size, 2 stories in hight. In this structure is to be located the steel range, nickel plating and japanning departments. A 100 horse-power engine, with boiler, furnishes the motive power. The building is constructed in such a way that it can be readily extended at any time. The patterns are to be stored in a fire-proof room 60 x 60 feet, which will be erected as soon as possible. The entire plant is equipped with the latest improved machinery and appliances, and furnished with a complete system of gas, sewerage and water mains. The ground occupied includes about seven acres, upon which is located the company's gas well. A handsome and spacious office is now in process of erection, and which, when completed, will be two stories in hight. The second floor will be fitted up as a sample room, in which will be the office of T. E. Silky, who will have charge of the salesmen. We understand that the company will add a number of new patterns to their already extensive assortment. Owing to some delay in receiving machinery and material, it will probably be a short time before all departments are in running order, but work will be pushed forward as rapidly as possible until the plant is ready for operation to its fullest capacity.

The officers of the company are Joseph Bell, president; J. D. William, secretary; D. Walter Bell, general manager; and E. A. Dufrene, head bookkeeper.

ODD PLATES.

The Culter & Proctor Stove Company of Peoria, Ill., are the assignees of a patent recently granted to John E. Hunter of that place for a heating stove, in which is provided a draft at the top and which is delivered beneath a grated bottom adapted to be opened for the purpose of allowing the draft to pass through it into the fire, or to be closed to cause the draft to pass from the fire chamber above the grate directly into the smoke pipe. The top plate has one or more openings to receive vessels for heating water or other purposes, as may be desired. This top plate has a register for controling the draft. A swinging cover is provided for the top plate, and this cover has an opening coincident with the register

slide to afford access to the latter and allow free entrance for the air to the diving flue. This swinging cover provides a hot-air chamber, and from it the hot air passes into the draft flue.

A. Kohler & Co., 85 Union street, Boston, Mass., have issued a pamphlet of 14 pages, bound in colored paper covers relative to the Kohler hot-air furnace. This construction is illustrated by several engravings and described in a manner which makes clear the several features of merit claimed for it. Reference is made to the wrought iron of which the radiator is made, and to the heavy cast-iron fire pot, which is one of the features emphasized by the manufacturers. Attention is also invited to the Roxbury furnace, a low priced construction, having heavy steel radiator, cast-iron fire pot, shaking and dumping grate, cold-air box attached to the back of the casings at the bottom of the galvanized iron to receive the wood box, thus saving the expense of a cold air pit and to the capacious receptacle for the ashes. Some of the other pages are devoted to the Highland Grand and Prize Highland ranges, and to a long list of testimonials from many who have used the company's goods. Another feature of the pamphlet is tables giving dimensions of the Kohler and Roxbury furnaces and directions for using the heaters.

The Indianapolis Stove Company of Indianapolis, Ind., have been making some slight additions to their foundry with a view to increasing their facilities.

The Van Wie Gas Stove Company, Rockford, Ill., are having a demand for their No. 1 and No. 2 Eclipse ranges, which surpasses anything ever experienced by this company. It is pointed out that the fact that this stove is positively odorless does away entirely with the necessity of flues for carrying away disagreeable odors.

Anton Weiskittel of the firm of A. Weiskittel & Son, Baltimore, Md., is the patentee of a burner intended for use in connection with gas stoves. The device consists of an annular cup or receiver, having an open central air space, and provided at the upper edges of the inner sides of its walls with outwardly flaring beveled surfaces, forming a concaved seat. The annular top has, on its under side, inner tapering beveled surfaces fitted to the beveled bearings of the cup. The beveled surfaces of the top are provided with radial grooves running to its edges, and arranged alternately with the grooves in the under side. By this means the top is simply held in place by gravity, and all separate fastening devices are dispensed with.

Wood, Bishop & Co., of Bangor, Maine, have just brought out a combination hot-air and hot-water heater in six sizes. It is known as the Etna, and is referred to as being simple in construction and effective in operation. The fire pot is made in two parts, the upper half being hollow, forming the waterway. The water enters at one side, passes all around the fire pot, becoming highly heated in its passage, and then goes to the radiators, after which it is again returned to the fire pot, being heated to a higher temperature each time it returns. The makers state that with this combination rooms at any distance can be thoroughly warmed with hot water and the living rooms with fresh warm air, as the supply of cold air from the outside enters at the bottom and rising above the combustion chamber becomes thoroughly heated before being discharged into the hot-air pipes leading to the several rooms.

The Union Heating Company is the title of a new concern recently established at 92 Union street, Boston, Mass., for the purpose of transacting a general business in the sale of modern heating apparatus and the execution of all kinds of sheet metal work to order. They state that they have secured the general agency for the Superior warm-air furnaces, combination steam and hot-water heaters, as manufactured by the Superior Furnace Company. The superintendent and heating engineer is Walter E. Lyons, formerly with the J. F. Pease Furnace Company, and he will have direct supervision of the mechanical department. The company state that their equipment and facilities are first-class, and they are prepared to submit estimates, close contracts, and execute work in a first-class manner.

The Carton Furnace Company of Utica, N. Y., have just purchased the property adjoining their present plant, which will enable them to increase their productive capacity at least 25 per cent., this being the expected growth of their business this year. The City Council of Utica, on account of the company now owning the entire north frontage of the street, have changed the name of the thoroughfare on which the plant is located from Rome street to Carton avenue. The company state that the outlook for business is gratifying, and that up to the present time this year the sales of the Carton heaters are ahead of any previous year, the increase being largely due to the popularity of the goods which they are offering to the trade.

The J. F. Pease Furnace Company of Syracuse, N. Y., have recently finished the installation of their exhibit at the World's Fair and organized their office force. The exhibit is the object of a great deal of attention on the part of visitors, many friends of the company calling upon them daily. They state that they have already booked a large number of earnest inquiries from France, Germany, Italy and even Norway, while the inquiry from Americans who are either contemplating building or making changes in their heating apparatus are numerous. The company are much gratified with the results thus far obtained and consider their exhibit an excellent advertising medium. E. C. Moses, assistant secretary of the company, had charge of the installation of the exhibit and F. A. Tyler, heating engineer, is now in charge. We understand that W. K. West, assistant treasurer of the company, will be in charge of the exhibit during July.

Among the advertising novelties which are being distributed by the Michigan Stove Company is a pocket memorandum book of the general character which has become so popular with industrial establishments for advertising purposes. In addition to the pages for memoranda, we find tables giving the population of the cities of the United States and of the world, together with rates of domestic and foreign postage, and information likely to be found of interest to those visiting the city of Chicago. A yearly calendar for portions of 1893 and 1894 is a feature. Another novelty which the company are distributing is a card on one side of which is a reference to the Garland stoves and ranges, the statement being made that these are the only goods of their kind in which aluminum is mixed with the iron. This mixture, it is said, adds strength and prevents cracking. Reference is also made to the aërated ovens with which the goods are fitted. Still another scheme of advertising the Garland line of stoves is a prescription issued by "Doctor Experience," and reading as follows: "For tired feeling, induced by too hard work to sell goods, take up Garlands as a line with brains and push. Repeat daily until prosperity is no longer bearable. To be taken and tested before shaking."

James Morrison of Troy died on June 11, after having been an invalid for about seven years. He was born in 1812 in the north of Ireland, of Scotch Presbyterian parentage, and came to Troy with his parents in 1819. In 1835 he entered the grocery and lumber business as a member of the firm of Anthony, Morrison & Landon. In 1847 the firm was dissolved, and he engaged in the manufacture of stoves on Green Island. He continued alone for a number of years, and in 1854 the firm of Fuller, Warren & Morrison, now the Fuller & Warren Company, was formed. In 1860 Mr. Morrison resumed the manufacture of stoves on his own account, and in the following year the firm of Morrison & Colwell was formed, the business being carried on at Green Island. In 1865 the firm of Morrison, Colwell & Page was formed and a rolling mill was established in Cohoes. The firm has been continued ever since, Mr. Morrison's associates being Thomas Colwell and E. N. Page. A few years later the firm abandoned the manufacture of stoves, the members devoting their entire attention to the rolling mill industry. In 1876 Mr. Morrison became a member of the firm of Curtis & Co. of Cohoes, iron-pipe manufacturers. He severed his relations with this firm last January. In 1885 the Syracuse Tube Company was organized, to manufacture boiler tubes, Mr. Morrison becoming the president and one of the principal stockholders. He continued his connection with this company to the time of his death.

Grange Sard, vice-president of Rathbone, Sard & Co., is in Chicago attending the Columbian Exposition. His family are enjoying the trip with him.

Secretary Edward Bowditch of Rathbone, Sard & Co., Albany, spent the latter part of May in the Adirondack Mountains on a fishing tour. It is understood that he was very successful as a Waltonian.

The cultivation of beans and peas on cotton lands which have been overcropped is strongly urged on Southern farmers. Numerous varieties of these esculents are raised in India, China and Japan, which, apart from their edible uses, have other valuable properties, yielding oil and starch, while the stalks make an excellent fodder for cattle. These crops require little care, and some of them will grow on the poorest and sandiest soil.

According to a report recently issued by the Texas Agricultural Experiment Station, the cost of raising cotton in the Lone Star State is considerably less than 6 cents a pound. The cost in Georgia is 7.06 cents, so that the report is very flattering to Texas. It is further claimed that cotton can be grown in that State at less than 5 cents a pound.

Prize Competitions

$25.00.

As announced in previous issues the following competitions are now before our readers and remain open until the dates named:

Prize Competition No. 25.

SUBJECT:

Show-Window Display.

The subject of attractive show-window display is one requiring careful attention as an inexpensive and sure method of attracting and securing trade. This competition is designed to draw out suggestions as to the best methods of displaying goods, which may, if desirable, be illustrated by sketches and photographs. Prominent among the points which may be touched upon are the following:

1. The object of window display;
2. How this object may best be accomplished;
3. Kinds of goods especially suitable for window display;
4. The frequency with which displays should be changed;
5. Treatment of season goods;
6. To what extent goods in operation may be shown;
7. Suggestions for special and unique designs;
8. Arrangement of stands, shelving, &c., in windows;
9. Errors to be avoided in window display.

This competition will remain open until June 24, 1893.

Prize Competition No. 26.

SUBJECT:

To What Extent Are Manufacturers and Jobbers Justified in Selling to Consumers.

This competition is suggested by the fact that frequent complaints are made that manufacturers and jobbers interfere with the retailer's business by selling to his customers. It is intended to draw out the views of the trade on the subject. In discussing the question the following points may, perhaps, naturally be touched upon:

The annoyance and injury to which the retailer is thus subjected;

What the rights and privileges of the manufacturers and jobbers are in this matter;

What it is feasible for retailers to do for their own protection.

This competition will remain open until July 1, 1893.

Prize Competition No. 27.

SUBJECT:

Local Associations of Merchants.

It has been found feasible to form associations in many places for the purpose of securing more friendly relations among competitors and reaching an understanding in regard to matters of common interest. Among the good results referred to as coming from such associations are the following: Overcoming petty jealousies; cultivating a spirit of fraternity; listing of undesirable customers; an understanding in regard to time of presenting bills; putting in operation early-closing movements; agreement as to the prices at which goods are to be sold; mutual accommodation in supplying goods which one merchant may be temporarily short of, &c. The subject is thus evidently a broad one and of a good deal of practical interest. In discussing it the following points are suggested:

Whether it is desirable to have such associations;

How such associations may be organized;

The objects to be accomplished by them.

It will also be of interest to have any information in regard to the practical working of such associations.

This competition will remain open until July 8, 1893.

The following prizes will be awarded in each competition:

First prize.....	$12.50
Second prize.....	7.50
Third prize.....	5.00

The prizes will be awarded for answers which, in the judgment of the Committee of Award, are most suitable for publication and of the most general interest

We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than the dates on which the competitions close. They should be addressed as follows:

DAVID WILLIAMS,
96-102 Reade street,
New York.
Prize Competition No. —.

The committee to whom the contributions in Prize Competition No. 14 were referred have awarded the prizes as follows:

First Prize to WM. TODD, JR., Norristown, Pa.

Second Prize to E. T. BRADLEY, Swanton, Vt.

Third Prize to W. O. JACOBS, Danielsonville, Conn.

Australian Resources.

Australia, with her difficulties and disasters, has of late come into considerable prominence of an unenviable sort. The financial mire in which the country is now struggling seems to be ever thickening and deepening. Almost every day brings fresh news of bank crashes, involving industrial and commercial ruin and embarrassment there, and it is difficult to see what the outcome of it all will be. Yet few people in the United States are probably aware of the magnitude and of the immense natural wealth and resources of that great island continent. To many it may be surprising to learn that Australia possesses an area somewhat larger than that of the entire United States, exclusive of Alaska. Yet this vast territory is, for the most part, unpopulated and to a large extent unexplored. The whole Continent contains a population only about as large as the aggregated populations of New York, Chicago and Philadelphia. And more than half of the 4,000,000 of souls, or thereabouts, living in Australia are coogregated in half a dozen cities on the coast. Indeed, the populated and cultivated portion of the country comprises little more than a fringe round certain parts of the coast line. By far the greater part of the interior is wilderness or "bush." The primeval forests in many regions are rich in valuable timber. Yet their silence is unbroken by the ring of the woodman's axe. "No amount of word-painting or piling up of statistics can give even a faint idea of the vast potential wealth of Australia," says a recent writer, Edmund Mitchell, in the *Engineering Magazine.* He adds that there is an area equal to an English county for every man, woman and child in Australia, absolutely unoccupied and undeveloped. The productive capabilities of the waste lands are unbounded—rich soil, waiting for the plow, extends for hundreds of miles in every direction among the savannahs of Queensland alone; while the land teems with undeveloped mineral wealth. We are, for the most part, dimly aware that Australian tin is a commodity in the market, also that the gold mines of that country were at one time of great importance; while some may have heard of the more recent silver-mining enterprises carried on in New South Wales. But how many people realize that the biggest tin mine in the world is in Tasmania—Mt. Bischoff; that Queensland boasts the greatest gold mine in the world, at Mt. Morgan; that the biggest silver mine is the Broken Hill Proprietory in New South Wales, and that one of the largest copper mines of the world is situated at Moonta, in South Australia, while around Newcastle, in New South Wales, are some of the most extensive coal measures anywhere to be found. The mineral treasures of the country have, indeed, only been tapped hitherto, and but an infinitesimal portion of the buried wealth of Australia has yet been brought to light. Her agricultural industries are of great importance, the export trade in wool, fruit, frozen meat, butter, &c., is rapidly growing, and the possibilities of expansion in this direction are practically unlimited. Population and capital are the two requisites which are loudly called for in order to effect the development of all these great resources. Difficulties attendant on the "labor question" and the faulty system of government at present obtaining in the different colonies are, it is said, responsible for their present embarrassments. These are the reasons which have blocked the flow of immigration to Australia and diverted much needed capital into other channels. With her vast advantages properly and adequately developed, Australia would undoubtedly progress marvelously and quickly become a leading power in the world. But as it is, to quote Mr. Mitchell, "so far as population is concerned, Australia, outside a few score of large cities and towns, is virtually a wilderness."

The Governor of New York has affixed his signature to the bill providing for the punishment of persons willfully procuring the publication of false statements. It cannot be denied that the financial scare from which we have lately suffered was greatly aided by the circulation of rumors having no foundation in fact.

TRADE REPORT.

The Iron Market.

The financial question still overshadows everything else in the Iron trade. The feeling of distrust which prevails throughout the country has had a depressing effect upon the market, the condition of which can only be described as dull and apathetic. Little interest appears to be manifested in either buying or selling anything on terms usually available, and no present indication exists of any upward change. Meanwhile better collections in one or two sections of the country are reported, although in the East conditions in this respect continue unsatisfactory. The financial flurry of last week in Chicago passed over without any unpleasant consequences, the panic not extending much beyond the savings banks, which stood the strain easily.

Pig Iron.—The market in New York is very dull, and there are indications of increasing pressure to sell by some Southern companies in need of money. It appears that only about one-half of the 17,000-ton Cast-Iron Pipe contract for the East River Gas Company has been let. We quote Northern brands at $14.50 @ $15.25 for No. 1; $13 75 @ $14.50 for No. 2; $12.25 @ $12.50 for Gray Forge, tidewater. Southern Iron, same delivery, $14 @ $14 50 for No. 1; $12.75 @ $13.50 for No. 2, and $13 @ $13.50 for No. 1 Soft; $11.75 @ $12.50 for Gray Forge.

In the Chicago market inquiry for Coke Iron is very light. Production is being curtailed on account of the accumulation of stock. Northern prices are unchanged, but Southern prices are decidedly irregular, and very low rates are named on some brands. Cash would secure good bargains if buyers knew just where to place their orders to advantage. Lake Superior Charcoal is quiet, large buyers not being in the market at present. On such small lots as consumers are taking, prices are reported as fairly steady. Southern Charcoal is selling at very low rates. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal.....	$16.25 @ $16.50
Local Coke Foundry, No. 1...	14.75 @ 14.25
Local Coke Foundry, No. 2...	14.00 @ 13.25
Local Coke Foundry, No. 3 ..	12.75 @ 13.00

Business is extremely dull in Philadelphia and district. There is a general feeling of uncertainty which prevents either buyers or sellers making bids or offers, unless at figures wider apart than usual. Good Irons are not in large supply, and while it is possible to get all the Iron required at quoted rates, it is not going begging. In the prices of good Irons there is absolute strength, the uncertainty being in regard to brands which nobody particularly cares to buy. Southern furnaces are reported as reaching Philadelphia by water, and large sales of No. 3 Foundry have been made within a day or two at as low figures as were made before the advance in rail freights. The general demand, however, is for small lots, and prices quoted as follows for Philadelphia and equivalent points, with 20¢ @ 30¢ less on brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X...	$16.00 @ $16.50
American Scotch, No. 2X...	15.00 @ 15.50

In Southern markets Pig Iron has reached still lower depths of depression than before, not that prices are quotably lower, but there are no buyers at any price. In almost every instance the furnaces have been requested to make no shipments on contracts, because the withdrawal of banking facilities renders it practically impossible to receive and pay for the Iron. The Iron trade is practically suspended, and it seems probable that it will remain so until there is an improvement in the financial situation. There is so little Pig Iron of any kind selling that there is nothing upon which to predicate prices, and while the stronger Southern companies and furnaces are not offering to sell at lower rates, there is no doubt that there are furnaces so pressingly in need of money that a cash buyer could obtain material concessions. It is not that the Iron trade is not in a fairly healthful condition, but it is forced into inactivity by the lack of the usual financial facilities. Quotations are as follows:

Foundry.

Southern Coke, No. 1.	$13.00 @ $13.25
Southern Coke, No. 2.....	11.50 @ 11.75
Southern Coke, No. 3.....	11.00 @ 11.25
Ohio Soft Stone Coal, No. 1....	16.00 @ 16.25
Ohio Soft Stone Coal, No. 2....	15.00 @ 15.25
Lake Superior Coke No. 1.....	15.00 @ 15.25
Lake Superior Coke No. 2.....	14.00 @ 14.25
Hanging Rock Charcoal, No. 1..	18.50 @ 19.00
Hanging Rock Charcoal, No. 2..	17.50 @ 18.00
Tennessee and Alabama Charcoal, No. 1	15.00 @ 15.50
Tennessee and Alabama Charcoal, No. 2.....	14.00 @ 14.50

Metal Market.

Pig Tin.—The one prominent feature is that the recognized "bull" leaders, with some trade assistance, have effectually manipulated prices in a manner calculated to somewhat allay the uneasiness of customers who loaded up heavier than usual during the time that prices dropped from about 21¢ to 19¢ ℔ lb. This serves to facilitate deliveries at the present time and to cut down the "visible" supply in a manner. The arrivals here thus far this month have been 1340 tons, and there are now 365 tons on the way from Europe.

Copper.—Lake Superior Ingot Copper has been sold during the past week at 10¾¢ ℔ lb. There were rumors of some large contracts having been made at as low as 10½¢, and back of those rumors is the substantial fact that a great deal of Electrolytic Copper has latterly been shipped in where the Lake product formerly had an almost clear field. Business in Electrolytic Copper is said to have been done at as low as 10¼¢, though popular quotation is 10½¢. Common Casting Copper is quoted at 10¢, but that price seems extremely high at the present time.

Pig Lead.—Sales of Common Domestic have been made this week at 3¾¢, which fairly reflects present market value. Stocks here are moderate, and advices from the West are to the effect that the surplus there is rather below the average, but the power of the leading buyers, along with the condition of the money market, still offsets the statistical position.

Spelter.—The market is bare of new feature. The offering from primary points has been somewhat reserved of late, and the demand from Eastern consumers continues extremely tame; hence a slow market, yet apparently steady undertone to values. Current quotations are 4 25¢ @ 4.30¢, Eastern delivery, for near future shipments.

Antimony.—Of small parcels there has been a fair movement, and the market is quite steady, with Hallett's, quoted at 9¾¢ @ 10¢, L.X. at 10¢ @ 10⅛¢ and Cookson's at 10⅝¢ @ 10½¢, in wholesale lots.

Tin Plate.—Buyers are still taking hold in a very indifferent manner. Their purchases of spot stock are invariably small and the most attractive inducements offered thus far fail to stimulate interest in future deliveries. Prices are unsettled and lean more or less in buyers' favor.

THE ILLINOIS GLASS COMPANY, Rockford, Ill., among the largest manufacturers of Glassware in the country, are now manufacturing the Manny Lemon Juice Extractor. Their No. 2, or saucer extractor, is a very convenient article. It is made of heavy glass, and the saucer prevents the loss of any juice, at the same time doing away with the discomfort of soiling the hands when using it.

Chicago Report.

Scrap.—Old Material is very quiet. Dealers quote buying prices as follows:

	Per net ton.	Per lb
No. 1 Wrought Scrap	$12.00	....
Machinery Cast	9.00	....
Malleable Cast	7.00	....
Stove Plate (free of burnt)	6 50	....
Burnt Iron and Grate Bars	4.00	....
Sheet Iron and Hoops	3.00	....
Plow Steel and Breaking Stock	8.00	....
No. 2, such as Shovels, Hoes, &c.	4.50	....
Old Boilers—whole (Iron)	7.00	....
" (Iron)—cut in single Sheets and Rings	10 00	....
Old Gas-Pipe and Boiler Tubes	7 50	....
Cast Borings	4 00	....
Turnings	5.50	....
Horseshoes	2 00	....
Copper Bottoms	....	8 ¢
Copper Clips and Heavy	....	9 ¢
Heavy Brass	....	8 ¢
Light Brass	....	4 ¢
Pipe Lead	....	8 ¢
Tea Lead	....	2¾¢
Zinc	....	3 ¢
Rubber	....	2¾¢

Anthracite.—Quotations on carload lots of 12 net tons are continued as follows:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill.	$5.60	$5.85
Milwaukee, Wis.	5.60	5 85
Kansas City, Mo.	8 80	9.05
Council Bluffs, Iowa	8.80	9.05
Lincoln, Neb.	8.95	9 20
Sioux City, Iowa	8.80	9.05
Aberdeen, S. Dak.	8.85	9.10
Dubuque, Iowa	6.90	7.15
Madison, Wis.	7.10	7.35
St. Paul, Minn.	8 10	8.35
Burlington, Iowa	7.10	7.35
Des Moines, Iowa	8.55	8.80
Davenport, Iowa	6.90	7.15
St. Joseph, Mo.	8.80	9 05
Leavenworth, Kan.	8.80	9 05
Omaha, Neb.	8.80	9 05

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.	
Denver	$8.00
Pueblo	8.00
Colorado Springs	8.00
Leadville	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River	9.35

WALLACE & SONS, 29 Chambers street, New York, have greatly enlarged their facilities for suitably showing their large and constantly increasing line of Lamp and Art Goods. Since occupying their present quarters, east of Broadway, various expedients have been resorted to in order to adequately exhibit the numerous patterns of banquet, piano, library, boudoir and other Lamps, until recently they secured about two-thirds of the loft above them to be used exclusively as a display room for Lamp goods, Pedestals, Tables, &c. This display room is reached by means of an ample hardwood stair case about the middle of the building, on the Broadway side. The new rooms add 2800 square feet to what the firm had already possessed. One point made by the management is that a complete stock can be selected here from the most primitive and inexpensive Lamps to those costing upward of $100 each, in addition to the numerous art goods referred to above.

NORTON EMERY WHEEL COMPANY, Worcester, Mass., are extending their works by an addition about 50 x 40 feet on the north and one on the west, 37 x 44 feet, both two stories and basement. They are also erecting new kilns and hope to thus increase their facilities for production something over 50 per cent.

CONDITION OF THE

Hardware Trade.

THE BUSINESS IN HARDWARE, as in trade in general, is much affected by the financial uneasiness which so generally prevails, and as a rule merchants are only purchasing goods which are required for their trade in the near future. Manufacturers and jobbers are also refraining from urging sales with as much enterprise as usual, unless there is a prospect of their receiving prompt payment, there being a disposition to restrict business closely to cash transactions. There is, however, evidence of a somewhat improved demand, many of the jobbing houses reporting a fair, though not heavy, business, and on the whole, a more satisfactory trade than a few weeks ago. In the matter of prices there is but little change. The market is not characterized by a strong tone, but the indisposition to force goods on the market has a tendency to keep prices from being cut to any great extent. Most houses are at present giving their attention to the matter of collections, in regard to which a good deal of complaint is made, though in this respect the situation is probably a little improved.

Advices from Chicago.—The condition of the Shelf Hardware trade has changed materially within the past week. Business is now moving along vigorously and some jobbers say their orders for the past few days have been up to their capacity for handling goods. The demand is general, running through the whole line, except staple goods. Collections are also growing better. City collections jumped up last week, notwithstanding the panicky feeling among savings depositors. It is presumed that many of them paid accounts with the money which they drew out, thus enabling merchants to pay their bills more promptly.

Notes on Prices.

Cut Nails.—During the past week there has been only a moderate amount of business in Cut Nails, and prices remain on substantially the same basis as at our last report. The market is fairly represented in the East by the quotation of $1.05 on carload lots at mill, though it is understood that this figure has been slightly shaded in some special cases. Small lots from store in New York are held at about $1.25.

Advices from Chicago.—New business is rather quiet, and specifications are coming in slowly on old contracts. Factory prices are still nominally held at $1.25, but competition for business is less keen from outside concerns, and this price is more nearly maintained at present than a week ago. Small lots are selling from stock at $1.35.

Wire Nails.—The Wire-Nail market continues irregular with a fair, but not especially heavy, demand. The low prices developed had the effect of securing some large orders, but in the present condition of the money market the trade are not disposed to purchase on speculation, their orders being confined for the most part to their early requirements. During the week sales have been made at $1.35, f.o.b. mill, and while some manufacturers refuse to meet this figure it is intimated on the other hand that it has been slightly shaded by others. At the meeting held last week in Cleveland nothing definite was accomplished except the agreement to shut down the mills during July. The feasibility of effecting a strong organization among the manufacturers is, however, under consideration, and it is thought by some well-advised parties that the prospect for accomplishing something in this direction is more favorable than when the attempt was last made. It is thought by some directly interested that an organization by which the production would be limited and the price held at a remunerative figure is the only means by which the extremely unsatisfactory condition of the market in this line can be improved.

Advices from Chicago.—The recent drop in the factory price of Wire Nails leads to a great deal of business. Quite a number of heavy contracts were taken at the low rates prevailing last week. The demand continues in a small way, so that manufacturers are more encouraged than they were. They are inclined to think that prices have seen their worst. Quotations from factory are pretty generally $1.50, Chicago. Prices from stock for small lots are maintained at $1 65 to $1.70, with concessions to best buyers.

Barb Wire—Quotations on Four Point Galvanized continue on the basis of $2.45 to $2.50 for carload lots at mill. The volume of business is fair but not heavy.

Advices from Chicago.—Manufacturers report an improved demand for Barb Wire from factory. Buyers are hurrying shipments, indicating that stocks are low. The orders recently received have in many cases come by telegraph. Quotations are continued at 2.15¢ for carload lots of Painted and 2.55¢ for Galvanized. Local jobbers report their trade quiet, but quotations are steady at 2.30¢ and 2.70¢ respectively.

Tacks.—Atlas Tack Corporation, 508 Sears Building, Boston, issue under date, June 5, a revised discount sheet on Hardware list goods, which is, however, in the main the same as their last. Revised quotations are, however given on Basket and Trimmers' Tacks and Trunk and Clout Nails, the discounts on which are now as follows:

	Per cent.
Basket and Trimmers' Tacks, Lauc	52½
" " " S. S.	55
Trunk and Clout Nails, black	65
" " " tinned or coppered	67½

These prices are subject to the regular additional discount of 25 and 2 per cent. for cash.

The Atlas Tack Corporation also issue under date June 5 a revised Shoe Finders' List embodying many changes, a large number of which are in the way of advance.

Ideal Dipper.—Sidney Shepard & Co., Buffalo, N. Y., are manufacturing this Dipper of IXX tin plate with the handle riveted to the bowl, in one size, as follows: Diameter of bowl, 6½ inches. Depth of bowl, 3¾ inches. Length of handle, 9¼ inches. The Dippers are sold at $2 per dozen net.

Kettle Cleaner.—Clauss Shear Company, Fremont, Ohio, are manufacturing this article, which was illustrated in a recent issue. The Cleaner is sold to the trade at $2 per dozen.

Hot-Air Dampers.—Excelsior Hot-Air Dampers are manufactured by the Excelsior Steel Furnace Company, 110-114 South Jefferson street, Chicago, Ill., in sizes from 7 to 16 inches in diameter. They are sold at a discount of 50 per cent. from the list as published in their 1893 catalogue.

Puritan Coffee Pot.—Bronson Supply Company, Cleveland, Ohio, and 72 Beekman street, New York, are manufacturing this article, a description of which appeared in a recent issue. The Coffee Pot is sold from the following list, which is subject to a discount of 25 per cent.:

No.	20	30	40	50
Pints	2	3	4	5
Per dozen	$6.50	$7.50	$9.00	$10.50

Columbia Roaster and Baker.—This article is put on the market by the Star Baker Company, Bellville, Ohio. The device is sold from the following list, which is subject to a discount of 55 per cent.:

Number.	Length. Inches.	Width. Inches.	Hight. Inches.	Smooth Iron.	Russia Iron.
1—Small family	14½	9	7	$1.00	$1.50
2—Medium	16½	10¾	8	1.35	2.00
3—Large	18½	11½	9	1.50	2.30

Mrs. Potts' Sad Irons.—Under date of June 12, Enterprise Mfg. Company, Philadelphia, withdraw the former net prices on Mrs. Potts' Cold-Handle Sad Irons, and announce the following in their stead:

No.	In lots of 25 doz. sets at one shipment.	In lots of 12 doz. sets at one shipment.	In lots of less than 12 dozen sets.
50, per set	$0.78	$0.83	$0.90
55, "	.73	.78	.85
60, "	.90	.97	1.05
65, "	.82	.88	.95
550 (Containing Nos. 82, 90 and Set No. 50 Irons)	2.35	2.50	2.75
535 (Containing Nos. 87, 95 and Set No. 55 Irons)	2.20	2.35	2.60

Handles in lots of 25 dozen are sold at $1.30 per dozen; in lots of 12 dozen, $1.40, and in lots of less than 12 dozen, $1.55 per dozen.

Glass.—Locally there is little of interest to report in the Glass market, as the situation remains practically unchanged since our last report. Some Glass is changing hands, but the demand is light, and there is apparently no indication that trade will improve during the present month. It is believed that official prices are well sustained, but it is a question whether such a condition would exist if the time for the annual closing of the Glass factories was not near at hand. This, with the reported scarcity of single strength Glass in manufacturers' hands, and the pledges made by the members of the National Window Glass Company, have given prices unusual strength for a time when demand is as light as at present. Imported Glass has shown no improvement, and unchanged quotations of 75 and 10 and 5 per cent. discount nominally represent the price at which it is sold. It is reported that the National Plate Glass Company have decided to close their factories until July and perhaps longer, unless demand improves and present stocks are considerably reduced. We quote prices unchanged as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to exceed 17½ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, ton lots, ℔ lb.	....	@	$0.03½
Rubber Shoes, ton lots ℔ lb.	....	@	.04
Large Hose, ℔ ton	....	@	9.00
Wringer Rolls, ℔ lb.	....	@	.04½
Wringer Wire Rolls, ℔ lb.	.01	@	.02
Syringes, ℔ lb.	....	@	.05

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags	℔ lb		4¢
No. 2 White Rags	℔ lb		3¢
Mixed Rags	℔ lb	1½ @	1¾
Blues and 3ds	℔ lb	1¾ @	2
Hard Sized White Shavings	℔ lb	2¾ @	3 ¢
No. 1 White Book Shavings	℔ lb	2½ @	2¾¢
No. 2 White Book Shavings	℔ lb	1½ @	1¾¢
Light Book Shavings	℔ lb	⅞ @	1 ¢
No. 1 Mixed Shavings	℔ lb		1¼¢
No. 2 Mixed Shavings	℔ lb	¾ @	⅞¢
No. 1 Printed Books	℔ lb	1⅜ @	1½¢
Ordinary Mixed Books	℔ lb	¾ @	⅞¢
Newspapers	℔ lb		½¢
No. 1 Manila Paper	℔ lb	1¼ @	1¾¢
No. 2 Manila Paper	℔ lb	⅞ @	1 ¢
Bogus Paper	℔ lb	¾ @	¾¢
Common Paper	℔ lb	¾ @	½¢
Straw Chips	℔ lb	½ @	⅝¢
Binders' Clippings	℔ lb	½ @	⅝¢
Jute Butts	℔ lb		1¼¢
No. 1 Jute Bagging	℔ lb	1¼ @	1½¢

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	℔ lb		9½¢
Light and Tinned Copper	℔ lb		8½¢
Heavy Brass	℔ lb		7¢
Light Brass	℔ lb		6¢
Lead	℔ lb		3½¢
Tea Lead	℔ lb		3¼¢
Zinc	℔ lb		2¾¢
No. 1 Pewter	℔ lb		14¢
No. 2 Pewter	℔ lb		7¢
Wrought Scrap Iron	℔ gross ton,		$13.00
Heavy Cast Scrap	℔ gross ton,		9.00
Stove Plate Scrap	℔ gross ton,		6.00
Burnt Iron	℔ gross ton,		4.00
Mixed Bagging	℔ lb		1 ¢
No. 2 Bagging	℔ lb		8¼¢
Hemp Twine	℔ lb		2½¢
Manila Rope	℔ lb		2¼¢
Jute Rope	℔ lb	1⅜ @	2 ¢
Mixed Rope	℔ lb	¾ @	⅞¢

Trade Notes.

The Loyhed Tinware Mfg. Company, 1317 Front street, Seattle, Wash., which were organized in December last for the purpose of manufacturing pieced Tinware, and the jobbing of Stoves and Sheet Metals, are said to be one of the most successful manufacturing and jobbing houses on that portion of the Pacific Coast. At present the company are confining their manufacturing efforts to the production of Tin Cans, for which there is a large demand. They are turning out in quantity Spice, Baking, Powder, Syrup and Fruit Cans, in various styles and sizes, together with some Salmon Cans. Prospects with them are reported as very good. The members of the concern are F. A. Hill, president; E. H. Loyhed, manager; and D. B. Porter, treasurer.

The Milton Smoke Burner Company have been incorporated at Alexandria, Va., to manufacture Milton's gas and smoke burning apparatus. Capital stock $10,000.

"At Home" June 12–16, is the inscription on the first page of a folder which reaches us from H. M. Hillson of 93–97 North street, Boston, Mass. Mr. Hillson has just opened his new salesrooms and offices at the address given and from June 12 to 16 was "at home" to all his friends in the trade. His force of traveling salesmen were on hand to welcome customers and friends and to show them about the new quarters.

E. T. Barnum, Detroit, Wis., has just secured the contract for the fittings for the cavalry stables at Fort Leavenworth, Kansas. The stables are two fine large brick buildings, arranged for 144 horses, and will be provided throughout with the most improved stable fixtures, such as hay racks, oat mangers, saddle and bridle brackets, harness hooks, &c. Seventy-two ventilators will be placed in the stables, and each of the 76 windows covered with galvanized-wire guards.

W. E. Beveridge, 305 South Sharp street, Baltimore, Md., has purchased the United States patents on a smokeless Fry Pan, which he proposes to introduce to the trade. The Fry Pan is intended for use on a range or cook stove, to carry off all odor or smoke, or in the ordinary way on a gas, gasoline or coal-oil range in summer. We understand that Mrs. Rorer, principal of the Philadelphia Cooking School, is using one of these Fry Pans in demonstration at her Model Kitchen at the World's Fair. She is likewise using one of Mr. Beveridge's Steam Cookers. The smokeless Fry Pan is made in three sizes.

MATTHAI, INGRAM & CO., Baltimore, Md., issue a catalogue of summer and new goods. The pamphlet of 7¼ x 5½ inches, contains 20 odd pages of illustrated matter respecting seasonable articles, beginning with Fly Fans. Next come Water Coolers of various designs and shapes; Tubs of all sorts; Kettles, Lemonade Shakers, Fruit Cans, Oil Cans, Dripping Pans, Watering Pots, Soap Dishes, Coffee Boilers, Dippers, Fly Traps, &c. Along with the illustrations are printed tables of sizes and prices, and a discount sheet accompanies the pamphlet.

THE AMERICAN SHEET IRON COMPANY, Phillipsburg, N. J., report a large and steady demand for their "American R. G." black sheets. Last year the company put in an English or tight iron mill with the view of producing black sheets for tinning, but have not used it for that purpose hitherto, the call for their regular black iron sheets having kept them fully employed on that material. The company think that the consumption of domestic sheets by the tin-plate factories has increased the trade for regular sheet iron.

STRANSKY & CO., 27 Murray and 31 Warren streets, New York, have now in stock and afloat a full assortment of their Cameo Mottled Enameled Ware, in American shapes, embracing, we are told, upward of 800 styles, sizes and finishes. This ware is enameled on steel with three coats of enamel, and has long been sold by them on importation orders only. They will now be in a position to execute promptly from stock such orders as they may be favored with. They desire to say that this ware in no way infringes enameled goods made here, but if necessary they are prepared to give a written guarantee holding everybody harmless handling it. It is made in three finishes, vermilion-blue, gray and brown, and is very tasteful in appearance.

CINCINNATI MFG. COMPANY, Cincinnati, Ohio, issue a circular in which they state that they do not belong to any combination and call attention to the excellence of their Leader Fly Traps, Corn Poppers and other Wire goods.

THE J. T. HENRY MFG. COMPANY, Hamden, Conn., have recently completed a new building 40 x 24 feet, two stories high and built of brick, adjoining the old shop. New machinery also has been added and the plant equipped for special press work and the manufacture of Sheet Metal goods to order. This concern are pushing the sale of Henry's New Grape Shear, which is especially designed for picking grapes, but is also recommended for cutting flowers. The blades and jaws are made of best cast steel, carefully tempered, and the design is the result of a number of years experience in manufacturing articles of this character.

THE STOVER MFG. COMPANY of Freeport, Ill., have recently added to their already large works a galvanizing plant for galvanizing steel Wind Mills and a general line of job work. This has necessitated a considerable enlargement of their force.

The strike of dock laborers at Hull, England, which at one time threatened to extend to other of the British ports and cause as grave hindrance to shipping and commercial business as did the great strike of London dockers some time since, was ended in a complete fizzle. The dockers have surrendered unconditionally, and will only be taken back as vacancies occur. Employers retain the power to dismiss or refuse employment to any man who intimidates non-union or union men. None of the points for which the men went out on strike have been gained; so that their suffering and pecuniary loss have been for no purpose, except to gratify the vanity of the agitators. The causes of the strike were not sufficient to justify such a course of action as was resorted to, and the lawless methods used during its progress, in the way of incendiarism, mob violence and intimidation, alienated from the men the sympathies of the general public, and brought about the collapse which has taken place.

New Publications.

METAL PLATE WORK: Its Patterns and Their Geometry; also Notes on Metals and Rules in Mensuration. For the use of Tin, Iron and Zinc Plate Workers, Coppersmiths, Boiler Makers, Plumbers and Others. By C. T. Millis, M. I. Mech. E. London: E. & F. N. Spon. New York: Spon & Chamberlain. 1893. $3.50.

A second edition of the useful book of C. T. Millis on sheet-metal work has just been issued, which contains all the information included in the first edition, published five years ago, supplemented by some 70 pages of new and original matter. The work does not need any lengthened description, being, in its original form, well known to metal workers. The author is an established authority in the trade in Great Britain. He is now the head of the educational department of the Borough Polytechnic Institute of London, and also lecturer in sheet-metal work to the City and Guilds of London Institute, two of the foremost mechanical training schools in England. His qualifications, therefore, for a work of this kind are obvious. The present edition of "Metal Plate Work" is one of the Finsbury Technical Manuals. It is a well gotten up volume of 376 pages, with excellent text and illustrations, the latter including some 250 patterns, and is calculated to be an exceedingly useful manual to the sheet metal worker anxious to master his trade. Starting with some introductory geometrical problems, the work is divided into four sections. The first three treat, respectively, of "Patterns for Articles of Equal Taper or Inclination," as pails, oval teapots, strainers, &c.; "Patterns for Articles of Unequal Taper and Inclination," as baths, hoppers and canister tops, and "Patterns for Miscellaneous Articles," elbows and articles of compound bent surfaces, such as vases, aquarium stands, moldings, &c. The fourth division comprises a chapter on the metals, alloys, solders and soldering fluxes, mostly used by metal workers, and one on the more important seams or joints used in sheet metal practice. It concludes with a number of useful practical rules in mensuration, and tables of comparative weights and gauges of various metals, together with the strength, sizes and weights of tin plates. Taken altogether, the book in its new form is a serviceable addition to the somewhat scanty literature of the trade, and will doubtless find a welcome among the sheet-metal workers in the United States.

A bill for the prevention of accidents and protection of the life and bodily safety of workmen is at present before the Italian Parliament.

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Metal and Miscellaneous Prices.

See Standard Lists on Following Pages

CHICAGO, JUNE 15, 1893.

Tin—

Straits pigs.....22¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

		Per box.
Calland'and Melyn Grade	IC, 10 x 14	@ $6.75
	IC, 12 x 12	@ 6.75
	IC, 14 x 20	@ 6.75
	IC, 20 x 28	@ 8.75
	IX, 10 x 14	@ 8.75
	IX, 12 x 12	@ 8.75
	IX, 14 x 20	@ 8.75
	IX, 20 x 28	@ 17.50
	DC, 12½ x 17	@ 6.50
	DX, 12½ x 17	@ 8.50
Allaway Grade,	IC, 10 x 14	@ 5.50
"	IC, 12 x 12	@ 6.50
"	IC, 14 x 20	@ 6.50
"	IC, 20 x 28	@ 13.00
"	IX, 14 x 20	@ 8.00
"	IX, 20 x 28	@ 16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14, 14x20	@$6.00
IC, 14x20, 90 ℔	@ 5.75
IC, 14x20, 100 ℔	@ 5.85
10 x 20	@ 9.00
20 x 28	@12.00
'X, 10x14, 14 x 20	@ 7.50
Grade. IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grades.—	
IC, 14 x 20	@ $5.62½
20 x 28	@ 11.25
IX, 20 x 28	@ 14.25
Worcester Brand and equal.—	
IC, 14 x 20..6.12½	@ .....
IC, 20 x 28..12.25	@ .....
IX, 14 x 20..7.02½	@ .....
20 x 28..15.25	@ .....

American Tin Plates.

Charcoal Plates.—Bright.

Irondale, A. A.—IC, 14 x 20	$7.00
" " IX, 14 x 20	9.00
" " IXX, 14 x 20	11.00
" " IC, 20 x 28	14.00
" " IX, 20 x 28	18.00
" " IXX, 20 x 28	22 00
Florence.—	
IC, 10 x 14, 12 x 12, 14 x 20..	$6.75
IC, 10 x 14, 12 x 12, 14 x 20..	8.75
Palma.—	
IC, 10 x 14, 12 x 12, 14 x 20..	$7.50
IX, 10 x 14, 12 x 12, 14 x 20..	9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, Tissue Packed, IC, 14 x 20	$9.25
Royal extra, IC, 14 x 20	7.25
Merion, IC, 14 x 20	7.00
Almond, IC, 14 x 20	6.50
Mint, IC, 14 x 20	6.25

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (205 ℔), 20 x 28	@$12.00
Palm (205 ℔), 20 x 28	@ 12.25
Crescent, IC, 20 x 28	@ 12.50
Crescent, IX, 20 x 28	@ 15.75
Empire, IC, 20 x 28	@12 75
" IX, 20 x 28	@16.00
Hickory, IC, 20 x 28	@ 13.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20 x 28	@$14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.00
" IX, 20 x 28	@ 18.25
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@$21.50
Merchant's Old Method, (extra heavily coated), IX, 20 x 28	@$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	$23.60
Irondale A:	
IC, 14 x 20	$6.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Westmoreland:	
IC, 14 x 20	$6.25
IC, 20 x 28	12.50
Elwood:	
IC, 20 x 28	$12 00
Jono:	
IC, 14 x 20	$5.75
IC, 20 x 28	11.50
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20	$7.50
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20	11.00
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28	19.00
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28	22.00
Neville, Stamped, IC, 14 x 20	6.25
" " IX, 14 x 20	7.50
" " IC, 20 x 28	12.50
" " IX, 20 x 28	15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resqued)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resqared)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resqared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resqared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.50
" IC, 20 x 28	13.00
Knoxall, IC, 14 x 20	6.25
" IC, 20 x 28	12.50
Globe, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
Miami, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
" IX, 20 x 28	15.00
" (Redlipped), IC, 20 x 28	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50

	Per box of 56 sheets.
X, 14 x 56	16.50
XX, 14 x 56	18.20
X, 14 x 60	17.65
XX, 14 x 60	20.90

Sheet Iron—

Black.

Nos.	Common American	Refined.
Nos. 10 to 15	℔ 2 7-10¢	3 3-10¢
17 to 20	℔ 2 8-10¢	3 4-10¢
21 to 24	℔ 2 9-10¢	3½¢
25 and 26	℔ 3¢	3 6-10¢
27	℔ 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ A, 10½¢; B, 9½¢
dis. 5%

Galvanized.

List on following page.
Juniata or first quality.....dis. 70&2½%

Copper—

Ingot.

Lake.....12¢ @ 12½¢
Casting Brands.....11¢ @ 11½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, of 50¢ ℔ 100 ℔.

Above 5-16 inch to 3 inch inclu...	.35¢	40%
Plain, above 3 inch	.45¢	
Plain, 5-16 inch	.60¢	
Plain, ¼ inch	$1.00	@
Plain, 3-16 inch	$1.50	
Plain, ⅛ inch		32½
Fancy Tubing, Brass, to No. 20		
Tinned	.43¢ ℔	
Bronze Tubing, 3¢ ℔ more than Brass.		

Roll and Sheet Brass.

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 ℔ casks.....6¼¢
Less than Casks, ℔.....6½¢

Lead—

Soft Pig Lead.....4¼¢
Bar.....4.60¢@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10%

Solder—

½@½.....13¼¢@13½¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....12¼¢@13½¢
Hallett's.....11¼¢@12¾¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1¼ and under, Plain	.50&10%
1¼ and under, Galv	.52½&10%
1½ and over, Plain	.70&10%
1½ and over, Galv	.60&10%
Boiler Tubes, list Oct. 24, 1892	.65@67½%
Casing, list Nov. 16, 1892	.52½%
Inserted Joint Casing, list Nov. 16, 1892	.47½%
Steel Boiler Tubes	.27½%
Cold Drawn Seamless Steel Tubing	.50%

Cast-Iron Soil Pipe—

Cast-Iron Soil Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dis 70&2½%
Other sizes.....dis 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted.....55%
Austin's Corrugated.....60%
Gordon & Gilbert's Corrugated.....55%
Ritchie's (Galv. Iron only) Cor'd.....55%
Ritchie's Spiral Lock Seam, Galv'd.....50%
Austin's Spiral Ribbed Pipe.....55%
Plain Adjustable Elbows.....55%
James A. Miller Bros. (Galv'd Iron only) Corrugated.....55%

Furnace Fittings—

Discount from Excelsior Steel Furnace Co's list.....50%

Steel Roofing—

Perfection.....$3.75 square
Climax.....$3.50 square
The Lloyd Spanish Tiling....$4.50 square

Metallic Shingles—

Cushman's.....$1.25 square
Merchant & Co's Spanish Tiles:
Copper, 14 oz.....$36.00 square
Steel, painted.....$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7¼@8 ¢
Iron Palut, Bright Red	℔ 5, 2 ¢
" " Brown	℔ 3, 1½¢
" " Purple	℔ 3, 2½¢
" Ground in oil, B. Red	℔ 3, 6½¢
" Ground in oil, Red	℔ 3, 6½¢
" Ground in oil, Brown	℔ 3, 5¢
" Ground in oil, Purple	℔ 3, 6 ¢
Linseed Oil, Boiled, in bbls	.58¢
Linseed Oil, Raw, in bbls	.56¢
Mineral Paluts	2@4¢
Orange Mineral	.10¾¢
Pure White Lead in Oil	.8¾@7¼¢
Dry White Lead in bbls	.6¼@6¾¢
Red Lead, American	.7@7¾¢
Red Venetian English, dry	.$1.65@$1.70
Red Venetian in oil; asst'd cans, 8¾ ℔ kegs	.7¾¢
Sipe's Japan Oil, in bbls, ℔ gal	.34¢
Spirits Turpentine, in bbls., ℔ gal.	.34½¢
Asphaltum, Trinidad Refined, ℔ ton	.$15
Tarred Felt, 1 Ply, ℔ 100 ℔	.$1.65
Tarred Felt, 2 Ply, ℔ roll 108 sq. feet	.$1.50
Tarred Felt, 3 Ply, ℔ roll of 108 sq. feet	.$2.00
Roofing Pitch, ℔ bbl. of 300 ℔	.$3.20

NEW YORK, JUNE 16, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots, ℔ ℔, $0.75
No 1 (guaranteed to be 98 ℔ pure and over), in ton lots.....℔ ℔, .80
Lots less than 1 ton, 10¢ ℔ ℔ additional.

Antimony—

Cookson.....℔ ℔, 11¼¢
Hallett's.....℔ ℔, 10¾@11¢

Brass—

Planished.....net
Roll and Sheet.....35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

	Per ℔.
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	$0.35
Plain, to No. 20, above 3 inch	.45
Plain, 5-16 inch to No. 20	.45
Plain, ¼ inch	.60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing to No. 20, inch	.43

35&40%

Copper and Bronze Tubing—

3¢ ℔ ℔ more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¼ to 3½ inches inclusive....17¢ ℔ ℔
Over 3½ to 6 inches inclusive....18¢ ℔ ℔

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ ℔
Over 3½ to 6 inches inclusive....19¢ ℔ ℔

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $2.50 per doz.....40&10%

Conductors—

Corrugated. *Round or Square—*

Galvanized.....60%
Galvanized, Locked Joints.....60%
Tin.....60%

Spiral Riveted—

Galvanized.....50%

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.....15@25%

Ingot.

Lake.....12¢
Ansonia Grade Arizona.....11¾¢
Ansonia Grade Casting.....11¢

Planished......net

Sheet and Bolt......25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering*, in Current Hardware Prices.

Damper Clips Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

Lap or Slip Joint.....list, net

Elbows—

Plain Adjustable—

Tin.....70%
Galvanized.....70%

Crimped Tubing—

Re-Tinned or Galvanized.....35%

Stove-Pipe—

Buffalo Four-Piece.

4 in.	5	6½	0	7 inch,
$0.78	.87	.90	.99	1.20 per doz...20 %

Elbows and Shoes—

Flat Crimp,

Tin.....35%
Galvanized.....35%

Corrugated.

Flat Crimp.

Galvanized.....60%

Round or Square.

Tin.....60%
Galvanized.....60%

Iron, Sheet—

Black.

Nos.	Common R. G. Cleaned American.	American.
Nos. 10 to 16	℔ ℔, 2¾@...	3¼¢
Nos. 17 to 20	℔ ℔, 3 @...	3¼¢
Nos. 21 to 24	℔ ℔, 3¼@...	3¾¢
Nos. 25 and 26	℔ ℔, 3¾@...	3¾¢
No. 27	℔ ℔, 3½@...	3¾¢
No. 28	℔ ℔, 3⅝@...	3¾¢
American B. B.	℔ ℔, 4¢@4½¢	

Russia, Planished, &c.

Genuine Russia, according to assortment.....℔ ℔, 12@13¢
Patent Planished....℔ ℔, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ ℔, 8½¢

Galvanized.

Nos.	B. B.
Nos. 10 to 16	℔ ℔, 4¢
Nos. 17 to 22	℔ ℔, 4¼¢
Nos. 23 to 24	℔ ℔, 4¾¢
Nos. 25 to 26	℔ ℔, 5¢
No. 27	℔ ℔, 5¼¢
No. 28	℔ ℔, 5½¢
Nos. 29 and 30	℔ ℔, 6¼¢

Filter Joints—

Lee's.....33⅓ %

Lead—

American Pig.....4¾¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....7¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3¼¢ ℔ ℔.

Pittsburgh Prices.

Lead Pipe in whole coils, ℔ ℔, .05¢, 10&5%
Sheet Lead in whole coils, ℔ ℔, .05½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Door Mats, Galvanized	25%
Window Guards, Paneled	15%
Tree Guards, Paneled	15%

Mitres Eave-Trough—See *Eave-Trough Mitres.*

Paints, Oils, &c.—

Lead, Ammn. White, Dry or in oil:		
Kegs, lots less than 500 ℔	7	@ 7¼¢
Kegs, lots 500 ℔ to 5 tons	6¾	@ 6¾¢
Kegs, lots 5 tons to 12 tons	6¾	@ 6⅝¢
Kegs, lots 12 teus and over	6¼	@ 6⅝¢
Lead, White, in oil, 25 ℔ tin pails, add to keg price		...@ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price		...@ 1
Lead, Red, bbls. and ½ bbls	6	@ 7
Lead, Red, kegs	6¼	@ 7¼
Ocher, American	¼	@ 1¼
Red, Venetian, American	℔ 100 ℔	...1.00 @ 1.10

Linseed Oil:

City, raw, ℔ gal	.. @ .50
City, boiled	.. @ .53
Western, raw	.. @ .50

Spirits Turpentine:

In regular bbls	.28½ @ .. 29
In machine bbls	.. .. 29 @ .29¾

Putty:

In barrels and ½ bbls	.01¾ @ .01¾
In tubs	.01¾ @ .01¾
In tin cans	.01¾ @ .02¼
In bladders	.01¾ @ .02¼

Roofing Material, &c.:

Asphaltum, Trinidad Refined, ℔ ton	$30.00@$35.00
Asphaltum, Rock, ℔ ton	$14.00
Coal Tar Felt, 1 Ply, ℔ ℔	.2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft	$1.85
Roofing Pitch, ℔ bbl	$2.24

Pipe, Drain—.....50%

Pipe and Fittings, Cast Iron Soil—

Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 Inches, inclusive.....60@60&10%
Other sizes.....55@55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 inches, inclusive.....60@60&10%
Other sizes.....55@55&10%

Pipe, Spiral—

Galvanized.....60%
Tin.....60%

Pipe, Wrought Iron—

For discounts see Current Hardware Prices.

Polish, Stove—

Raven Liquid:

6 oz. bottles, ℔ gro	$8.00
8 oz. bottles, ℔ gro	$9.00
Water Polish	$7.20

Rivets and Burrs—

For discounts see Current Hardware Prices.

THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, June 24, 1893.

DAVID WILLIAMS, - PUBLISHER

BUSINESS OFFICES:

NEW YORK.....96-102 Reade Street.
PHILADELPHIA.....220 South Fourth Street.
BOSTON.....146 Franklin Street.
PITTSBURGH.....Room 500 Hamilton Building.
CHICAGO.....59 Dearborn Street, cor. Randolph.
CINCINNATI.....Rooms 22-24 Pickering Building.
ST. LOUIS.....Bank of Commerce Building.
CLEVELAND.....312 The Cuyahoga.

BRITISH AGENCY: The Ironmonger, 42 Cannon street, London, England.

System.

Given a good business or a good practice, with reasonable ability, and there is certainly no one thing more conducive to success than system in its management. While the word "system" naturally carries with it the idea of good system, yet there is such a thing as a bad system, one perhaps good enough in its place, but absolutely unsuited to certain circumstances. Mere red tape is not system: but that perfection of management by which every action links into and is properly timed by another, where no effort is wasted, where everything is in its proper place and all methods are the most economical and approved truly deserves to be termed systematic. Such management may be considered as ideal, but such an ideal may well be sought by many a man with profit to himself.

Summer Care of Heating Apparatus.

It is a well recognized fact in the heating trade that use does not wear out steam and hot-water heating apparatus so much as *disuse*. Not the winter months, when heat is actively maintained, but the summer season, when the apparatus lies dormant, is the time when the metal of heating plants suffers the most. Contact of hot water or steam with the inner surfaces of heating boilers, pipes and radiators affects them very little; and when the pipes are hot, exterior surfaces are scarcely ever attacked with rust. But let the apparatus stand in a humid atmosphere in summer, and rust will eat into all unprotected parts. Hence, to preserve a heating apparatus requires some special attention at, or soon after, the time it goes out of use in late spring or early summer.

Exterior and Interior Protection.

All exposed pipes or metal surfaces should be covered with a suitable protective coating. For pipes, a good quality of black japan varnish should be used. Coils or radiators should be painted or bronzed, and pipes wrapped with non-conducting material ought also to be painted with black japan varnish, because both air and moisture will penetrate the porous insulating material and get in their fine work upon the metal surfaces if the latter are left unpainted. When heat is no longer wanted, the furnaces, flue spaces and the smoke pipe should all be thoroughly cleaned. The accumulations of soot from fuel draw moisture, and, when moist, these are corrosive in their action upon iron, especially when the repellant effect of heat does not counteract this tendency. The cleaner the metal can be kept when out of use, the longer it will last. As to whether it is better to leave water in or out of pipes and boiler, there are conflicting views. Pipes filled with cold water are not much attacked by rust if air be excluded; but in a hot-water system valves may get to leaking, or other leaks may take place, and many prefer to draw all the water off when the apparatus goes out of use. A good way with either steam or hot-water apparatus is to heat up the plant and then draw out the water while hot, leaving open the air valves and blow-off cock till the whole system has had time to dry out, which, when the surfaces are hot, will be not not more than an hour or so after the water has been drawn out. Then everything should be closed to exclude any interchange of air to and from the interior. If these precautions are strictly observed each season, an apparatus may be made to last some years longer than it would if neglected.

A Departed Race.

Easily within the recollection of many now living is the time when the inhabitants of rural districts obtained supplies of tinware largely from itinerant venders, who, in country parlance were called tin peddlers. Great was the delight of the farmers' children to see coming over the brow of the hill the quaint wagon, hung about with its glittering wares, and when it stopped before the house how they used to cluster about it, curious to see what its interior contained. The owner of the vehicle and its contents was a peddler of news as well as of tinware, and hence was always welcome to the house whether anything in the tin line or not was wanted. He was often a quaint character who could crack his joke with the best, could tell a good story, or sing a song, and so when he stayed over night, as he would be apt to do if arriving at nightfall, paying for his accommodation in tinware instead of coin, he became the center of an interested group. The race of tin peddlers has gone the way of many other peculiar characters who flourished a few years ago. The large manufactory and the village store were too much for him, and he no longer adds a picturesque feature to travel on country roads, or brings an occasional relief to the monotony of the farmer's life. But in his day he was useful, honest and industrious, and an interesting factor in a trade that while it has outlived the tin peddler, has grown into proportions that give it rank among the world's most important industries.

The Local Tinshop.

The local tinshop has also felt the effects of the centralization that is going on in all lines of manufacture. From stores of manufactured goods kept in these shops the tin peddler used to stock his wagon, and before such a shop was frequently seen standing the peddler's vehicle, while the owner was inside making purchases. In those days all time between outside jobs was put in making up goods, as a lot of tin candlesticks, a quantity of milk pans, tea kettles, pie pans, pepper boxes, tin funnels and so on, all of which were stock articles, sure to sell at prices that would yield a profit. Then a journeyman tinsmith could travel from town to town, sure of finding employment without tramping off the soles of his boots; and there were many of them who knew more about the geography of the country and the peculiarities of the towns and their populations than the Congressman from the same district. Now the methods and tools then in vogue cannot be used for general manufacturing in competition with factory methods and machines, and the old-time tinshop, with its hand methods, has changed into a place where about all the work is tin roofing and the manufacture of tin and sheet-iron work for heating apparatus. There are yet journeyman tinners, but they are not the journeymen of old, some of whom could make anything that could be made of tin, and who could lay out patterns for any kind of work. The local tinshop as it used to be has gone with the race of tin peddlers.

The Pratt Institute of Brooklyn.

Few nobler or more beneficent monuments have been left by American men of wealth than that which perpetuates the name and memory of the late Charles Pratt in his native city of Brooklyn. The great educational establishment known as the Pratt Institute, to one phase of which we have referred in another column, based as it is upon an appreciation of the dignity, as well as the value, of intelligent handicraft and skilled manual labor, stands out as a grand and enduring

testimony to the truth and soundness of its founder's conviction that the manual and industrial education of its individuals underlies all the prosperity and progress of a community or a nation. The idea of a perfect education conceived by this practical philanthropist is one in which mind, eye and hand are together trained, securing symmetrical development. This idea it is which is being carried out in its integrity in the Pratt Institute. While literature, science and art are taught, the students, both male and female, are trained in handicrafts of some sort, as an essential part of their general education, although they may not propose adopting manual labor as their business or profession in after life. This feature is considered on an equal basis with the regular academic studies, and is calculated to invigorate the mental faculties of the student and prepare him more fully for the ordinary activities of life, giving him a discipline and strength of judgment which cannot fail to have a fortifying effect upon his character. To those, however, who do propose to take up a handicraft as their calling in life, the education such an institution offers, adding mental to manual training, must be invaluable.

Ten Years' Progress.

"No other country in the world ever advanced in population and wealth as the United States is doing. The progress of the past shows no signs of halting. In fact, the development of our foreign and domestic trade and commerce, and of our industrial interests, is steadily broadening out." So writes Richard H. Edmonds in an interesting and instructive paper recently contributed to the *Engineering Magazine* and the facts and figures marshaled in support of his verdict amply bear out its justice. A progress truly marvelous in character and extent is demonstrated in the history of the United States for the decade 1880–1890. Comparison of the statistics of population and wealth at the former period with those shown in the returns for 1890 reveal a growth and expansion absolutely unparalleled in the world's history. It has been, moreover, a well-proportioned growth, a steady advance all along the line of population, commerce, industries, and all that makes for the material prosperity of a country, including education and intelligence. The presentation of a few facts culled from the paper above quoted will give some conception of the amazing progress of this country during the ten years in review, a decade which, it may be mentioned in passing, will stand in history as, above all, remarkable for the great developments in the application of electricity which it witnessed. Twelve years ago that force, as applied to power, motive and illuminating purposes, was just in its infancy, and the aggregate capital invested in it was small. To-day it reaches a sum estimated at $800,000,000.

In the ten years from 1880 to 1890 the population of the United States increased from 50,100,000 to 62,500,000, or 24.8 per cent. This means that 3,000,000 more inhabitants were added to the population than are contained in the aggregated populations of the 28 American cities numbering over 100,000 of population to-day. A striking illustration of the remarkable growth of Western cities, especially during the decade, is shown in the following instances, which give a good idea of the extraordinary development which has taken place in that section of the country:

Population of	1880.	1890.
Chicago	503,185	1,099,850
Minneapolis	46,887	164,738
Omaha	30,518	140,452
St. Paul	41,473	133,156
Kansas City, Mo.	55,785	132,716
Denver	35,629	106,713
Lincoln, Neb.	13,003	55,154
Los Angeles, Cal.	11,183	50,395
Portland, Oregon	17,577	46,385
Duluth, Minn.	3,483	33,115
Seattle, Wash.	3,553	42,837
Tacoma, Wash	1,098	36,006

And we find that wealth has increased even more rapidly than population. The gigantic railroad and industrial developments of the decade enormously increased the volume and value of property. It is estimated that the absolute wealth of the United States in 1890 was about $63,648,000,000, or an approximate gain of $20,000,000,000 in ten years, leaving out of account the increase in railroad property. At the end of 1880 we had 93,200 miles of railroads with capital invested to the extent of nearly $5,000,000,000. At the end of 1890 these figures had increased to 166,700 miles of railroad representing a capital of little less than $10,000,000,000. The gross value of manufactures during 1890 was about $8,600,000,000, against $5,300,000,000 in 1880, showing an enormous gain of $3,300,000,000. The capital invested in manufacturing industries reached $4,600,000,000, against $2,700,000,000 in 1880. The wages paid to employees in manufacturing establishments in 1890 were $500,000,000 more than in 1880: and the number of hands employed increased 900,000 during the period of ten years. In the progress of manufacture all industries alike show remarkable growth. The manufactured iron produced in 1890 showed a gain of 150 per cent. over the amount put out in 1880, and similar increase was marked in all departments of industrial effort. The mining industries also show similar expansion, having turned out $656,600,000 of products in 1890, against $369,000,000 just ten years before. This gain touched every branch of mining, but was principally marked in the output of coal, silver, copper and petroleum. Agriculture shared in the progress, but not to as great an extent as did the industries alluded to. A gain of $100,000,000 in value of agricultural products is, however, noted in 1890 over 1880. In concluding this cursory sketch, it may be well to mention that the national banking capital of the country increased from $467,000,000 to $662,000,000 in the ten years; and the deposits in savings banks from $819,000,000 in 1880 to $1,550,000,000 in 1890.

The Bertrand Process for Rust Proofing, Tinning and Enameling Iron.

Among the various means in use to protect iron from oxidation the Bower-Barff process, or some modification of it, has proved the most successful. It is well known that by this process a coat of permanent magnetic oxide is deposited on wrought and cast iron which, if proper care has been taken, will protect the coated surfaces for all time. This method has been in use in this country for many years and has given very satisfactory results, but owing to the necessity of a rather costly special form of furnace and the limited output of such furnace, its use has been restricted and has never reached the development that a cheap and rapid method of producing a coating of permanent oxide upon iron articles of any size or weight should have reached.

Researches in this direction have been going on for some time, and lately Pierre Henry Bertrand of Paris has brought out a new process by means of which iron can be coated with magnetic oxide rapidly, cheaply and effectively, in any furnace of ordinary construction. M. Bertrand discovered the fact that, when an iron article previously coated with a thin layer of a volatilizable metal or alloy is heated to a temperature at which the metal or alloy is volatilized, the protection afforded by this layer prevents the free access of oxygen to the iron surfaces, and the resulting oxide, instead of being a sesquioxide, or Fe_2O_3, is a magnetic oxide, or Fe_3O_4, of a fine blue slate color.

M. Bertrand, perceiving that the ultimate success of his process depended upon a cheap and rapid way of placing upon the surface of the articles to be blued the first thin layer of alloy, developed a new method by which this can be done in a few seconds. It consists in the preparation of a bath or mixture in which the salts of the metals to be deposited are dissolved. Upon simply dipping the articles in this bath, without the aid of electricity, the metals of the salts are quickly precipitated upon the surfaces, so that the whole operation of alloy, coating and oxidizing is completed in 30 to 40 minutes. No special furnace is needed, and all there is wanted to form the coat of oxide is a stay of about ten minutes in an atmosphere of about 1000° C. With proper charging arrangements the furnace can run continuously at the rate of two charges an hour. The operation is very simple and requires no specially trained men, so that the process can be installed in any foundry at a trifling expense.

Pursuing the problem of coating articles with a thin layer of volatilizable metal or alloy a little further, M. Bertrand has succeeded in causing a durable coat of tin to be deposited on cast iron. The method is simple and inexpensive and is used extensively now in coating the inside of cast-iron cooking utensils, which are thus kept from oxidation and preserved from the usual inherent iron taste.

Further experimenting with articles coated with magnetic oxide by his process led M. Bertrand to discover a very cheap method of covering such articles with a layer of enamel, which may be varied in design and color, as enamels usually are. The interesting part of this method is that any article of cast or wrought iron or steel may be enameled in any color at one single firing. Articles thus doubly coated with the magnetic oxide and enamel are non-conductors of electricity, and this property has led to their use in various electrical devices, such as parts of dynamos, isolating plates, conduits, &c. The oxide coating and enameling occupy less than an hour.

These processes have been in practical use at M. Bertrand's works in Paris for nearly two years, and the results have proved highly satisfactory. The usual products of the works are blued and tinned cooking utensils, blued and enameled soil pipes, enameled parts of electrical devices, blued railings and stable fittings, enameled mantel pieces to imitate various marbles, blued and enameled drinking fountains, &c. The pipe foundry at Pont-à-Mousson, the largest of the kind in France, has acquired the right for bluing and enameling gas and water pipes, and the cheapness with which these operations can be carried on bids fair to develop a large trade, not only in that line, but in the coating of all iron exposed to the weather. M. Bertrand has an interesting exhibit at the Columbian Exposition in the French section of the Electricity Building.

THE LETTER BOX.

Thickness of Tank Material.

From C. A. N., *Alliance.*—Will you let me know through the columns of the paper whether a tank made of No. 20 galvanized iron, 54 x 54 inches, would be of sufficient strength to hold ten barrels of gasoline? I riveted the side seams and double riveted the bottom.

Answer.—If the tank is cylindrical and strengthened by bands of $\frac{1}{4}$ x 2 inch iron at frequent intervals, and well secured otherwise, the No. 20 iron will stand, but a much heavier gauge is preferable. If the tank is to be rectangular its hight would be about 40 inches to hold the quantity mentioned, and in that case much heavier iron should be used. Braced only with angle iron at the top, a well-established tank maker states that iron $\frac{1}{16}$ inch thick should be used. If a number of angle-iron braces are used to stay the sides, and are put on so as to give the greatest strength, much lighter iron could be used, but a heavy material would save the extra labor and cost of the extra angle-iron braces.

Dangers of the Copper Kettle.

From E. T., *Boston.*—Those who have been connected with the sale, manufacture or use of copper cooking utensils, having the interior nicely tinned, must be somewhat surprised in reading the following account regarding how so-called copper kettles deport themselves in England. A correspondent of the Sheffield *Telegraph* says: A Sharrow gentleman was always unwell at home and invariably got better when he left. The symptoms were those of lead poisoning, including the much dreaded "drop-wrist." An idea struck him. It was the copper kettle. He had it cut in two and found the alleged copper kettle was three parts lead, which the hot water had liberated and assimilated with the sufferer's system. The copper kettle has been discarded and there is no more ill-health. A gentleman brought me the lid of one of these so-called copper kettles. The surface only was copper, the rest was lead, which left the copper freely to the thumb touch. It is said that a large number of people have recently experienced all the effects of lead poisoning and the evil has been traced to the copper kettle, which is now a discarded utensil in many households.

The Sharrow gentleman little thought when he purchased the bright copper kettle that it was to be the means of starting a lead mine in his interior and be as bad for his health as an army of microbes. If this gentleman was unwell while at home and got better when away, and if lead soup from the copper kettle caused his illness, he certainly recovered rapidly when out of the house. It is also stated that when the copper kettle is cut in two it is found to be three parts lead. Was there ever a copper kettle made that was even lined with lead, let alone being three parts lead? The cover belonging to another kettle is put on trial, and it is stated that it has a copper surface only, the rest being lead. Can lead masquerade as copper and become so demoralized as to be removed with the thumb? As a friend of the copper kettle, I would like to be informed by the readers of *The Metal Worker* if there is any truth in the story regarding lead-lined copper kettles as told in the above article.

A Leaky Steel Roof.

From B., *Medina, N. Y.*—I am troubled with a steel roof leaking at the seams. It is a steep roof with flat seams, and paint does not stop the leaks. Please inform me, through the columns of *The Metal Worker*, if there is any kind of paint or cement that could be applied to the seams that would stop the leaks.

Answer.—It is taken for granted that the roof our correspondent mentions really leaks, and that the trouble is not due to the condensation of moisture on the underside of the roof. Regarding what kind of paint or cement to use, there are a number of kinds of roofing paints and cements that would overcome the difficulty if properly applied. As it appears that paint alone is not adapted to stopping the leaks, it is suggested that cloth be tried in connection with a good quality of roofing paint or cement. First clean the seams by removing all dirt or scaly paint. Then take unbleached cotton muslin, in strips about 2 inches wide, and either saturate the same with thick paint or spread on roofing cement. The leaky seams are then to be painted and the cloth applied, being rubbed down smooth by means of the brush, so as to be brought in close contact with the roof. Cloth thus applied is sufficiently elastic to withstand the expansion and contraction to which metallic roofs are subjected.

Noisy Wash Basin.

From I. R. S., *Norwich, N. Y.*—I would like to learn through *The Metal Worker* what is the cause of the noise heard on emptying some wash basins? I have had trouble in this regard, and would like to find out the cause so that I might apply a remedy.

Note.—Our correspondent writing from the country, it is fair to assume that all the plumbing is not up to the modern standards, and that there are a good many traps in the houses without vent pipes, and a good many fixtures without traps. Under some circumstances this might account for the noise which might be produced by the air gurgling up through the column of descending water when the stopper was removed. If the lower end of the waste pipe was not free there would be more opportunity for this trouble, as the air could not escape along with the running water. Sometimes the waste pipes are so arranged as to increase the vibration and make the sound unnecessarily loud. But the satest remedy is to ventilate the traps, and see to it that there is a free flow from the lower end of the pipe.

Furnace to Heat Three Stores.

From CÆSAR, *Louisville, Ky.*—I notice an article in *The Metal Worker* of June 10 on heating three stores with one furnace. With a little figuring, I find that "E. E. W." has three 16-inch hot-air pipes, equal to 603 square inches area, and also three cold-air pipes, 14 x 15, giving 630 square inches of area. I think this is reversing the order of piping radically. We have in this job 73,920 cubic feet to heat (allowing at least 14 feet for elevation), which is near the estimated capacity of the largest furnace under favorable circumstances. To handle this amount of air from the outside, subject to an expansion of at least one-quarter, requires 600 square inches area and an outlet for the hot air of not less than 750 to 800 square inches. Now, "E. E. W." has a greater cold-air supply, which is expanded, probably, one-sixth above its normal condition, than he has hot air. This, in my opinion, will choke in the casing and retard the flow considerably. Let him increase the hot-air to 900 square inches, and let the north room have a cellar pipe at least 2 inches larger than either of the other two, and increase his cold air to 850 square inches. A reason for the latter is the cold air is already expanded to a certain extent and, consequently, requires a larger inlet. The remarks on elevation, &c., need no comment. My experience teaches me that to handle 75,000 cubic feet of air, 900 to 1000 square inches are necessary for hot air, and from 600 to 850 inches of cold, according to circumstances. Under this rule I am heating one store of 143,000 cubic feet, and another of 126,700. The first is heated at an expense of 50 cents per day. The latter has given such excellent satisfaction that the owner has notified me that he is going to build another house and wants another furnace.

Stafford's Extension Boiler.

From C. G. R., *Brooklyn, N. Y.*—Will some of your readers inform me through *The Metal Worker* where I can get repairs for Stafford's extension boiler, patented December 23, 1884, by the Buffalo Steam Heating & Mfg. Company, Buffalo, N. Y.?

A Steamer for Bugs.

From A. L. H., *Pocahontas, Va.*—Will some brother be so kind as to give through *The Metal Worker* the address of some tinner making a steamer to be used for killing roaches and bedbugs with steam?

The Government of India has sanctioned the formation of an engineering school in Burmah for training native youths for subordinate grades in the Public Works Department.

PLUMBING and GAS FITTING.

Things of Interest to the Plumber at the World's Fair.

The exhibits of plumbing goods are by no means truly representative of the industry of manufacturing in the United States, as many of the largest and most prominent houses are conspicuously absent. This may be due to activity in business, inability to secure acceptable space, the reluctance to enter into the enormous amount of tedious labor necessary and the expense following, or some other satisfactory reason that is not offset by the advantages derived from displaying goods before so many million of sightseers. Though only about a dozen of the exhibits that are grouped together just northeast of the center of the Manufactures Building are noticed here, there are many other goods of various character of equal interest, notably the pipe cutting and threading machines in Machinery Hall. Of what may be termed the plumbing exhibit it can be truly said that though the common, well-known and all-essential goods of every-day use are absent, what is displayed is largely of the specialty character, and correspondingly interesting.

STANDARD MFG. COMPANY,

Pittsburgh, Pa., were fortunate in securing a generous space which they inclose with columns of quartered oak and cover with a ceiling paneled, between the oaken rafters, with olive green plush. The floor is covered with an olive velvet Brussels carpet, and silk plush tapestries are draped back to the oak columns. At one side heavy silken cords and plush *portières* draped back inclose a magnificent bathroom. The floor, side walls and ceiling are tiled with white tile with a border at the top of the wainscoting of fluted tile with a gold band at the top and bottom. Above the wainscot the tiles are embossed with a *fleur-de-lis* in two sizes, the smaller one in gold. The ceiling tiles are secured by gold-plated studs giving the effect of stars. The room is furnished with a fine white enameled bathtub with a shower bath and curtain and a foot bath. The tubs are decorated with a row of olive *fleur-de-lis* between narrow gold bands. An onyx washstand is beneath a plate glass beveled-edge mirror in a narrow gold frame on the wall. A handsomely decorated Securo water closet completes the furniture. All of the pipes, cocks and fixtures are gold plated, giving a beautiful effect and making the bathroom in itself a most attractive exhibit, but the larger space is equally interesting to the plumber. There is a pool bath 52 inches square, white enameled, decorated with gilt bands, a mammoth bathtub similar to 12 that were furnished for the Mormon Temple at Salt Lake City for some religious ceremony, and several samples of their regular enameled tubs decorated in different styles, with a sitz bath, complete their display of bathtubs. Along the wall they show their Securo water closets in working operation, and a slop sink and some laundry tubs complete the exhibit.

PECK BROS. & CO.,

Chicago, New York, Boston and New Haven, attract the visitor with a fine display of plumbing fixtures, each one of which is a specialty. A Mosaic floor and a wall of hardwood in panels is inclosed by a railing, the nickel plating of which challenges admiration. The railing is acceptably ornamented with stop cocks of different styles, and at one end runs up into an arch supporting an artistic design in wrought-iron work, into which their name is worked. The arch is made to display different styles of basin cocks, by slabs of white marble, onyx, and old red Tennessee marble being a part of it. The arch also displays three drinking fountains of carved marble with a swan's neck supply. Through the center of the space a white marble portion is run with a space at each end. To this portion is attached a most elaborate display of lavatories, and, in addition to each one representing some special style of fixture for supply or waste or combination fixture, the beauty of the slabs to which they are attached is increased by the variety—a superb white onyx contrasting with a white marble slab. Other slabs are of Arizona and Mexican onyx and African yellow Sienna, Rose Numidian, Anstrian, violet and handsome selections of domestic and foreign marbles. This display of different marbles and onyx, as well as the various styles of nickel plated or solid bronze fixtures, will be of great interest to many plumbers and an education to the public. At the end of this display are some new goods in barber's lavatories, to which a shower bath is attached. Against the back, a handsome old red Tennessee marble stand is shown, with a mirror in a frame of the same material, for use in the hall of the modern residence. Another special attraction is a shower bath, circular in form, so made that water is sprayed in needle jets a couple of inches apart from every pipe or from a bidet, a jet, a douche or a shower, as desired, and a special mixer governs the temperature at any degree. Another feature is the array of Triple Jet, Gauntlet, Dorado and Glencoe water closets and their decorations. The flush tanks are of selected ornamental woods, and the shapes used in this display were specially designed for it. A silken canopy of the now popular "baby blue," with border of garnet and a silk fringe, hangs above.

SMITH & ANTHONY STOVE COMPANY,

Boston, New York and Chicago, have a very complete exhibit of their sanitary specialties. One side is devoted to water closets and a slop sink. The back displays lavatories and a hotel dish-washing sink with tank and grease trap. In the center is an enameled bathtub and an inclosed shower bath, formed of nickeled bars and curtains, intended for use over a drain and trap in the floor. The operation of their water closets and traps is shown by cutting away parts and cementing glass over the openings.

DAWES & MYLER,

New Brighton, Pa., make a specialty of sanitary enameled iron goods, and display some fine samples. The bathtubs attract great attention by their smoothness and the beauty of the decoration, mermaids and cupids, apple blossoms and flowers figuring largely. Sitz baths and foot baths, with lavatories, complete the display, which is by no means a full sample of the varied line of sanitary goods manufactured by the house.

OSWEGO INDURATED FIBRE COMPANY,

Oswego, N. Y., have carpeted their floor and inclosed it with an oxidized copper rail, and show bathtubs in different styles, plain and white, gilded and elaborately ornamented with designs in colors. Hip baths, lavatories and water closets of similar finish make an interesting display.

ALBERENE STONE COMPANY

of New York, Chicago and Boston, quarry a stone in Virginia that they claim is specially qualified for their purposes, by being of an even hardness and non-porous. Their display is attractive through the arrangement of griddles and culinary articles, with sinks and laundry tubs, the joints of which are of the dovetail character and cemented.

NORTON BROS.,

Chicago, display their hermetic seal, noiseless water-closet on a space which has a tile floor into the design of which their name is worked. The space is inclosed at the back and one end by a 7 foot wall, wainscoted with a cream tile for 4 feet, and above it is a scroll ornamentation with a molding to finish at the top. Against this the closets in different styles of finish, with the flushing tanks, are arranged. The closet works positively by a lever, which opens a valve of large capacity, emptying the closet, and when closed has in addition the usual water seal to prevent escape of gas and odor. The seal cannot be broken by syphon.

THE LENIER, JOHNSON, HOYER MFG. COMPANY,

Chicago, manufacturers of plumbers' brass goods and supplies, inclose a space of polished hardwood floor with a brass rail, and exhibit in showcases polished brass and nickel-plated bath, lavatory and sink stop cocks, a line of brewers' goods and hose fittings, with samples of enameled baths and sinks, water closets, air pumps and force pumps.

STEEL CLAD BATH COMPANY,

Detroit, Mich., make an interesting exhibit of bathtubs and fixtures. The tubs have an outside shell of steel, lined with planished copper, have a hardwood rim and are supported by four ornamental iron feet. A basin attachment is shown that can be used in connection with the bath where no lavatory is furnished, and a shower-bath attachment is exhibited which is a combination of the bath supply.

THE KILBOURNE & JACOBS MFG. COMPANY,

Columbus, Ohio, greet the eye on entering their exhibit, the letters being in dark wood in a hard-wood floor that has a wall of Troy border. A pot of

Japanese design, holding a palm, is in each of the front corners. Against a carved-oak back, bearing their monogram and in carved and gilded letters, "Wrought Steel Sinks," a fine display of these goods is made in different colors and decorations. At each side is a pantry table, covered with zinc and draining to a sink in the center and provided with hot and cold water cocks. All of these goods are enameled and claimed to be unaffected by heat.

STEWART CERAMIC COMPANY,

New York and Chicago, make an elaborate display of solid white crockery, stationary washtubs and butler's pantry, slop and kitchen sinks. The goods are all set up on oak platforms and the floor aisles are paved with blue and yellow tile. The exhibit is inclosed by a railing, embellished by wrought iron work decoration.

INSTANTANEOUS WATER HEATING COMPANY,

Chicago, show their rapid water heating apparatus in planished copper, nickel plate and oxydized nickel. Water is sprayed on cylinders that are heated by a gas burner, and about 30 gallons of water are heated in ten minutes, using 1½ feet of gas per minute. A portion of one of the apparatus is cut away so that the operation can be seen. The water heated to show the visitor is run off into a

BISCHOFF & CO.

steel bathtub, which is stamped up from one piece of metal and painted both sides. These tubs are claimed to be specially cheap. They are made at Bischoff & Co.'s factory in Chicago.

THE DAY MFG. COMPANY,

Detroit, Mich., show Day's Instantaneous heater and bathtub combined, in several different attractive styles, one of which to all appearances is a plush-covered couch, another a walnut, cherry or quartered oak wardrobe, but on uncovering an instantaneous water heater appears and a full-sized bathtub, only needing hose connections for the water and gas supply, or gasoline, to be used.

THE MOSELY FOLDING BATHTUB COMPANY,

Chicago, display in a cabinet of hardwood finish with a handsome plate-glass mirror their folding bathtub as it appears when not in use. On lowering the front the bathtub comes in view, as well as their apparatus for heating water, so that the hose connections for supplying the water and gas (or gasoline may be used) are all that are needed to enjoy this modern convenience in a desert.

M'CAMBRIDGE & CO., LIMITED,

Philadelphia, attract the passer-by to an elaborately fitted modern bathroom by a handsome front to their rooms, which are covered with a rich moquette carpet and lighted by electricity. One side of their reception room is provided with easy chairs for their guests, while the wall on the other is used to display handsome water closets, urinals and lavatories, fitted up with nickeled or gilded pipes and flushing tanks with nickeled trimmings or carved decorations. The special feature is the bathroom.

THE STRONG-BOYCE COMPANY,

Indianapolis, Ind., make a fine showing of the Strong water closet, the feature of which, the flushing tank, is hidden or may be in another part of a building away from the closet. The closets are shown in four different styles, from the plain to the handsomely decorated. They set on marble slabs, on a tile floor, and against a wall that is partly tiled with a colored tile border, the upper part being covered with linerusta-walton.

The Rundle-Spence Mfg. Company.

The Rundle-Spence Mfg. Company furnish an example of what can be accomplished by merit, push and fair dealing in their rapid growth to a large producing capacity, which is continually taxed to supply the demand. Located in Milwaukee, Wis., they have a large five-story building on Second street, and a foundry a short distance away. The first floor of the Second street building is used for private and business offices, a fine showroom and a large shipping department. The showroom is filled with plumbing fixtures of the latest design and highest grade. The space is divided by a center and two side aisles, and contains a fine display of bathtubs of wood fiber, steel clad, copper lined and enameled iron, the latter in different styles of elegant finish, with samples of both sitz and foot baths, all furnished with handsome nickel-plated fixtures. On the other aisle are arrayed laundry tubs of slate, ceramic and brown Yorkshire ware and slop sinks, all set up exactly as they should be in use. On one side at the end they make a show of their Iroquois water closets, with flush tanks, and their newly patented back, nickel plated, which makes a neat finish against the wall at the seat. Urinal stalls in both slate and Tennessee marble and a water closet enclosed in Tennessee marble show the plumber what the house can furnish in this line. On the opposite side is a fine array of lavatories, with handsome fixtures and decorated basins, one in onyx, that is particularly noticeable, and others in marble of different colors. The upper part of the walls display a fine exhibit of basins of different color, shape and decoration, tastefully arranged. In the front, which is one large glass window, is a Rider gas engine, some pumps, and enough attractive goods to bring the passing plumber inside to secure further information. A long table in front of this window displays many of their specialties, all nickel plated, including soap trays, sponge racks, air chamber on basin supply, stall legs for urinals, model supply and waste for baths, brackets, all of which they make in their own shops. The second floor is largely devoted to porcelain goods and general stock. The third floor has the brass-finishing shop and nickel and polishing plant. On the fourth floor is the machine shop for iron work, and the back half is devoted to storage of pumps, bathtubs and some special porcelain goods. The fifth floor is a large brass foundry, with its core-makers and ovens and furnaces. Having these manufacturing facilities directly under the eye of the office, with the shipping department in the same building, an order seldom remains long unfilled.

Across the river, a few blocks away on the railroad, is their iron foundry for making soil pipe, fittings and sinks, besides the many other cast goods the plumber requires. Features of their fittings are their length and the large sweep of all bends. A uniform thickness and a smoothness of surface is claimed for their pipe and sinks especially. The foundry is 100 x 150 feet, and runs as smoothly as clockwork, by providing good patterns and materials and pursuing a generous course with all employees. The core-making machines for making cores from 2 up to 12 inch diameter are of their own construction, modified from designs in use, but are to be supplanted by a different machine of their own design which the house has under consideration. The location of the rumblers, cleaning room, grinding shop, coating pots and warehouse is so arranged as to require the least expenditure of labor in handling the product of each day's labor, and storing it in the warehouse, which is three stories and cellar, 35 x 130 feet. The iron, coal and coke are delivered at convenient points from the freight cars, and on an independent inclined railway cars are drawn directly to the cupola house, to be convenient for charging.

A peep at the foreman's books shows that the percentage of loss is small. Both of the leading spirits of the company are practical plumbers who earned a reputation for good work, and this experience has been no small factor in their success, as it enables them to comprehend the needs of the trade and meet them promptly. With the growth of their business the demands made upon them for information keep Edward O. Geran, their consulting and hydraulic engineer, busy studying advanced methods and giving instructions about the setting of plumbing goods made by them. The fixtures in the Hotel Pfister, an exceptionally elegant hostelry, were selected from their stock, and the fixtures in the Wisconsin Building at the World's Fair will enable the plumber who did not attend the recent convention to see some of their regular stock goods in use.

Reports of State Vice-Presidents.

We print below reports of the State vice-presidents read at the convention of the National Association of Master Plumbers last week in Milwaukee. The following reports are in addition to those presented in our last issue:

Pennsylvania.

BY J. L. M'SHANE.

I herewith submit my report from the State of Pennsylvania, which you will find very brief owing to my inability, on account of business, and not having sufficient time to give association matters the necessary attention. However, I made a special effort to let the master plumbers of our State know that we had a National Association. I sent to all of them an invitation to come here to Milwaukee and join us. I mailed to nearly every master plumber of the State (in all about 800) the following circular:

OFFICE OF J. L. M'SHANE,

State Vice-President of the National Association of Master Plumbers, 19 Seventh avenue.

PITTSBURGH, April 26, 1893.

DEAR SIR: In conformity with the progress made in other States I am anxious to receive the co-operation of all master plumbers of our State to the end that we may perfect a strong State organization and have each city and town represented at the next National Association, to be held in Milwaukee in June.

With this object in view, I would be pleased to have you send me the names of all master plumbers in your city and vicinity, and that you express your opinion as to the possibility of forming a local association there. I suppose you know the object of the National Association is to protect the trade against the manufacturers and jobbers in plumbers' supplies from selling direct to consumers, and to protect our members in their determination not to put up any material unless furnished by themselves. The old Keystone State should stand in the front rank in this respect, and if you will aid in the work we can accomplish our object.

It is the purpose to organize a Pennsylvania State Association at the Milwaukee National meeting, and we would like you to be there to aid that object. The *per capita* tax is but $2 per year, and the trade benefits beyond computation.

Will you kindly write me your views on the matter? Fraternally yours,

J. L. McSHANE.

With each circular sent out I inclosed a copy of the Baltimore resolutions. I received replies from nearly every section of the State, all of which were very encouraging, and I am pleased to say that association matters throughout the State are on the increase. We have five cities of our State represented here, and I am certain that if we accomplish the formation of a State association we will have double this number of delegates from our State at the next annual convention.

Ohio.

BY W. A. KELLY.

As State vice-president of Ohio I herewith beg leave to submit my annual report.

Ohio, as she always has, still continues climbing the ladder of fame, looking out over this country for peace and prosperity, sometimes raising her muscular arms in self-defense and again extending them to the helpless and needy.

Always alert to the vital importance of rigid sanitary laws, she stands to-day one of the leading States in the Union and a section of the spinal column of this National Association. She has passed laws, rules and restrictions that have made her one of the healthiest States in the Union, and the plumbers of Ohio deserve credit for the adoption of a great many of her sanitary laws.

They have, through the adoption of laws governing plumbing, reduced certain diseases 50 per cent. in the last ten or twelve years, which the records of the Health Department will show.

Through the knowledge of the plumber (I do not mean tinker) thousands of lives are saved annually from the scourges of disease.

The plumber's whole thought and study is to dispel all filth and to procure for the people pure air and pure water, which are the most important necessities of life.

Thanks to the life of this association and the work of the plumber, the sanitary condition of this country has been revolutionized in the last decade; and if the good work continues during the next decade, the people will have no reason to fear the terrible plagues of disease that are promised so often.

With this object in view, the plumbers of Ohio are coming together, and at present 18 of the leading cities and towns in the State are thoroughly organized and awake to the great necessity of laws that will protect the lives of the people.

On the 14th of February last the plumbers of the State held their annual convention, and great interest was shown in this direction. Of course, we are working to a certain extent to better our own condition, and by combining in this direction we will soon show the people of this country the great importance of the plumber, thereby demanding of them the respect that to us belongs.

Texas.

BY F. J. MADDEN.

Texas is all O.K.

Illinois.

BY WM. T. GEARY.

I present herewith my report as State vice-president for Illinois:

During the past year local associations have been formed in the following cities:

Peoria, with 13 members.
Joliet, with 6 members.
Rockford, with 4 members.
Evanston and vicinity, with 13 members.

The associations in Peoria and Evanston, and several individuals from smaller towns throughout the State, have been affiliated with the National Association.

Thanks to the able efforts of its officers, the membership of the association in Chicago has also been very largely increased.

Many important questions concerning proper trade protection and other matters have been brought to my attention, and for their solution efforts have been made toward a closer relationship of plumbers in this State, which have resulted in the formation recently of a State association, in which are represented about 20 towns, and from this and the various local organizations much good work for the benefit of the trade in Illinois is expected during the coming year.

Wisconsin.

BY FERD. WITTIG.

I hereby hand to you my report as acting State vice-president of Wisconsin for the unexpired term of my predecessor.

Up to the present time we have not organized a State association, but we have formed local associations in various cities throughout the State, and I hope and trust that my successor in this office will accomplish that which probably may have been neglected in the past.

Missouri.

BY J. W. POWERS.

I beg leave to submit the following report, as vice president of the State of Missouri:

During the last year, by investigation, I find that the local associations throughout the State are in a flourishing condition. I might add with propriety that the association at St. Joseph is undoubtedly one of the most compact and fraternal bodies in the United States. Correspondence with master plumbers throughout the State not affiliated with the National Association has borne no fruit, as I have written to about 30 firms and individuals, setting forth all the possible advantages derived by affiliation, but as yet have received no reply from any of them. By observation, I sincerely believe that the organization of a State association in Missouri, under the jurisdiction of the National Association, would eventually lead to a large increase in our membership. A word for our highly esteemed president, Mr. Sheehan, who has rendered me incalculable assistance in the solution of knotty problems pertaining to the local associations, also in the way of organization.

Minnesota.

BY O. W. HUDRIER.

I herewith submit report as vice-president of the State of Minnesota.

The report I have to make is not very flattering to St. Paul or Minneapolis. I find the Duluth Association holding its own, notwithstanding they had a very stubborn strike last summer. I made several visits to Duluth last year and this. They have a representative here at this convention. I have made several visits to Minneapolis with that good missionary worker, W. E. Goodman of Milwaukee, who succeeded in getting a few good members together, by which they have a delegate here at this convention. In regard to the St. Paul Association, I find it is utterly impossible to get some men that should be members, but who are altogether indifferent to their own interests or any others. The only reason I can give is that they are ambitions for work and want it all to the exclusion of all others, and my opinion is that there are no towns in the United States that need the missionary efforts more than the twin cities of St. Paul and Minneapolis. I have had communications from Peoria, Ill., and Des Moines, Iowa, in regard to the National Association, in answer to which I gave the necessary information

Michigan.

BY WM. H. SULLIVAN.

In April, 1892, the master plumbers of Bay City, with one exception, met and organized. On May 20 this exception became one of us.

Immediately after sending application for membership to the National Association, our endeavors were directed toward the forming of other local organizations in the State. After some persuasion the Saginaw plumbers fell in line. Then came to us inquiries from the other cities of Michigan, and knowing that "In union there is strength," it was with great pleasure we answered these several inquiries with the desired information

In March notices of a State association were sent broadcast through Michigan. In April the State organized. Then local organizations were formed in the cities of Jackson, Grand Rapids, Lansing and Detroit.

In our local we have six members, this including all the master plumbers of the two cities. Among us there exist harmony and friendship. The forming of our association has been an excellent thing for each and every one of us.

To-day we are in a prosperous condition, and we have no desire to go back two years.

Between the jobbing trade and our plumbers things are satisfactory, none that we are aware of having violated the Baltimore resolutions, except by one or two errors.

In conclusion, allow us to say that we are proud to know that we were the first organization of the State, not because it means prosperity for us, but because it means prosperity for every member of the National Association in Michigan.

California.

BY GEO. E. HOWE.

The following report of the condition of the association in California is respectfully submitted:

One year ago, at the time of my appointment as State vice-president, the Los Angeles Association was the only one in good standing in the State. Since then I have induced the San Francisco Association to reaffiliate and its membership has considerably increased. Have also organized new associations in San Diego, Sacramento, Stockton, Oakland, Pasadena, Redlands and Riverside, with one representative at Alhambra.

In Los Angeles, San Diego, Redlands, Riverside and Pesadena, all the legitimate master plumbers are members of their local associations.

Last April I organized the Oakland Association with six members, and it now has 25 firms represented.

In the southern part of the State there is at present no opposition to the Baltimore resolutions, the only firm opposing them having finally indorsed them after three years' refusal, and now appreciate the mutual advantage. While there have been violations of the Baltimore resolutions, the offending firm has satisfactorily adjusted the difficulty.

In the northern part of the State the Baltimore resolutions have not been observed—no positive action having been taken for their enforcement until recently.

At present a few of the San Francisco supply houses have not agreed thereto, but indications are that they will very soon, as fully 85 per cent. of the plumbing business is controlled by members of the association wherever organized.

In the southern part of the State we have good plumbing laws. In Los Angeles we have a practical plumber for inspector, and each master and journeyman plumber is required to pass an examination and register, while in the other cities they are only required to register.

In San Francisco any one can take out a plumber's license, as no examination is required, which is a great disadvantage to the sanitary condition of that city, as there are over 200 licenses issued, with less than 100 firms competent to do the work.

The idea of one State association for California has been considered impractical on account of the extreme length of the State, but if the National Association will permit two State associations, one each for the northern and southern portions of the State, they can be immediately organized.

Previous to this year the master plumbers of California have considered themselves too far away from the National Association to derive any protection therefrom, but the occurrences of the past year and the prompt action of the officers of the National Association has convinced them of its extensive power.

The efficiency and untiring zeal shown by President Sheehan and all the officers of the National Association have placed the California master plumbers under great obligations, which will never be forgotten.

Washington.

BY D. B. SPELLMAN.

It affords me great pleasure to submit to you my annual report as State vice-president of Washington. Our State is very well organized to-day. During the past year we have increased our membership 100 per cent. Local associations have been formed at Spokane and Tacoma, and with Seattle comprise the three principal cities of the State, the small towns associating with these cities and all affiliating with our State and National Association.

I called a State convention of the master plumbers to meet in Seattle on May 20, which resulted in the formation of a State association. Some 40 delegates were present from the following places: Spokane, Tacoma, Seattle, Walla Walla, Yakima, North Yakima, Ellensburg, Port Townsend, Schome, Whatcom, Snohomish. After the regular routine business attendant upon organization we elected the following officers: President, D. B. Spellman, Seattle; vice-president, T. H. Bellingham, Tacoma; secretary, F. B. Cleveland, Seattle; treasurer, Wm. D. Coffee, Tacoma. We adjourned to meet at Tacoma on the first Saturday in May, 1894. After adjourning we assembled at the Arlington Hotel to partake of a banquet tendered to the visiting delegates by

the Seattle master plumbers. On the afternoon of the 21st the delegates were given a trip on Lake Washington.

In Seattle we have a local association second to none in the Union, and are getting along splendidly by working in harmony with one another. All our supply houses have consented to make our members their sole distributing agents, selling plumbing goods to no others. We have a joint conference committee with our Journeymen's Union, and all is harmony with them, their members only working for members of our association, and we agree to hire none but members of their union. For the past two years we have been endeavoring to secure the passage of city ordinances to govern plumbing, and I am happy to state we have succeeded. We now have a city ordinance regulating plumbing and sewerage, and providing for the examination and licensing of plumbers. We have set aside a fund and add to it monthly, for the advancement of the trade and the education of the apprentice.

In conclusion I wish to thank President Sheehan for his advice and support, and the plumbers of my State for their friendly co-operation in forming our State Association, and my colleagues in Seattle for their untiring support.

Washington is in full sympathy with the National Association and sends best wishes for its success.

Plumbing Instruction at the Pratt Institute, Brooklyn.

The Trade School at the Pratt Institute, Brooklyn, which is one of the most interesting features of that great educational enterprise, is an institution which is in many respects a model of its kind. While the branches of handicraft taught are at present limited in number, the instruction given and the general arrangements of the manual training classes are the very best obtainable. Every appliance that can in any way enlarge the scope and promote the efficiency of the instruction is provided. Thoroughness of training is aimed at throughout the curriculum, which is extended considerably beyond the time generally fixed in trade training schools. Usually a six-months course is the limit allowed, but that in the Pratt Institute schools reaches over double that period.

TRADES TAUGHT.

The school forms a branch of the science and technology department of the institute, presided over by Charles R. Richards. It includes classes for practical and theoretical instruction in carpentry, machine work, plumbing and house, sign and fresco painting. Formerly bricklaying and plastering also were taught, but as it was found that instruction in these trades was not in such request as had been anticipated, the space allotted to them has been applied to an extension of the painting department. The work includes both day and evening classes, except in the case of plumbing, in which only evening instruction is at present provided. In the day classes, efficient length of time is had at continuous practice to prepare for practical work at the trades, the hours of session being from 9 a.m. to 5 p.m. on five days of the week, with three hours on Saturdays. The evening classes aim principally to broaden and extend the training of those already engaged in the trades. These are held from 7.30 to 9.30 p.m. on Mondays, Wednesdays and Fridays, and are used principally by apprentices and younger journeymen, who are in daily employment.

PLUMBING CLASS.

The plumbing department, in its general features, offers a fair sample of the methods employed throughout the school. The full course is one of two periods of six months each, beginning each year on October 1 and ending on March 31 of the following year, so that it extends over a period of eighteen months. A unique feature of this class, which is not, we understand, found in any other similar plumbing school, is its connection with the Journeymen Plumbers' Association of Brooklyn, which body co-operates in its direction. At the end of the two years' course a committee of the association examines the members in regard to both manual skill and knowledge of trade methods, and awards certificates to those showing satisfactory proficiency, which certificates, in case of the holder subsequently applying for admission to the association are accepted in place of the examination of like character otherwise required by the Brooklyn Association of Journeymen Plumbers. This arrangement was entered into at the beginning of the last term, and is said to work very satisfactorily.

Applicants for instruction in the plumbing class must by the regulations of the institute be between 16 and 25 years of age. All tools and materials are furnished without charge, but a fee of $15 is payable for each six-monthly term. Two well-known and experienced Brooklyn plumbers, John Todd and George Heath, conduct the course of instruction, which is carried out in a large airy, and well-appointed shop, equipped for about 50 pupils, and which is always fully tenanted during instruction hours. A row of benches runs around three sides of the room, at which each pupil has his own particular division, supplied with a separate gas furnace for melting solder and a drawer holding a complete kit of tools.

COURSE OF INSTRUCTION.

Instruction is both practical and theoretical, lectures being given from 8.30 to 9.30 o'clock every Wednesday evening. The manual work includes the use of tools, preparing wiping cloths, making soil, tinning soldering iron, brass, iron, lead and tin, making solder, soldering seams, making cup joint, over-cast joint, straight-wiped joint, flange joint and branch joint, working sheet lead into bends, traps, service boxes and safes, lining tanks, calking iron-pipe joints and bending with sand and kinking irons.

The lectures deal with the material used in the trade; the proper arrangement of drain, soil and waste pipes; trapping and ventilating the same; supply pipes, boilers, tanks, fixtures and pumps. Charts and diagrams are freely used in the instruction, and the examples of defective plumbing illustrated in the trade journals are frequently studied. Special pains are taken to make clear the principles underlying the plumbing rules of the city of Brooklyn.

The lectures are at times increased in interest by a visit to the Museum of the Institute, where a splendid collection of minerals, ores, and specimens of metals and alloys are displayed, and instruction given in the history, treatment, and general application of those bearing on the plumbing trade.

Some fine examples of the work done by the class are included in the general exhibit of the Pratt Institute at the World's Fair.

In all the classes of the Trade School, including that of plumbing, promptness and regularity of attendance are insisted upon, and continued absence or irregular attendance without adequate cause are considered grounds for permanent withdrawal of the pupil. Although the large majority of the pupils are drawn from the city of Brooklyn, there is no rule by which such are preferred. In fact, several young men now going through the course have come from distant parts of the country, including Washington, Iowa, and other Western States.

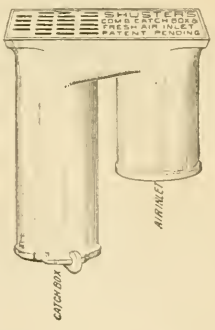
GRADUATION EXERCISES.

The certificates gained by students in the trade school during the past term were presented to them at the graduation exercises of the Pratt Institute, which were held in the assembly room of the building on Thursday evening last. The exercises were simple in character, consisting of prayer by Rev. A. S. Hunt; some excellent music by the Choral Society of the Pratt Institute, and a suitable address by the Rev. J. D. Burrell, followed by the presentation of certificates by Charles M. Pratt, president of the Board of Trustees.

Only three diplomas fell to the lot of the plumbers, those being given to J. B. Hagerty, P. Wallace and W. J. Wallace, Jr., all of Brooklyn. The reason the number was so limited on this occasion is that it is the first since the new arrangement was made with the Journeymen Plumbers' Association, and these three young men were the only ones who had fulfilled the conditions required. Next year it is expected that between 40 and 50 will be ready to graduate from the plumbing class.

Some Plumbing Specialties.

The cut, Fig. 1, shows a combination catch box and fresh air inlet invented and lately put on the market by L. Shuster, Jr., of Franklin and Willow streets, Philadelphia. The inlet ordinarily used is simply a square cap with a perforated top, unprotected, and allowing gravel, small stones, sand and other matter to collect in the trap



Some Plumbing Specialties.—Fig. 1.—Combination Catch Box and Fresh-Air Inlet.

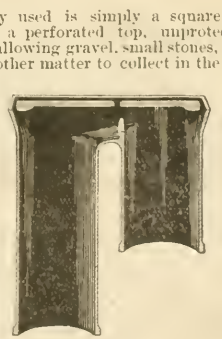


Fig. 2.—Sectional View.

and cause a permanent obstruction difficult of removal. When situated on a curb the ordinary inlet also presents an opportunity for deposit by the ever alert small boy of pieces of sticks and anything else that he can with a

little trouble pass through the holes in the cap. Fig. 2 shows a section of the combination. The catch box leads to the air inlet and has a top graded and recessed in such a way as to make it impossible for anything entering the air holes to pass into the trap, which is entirely covered. The bottom of the catch box has a plate or lid which can readily be removed to allow of the withdrawal of the contents. The combination is especially adapted for use on a pavement; but it may also be used where a pipe leads from a trap in the cellar.

Mr. Shuster is also putting on the market a new reducing Y, as shown in Fig. 3. Hitherto it has been customary

Fig. 3.—Reducing Y.

among plumbers when reducing one size of pipe to a smaller size to use a reducer, which necessitates an extra fitting and lead joint. The use of the new fitting obviates the necessity for a reducer and lead joint and makes a neater and more compact job.

Glycerine in Traps.

From SNIPS, *East Hampton, N. Y.*—What proportion of glycerine is used in water in filling traps in exposed places or in buildings not used in the winter season? What proportion is used in the air pumps connected with gas machines? Is there anything cheaper that will do as well?

Answer.—Inquiry among the plumbers in this city fails to elicit any information in relation to the use of glycerine for traps in unoccupied houses. The filling most commonly used is rock salt partly melted, which does not evaporate. Others use kerosene oil for the same purpose, and a large proportion use nothing whatever. We should be glad to hear from our readers in the matter, and also concerning the use of glycerine in gas machine air pumps.

TRAPS AND VENTS.

IN OUR REPORT last week of the eleventh annual convention of the National Association of Master Plumbers we printed the prize essay contributed by the Chicago Master Plumbers and written by Alexander W. Murray of that city. By an oversight, however, the verses entitled "The National Association," and signed "Orphan Boy," and which came appended to Mr. Murray's paper, were reprinted in a separate column and conveyed the impression that they were a distinct contribution, which was not the case.

GEORGE LLOYD, St. Catharines, Ontario, issues a tasteful little circular illustrating and describing Lloyd's Peerless water heater of his manufacture. The introductory note states that though the heater has only been on the market a short time, it has already proved a success. The pamphlet gives a sectional view of the heater, together with full description and particulars as to consumption of gas, &c. The closing pages are devoted to testimonial letters.

J. J. HAGGERTY, a plumber of New York, entertains some curious notions of suitable hot-weather exertion. Mr. Haggerty jumped off the Brooklyn Bridge one day this week when the temperature was at its highest. He was fished out of the river uninjured, and on being taken to the police station said he had taken the leap "for exercise," and did not mean to kill himself.

MAYOR BOODY of Brooklyn, N. Y., has appointed F. J. Gately and Michael J. Sherlin, master plumbers, and James J. Doody, journeyman, to be members of the Plumbers' Examining Board for that city.

IN THE BUSINESS CENTER of Milwaukee, Wis., will be found the Windsor Mfg. Company—a live metal house with two complete lead pipe making presses right on the ground. They make pipe of all sizes and thicknesses from ¼ inch up to 2½ inches, extra heavy double thick, and soil pipe up to 4 inches. They also make tin pipe, not house conductor, but pipe from pig tin. In addition to this, they make a full line of sheet lead of various widths and thicknesses. They carry solder and Babbitt metals, beside lead, tin, antimony, copper and spelter in ingots and bars.

E. N. SQUIRES dropped in on the plumbers in convention at the Pfister House, Milwaukee, meeting with a cordial welcome. The Dunning boiler is at home in Milwaukee, over 200 being installed and in some of the handsomest residences of the city.

A BILL for the registration of plumbers has passed the Colorado Legislature.

EXPERIENCED MEN, says an electrical contemporary, are needed to do electrical tinkering. There are two in Chicago who are described as "electrical plumbers." Why not? The designation is good, and only electro-mechanics should be entitled to the name.

OLD DOMINION MFG. COMPANY, Sheudun, Va., and 242 Water street, New York, are now manufacturing what they term a bracket board. It is to fasten against the wall over a water closet. Brackets are then screwed to the board for sustaining a water-closet tank. These boards are made of any of the hard woods, as ordered, including ash, oak, sycamore, walnut, mahogany, cherry, &c., in three sizes, the smallest of which is 22 x 20 inches. A vacant space is left, 12 x 5½ inches, which extends partly across the board, thus constituting an air chamber by which, it is said, the noise of the water in the tank is deadened. This company are also manufacturing a urinal tank, with fixtures, having capacities of 1 to 5 gallons. These may be regulated and automatically flush the urinal every 5 to 20 minutes or more, as desired, by means of a noiseless pet cock inside the tank. This tank, it is said, has been simplified, and the cost reduced so as to be within the reach of all. The top is fastened on with screws to prevent being tampered with.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until July 19 for the labor and materials required for plumbing, gas piping, &c., for the post office, &c., building at Sacramento, Cal., in accordance with the drawings and specifications, copies of which may be had at the office of the Supervising Architect, Washington, or from the superintendent at Sacramento.

WE ARE INDEBTED to the Toronto Steel Clad Bath & Metal Company, Limited, Toronto, Ontario, for a striking advertisement of Booth's Patent Steel Clad Baths. It is a very heavy card with beveled gilt edges and letters embossed in silver, and a colored print of the bath on a raised panel in the middle. The card is provided with a silk loop for attaching to the wall.

W. EMMET CROSBY, the very efficient executive clerk of the National Association of Master Plumbers, will very probably be continued in that position under the administration of President Daniel J. Finnerty.

THE STEEL BATH MFG. COMPANY, Detroit, Mich., have removed their works to the corner of Wayne and Congress streets, west. The present plant is a five-story and basement brick and stone building 120 x 50 feet, and is equipped with machinery of double the capacity employed at the former works, which will furnish largely increased facilities for the manufacture of the steel-clad bathtub. The new building will also afford, in connection with the above, commodious offices, sample rooms and warehouse privileges.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Washington, D. C., until July 12, for the labor and materials required for the interior finish and plumbing of the United States court house and post office building at Springfield, Mo., in accordance with drawings and specifications, copies of which may be had at the office of the Supervising Architect at Washington, or from the superintendent at Springfield, Mo.

THE CHICAGO BRANCH of the J. L. Mott Iron Works, 311-313 Wabash avenue, will sustain a loss of a few thousand dollars from the water which flooded their basement during the burning of the Adams Building, at the northwest corner of Wabash avenue and Congress street, Sunday morning, June 18. The south wall of the Mott Building received some damage from water, and one of the large plate-glass windows was broken. The timely opening of doors and windows prevented damage to the stock and exhibit in showroom from smoke.

THE WALCOTT-HURLBUT COMPANY, 175 and 177 Lake street, Chicago, have issued an exceedingly handsome supplementary catalogue of 48 pages. It is printed on heavy cream-colored paper, with an illustrated cover of the same. This catalogue is devoted to bathtubs, shower baths, lavatories, water closets, traps, cocks, urinals, &c. The bathtubs cover a variety of solid porcelain baths, porcelain enameled baths and seat baths. Shower baths comprise a combination needle, head and shoulder, liver spray and bidet bath: an improved rain shower with adjustable douche; head and shoulder shower, with appliances for maintaining an even temperature; ring shower, shampoo shower, &c. The closets shown are the Maelstrom syphon jet, the Dececo and the Torrent. The lavatories are four in number, two of which are very ornate, while the others are somewhat plainer yet elegant. Various styles of lavatory supports are shown, also brass traps, pipe straps, lavatory brass supply pipes, spun flanges, the Wrigley self-closing cock, nickel-plated soap cups, towel shelfs, towel racks, brass fittings, an enameled roll rim sink, the Security grease and sewer gas trap, slop sinks and syphon "eduction" closets for schools, factories, &c.

WORLD'S FAIR NOTES.

The Increasing Attendance.

The fair is proving its power as an attraction, and the figures of attendance are climbing up to the huge aggregates prophesied by its enthusiastic promoters. June has shown up remarkably well. In the first 15 days the total number of paid admissions was 1,200,000. That is an average of 80,000 per day. This beats all records in America, and in point of numbers nearly equals the paid attendance of the cheap admission exposition of four years ago in Paris, as it outdoes even Paris in amount of money taken at the gates. This result, compared with the Centennial Exposition attendance, during the same period, will show how great a popular success the Columbian enterprise is.

The whole of June gave the Centennial only 695,000 paid admissions, or but little more than one-half the number at the Columbian in the first half of the same month.

The daily average at the Centennial during the first 15 days of June was less than 27,000, against 80,000 at Chicago.

Already at Chicago during June there have been two days with an attendance far above 100,000 and a third day with a number of admissions but little below that mark, the three days together showing nearly 400,000 paid admissions. During the whole of June at Philadelphia not one day returned an attendance as great as 40,000, and only five days in the month exceeded 30,000.

Not only is the Columbian Exposition showing high figures, but the average is constantly increasing. It is a great, popular movement that gathers momentum as it marches along. The first seven days of the month showed a daily average of 58,500 paid admissions, while the remaining eight days of the half month showed a daily average of very nearly 100,000.

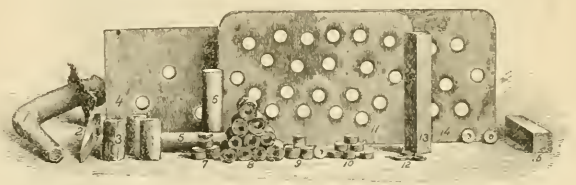
The Ferris Wheel.

The great Ferris wheel, which is intended to rival the Eiffel Tower as a mechanical curiosity, was tested on the 15th inst. At 6.30 p.m. the newspaper representatives and engineer corps of the company who had assisted in the construction, took their seats in the first car. In the second car to pass the landing was a party of ladies. Capt. Robert W. Hunt, president of the Ferris Wheel Company, was in direct charge of the arrangements.

Without jar or jolt when the power was applied, says the Chicago *Herald*, the great circle of steel began to revolve, and though but little was said by the adventurous travelers, it was evident from the expressions on some faces that they would have been perfectly satisfied to have discontinued the trip then. As the car rose and the view expanded, all thought of danger was overshadowed by the magnificent spectacle spread out before them. Midway Plaisance was crowded as never before and resembled a long, black stripe through a field. When half the circumference had been made the cars were brought to a stop at a distance of 260 feet from the ground. Cheers were given by all, and in bumpers of champagne the success of the enterprise was drank. Though the atmosphere was somewhat hazy from the recent showers, the view was superb. Jackson park and its buildings were almost dazzling in whiteness and every outline could be distinguished. Clouds prevented seeing the shores of Michigan or Indiana, but Lake Calumet was clearly outlined. The Hyde Park cribs stood out clear cut like a mirage in the green waters of the lake and the surface of old Michigan appeared to be on a level of the wheel top. In the misty haze a mirage of the cribs could be plainly seen and attracted much attention. After a short stop the journey was continued and in 30 minutes from the time of starting the party had completed the circle, well satisfied with its successful termination. Regular trips of the wheel will be made hereafter.

Punched Castings.

The publication of a series of punched cast-iron plates from iron made by the Thomas Iron Company of Ho endauqua has brought out a similar piece of work, for which we are indebted to Edwin C. Will, foundry foreman of Russell & Co., Massillon, Ohio. The castings were made from coke iron melted with coke and cast in green-sand molds in a horizontal position, the iron being the same grade used always by the firm in question in making their



PUNCHED CAST-IRON PLATES.

engines, harvesting machinery and saw mills. No alloys of any kind were used, nor were the castings annealed in any way. The punching was done on the regular machine without a crack or break. The plates had no supports about the edges and have not been altered or changed since they were punched. The plate, No. 4, was $\frac{5}{8}$ inch thick, while No. 11 was $\frac{1}{4}$ inch thick, and No. 14 $\frac{1}{8}$ inch thick. Nos. 7, 9, 10 and 12 were punchings from these cast-iron plates, 3 inches in diameter. Some of these punchings were $\frac{1}{4}$ inch from the edges of the plates, and since then other plates have been punched as close as $\frac{1}{4}$ and $\frac{1}{8}$ inch from the edge without a crack or break. Nos. 3 and 8 were full-length cuts 2 inches wide and 16 inches long from the hub of a pulley without a break. Nos. 5 and 6 are test bars broken on a Riehlé testing machine, showing 30,000 pounds per square inch tensile strength.

At a final meeting of the Rapid Transit Commission of New York a proposition was agreed upon, which, if accepted by the Manhattan Elevated Railway Company, will secure rapid transit to the city. By the terms of the agreement the company are given the franchises asked for at a gross rental of $175 000 a year, or 5 per cent. on the net income of the company, provided the minimum of $125,000 is accepted. The plan provides for a third track on the Sixth, Ninth and Third avenue lines for express trains, a further extension of the system into the annexed district and other smaller extensions downtown, which may be deemed necessary. While the plan outlined is not regarded as thoroughly solving the question of rapid transit in New York, the scheme is the outcome of over two years' deliberation on the part of the commission.

NEW PUBLICATIONS.

THE SLIDE RULE. By William Cox. 44 pages, size 5½ x 8½ inches, bound in cloth, published by Keuffel & Esser Company. Price 75 cents.

This is the third edition of a well-known work, to which the author has added a full description of the "Duplex" slide rule, an improved form of the Mannheim, which he has invented and patented. Besides clear instructions as to the method of using this valuable instrument, the book contains extensive tables of equivalents for rapid and easy conversion of geometric and other quantities, graphic demonstrations of the working out with the slide rule of some 80 different formulas and practical examples occurring constantly in mechanics, engineering, and even business. The "Duplex" slide rule, unlike all others, has scales on both sides, their arrangement being such that the working out of many complex calculations is very much simplified, while the solutions obtained of certain every-day problems are in a much more convenient form. The work considered as a whole is one likely to prove interesting and instructive, and should be found in the library of trade literature of every wide-awake and progressive mechanic.

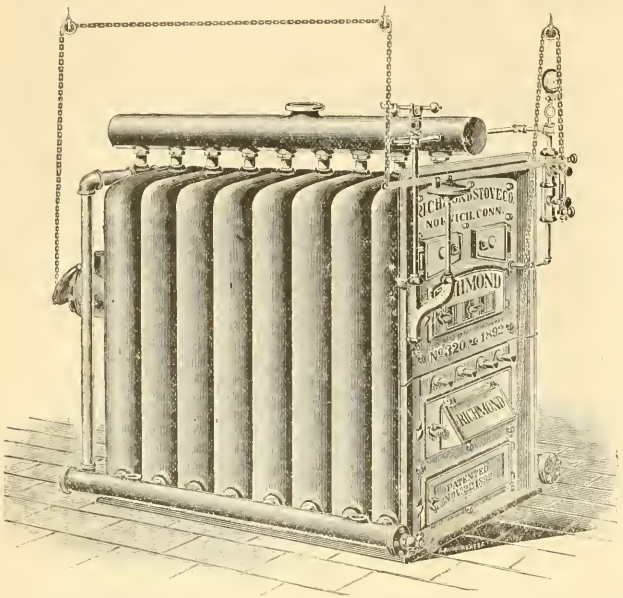
The appeal in the case of the Pittsburgh Reduction Company of Pittsburgh, manufacturers of pure aluminum, against the Cowles Electric Smelting & Aluminum Company of Lockport, N. Y., pending before the United States Circuit Court of Appeals, at Detroit, Mich., was dismissed on the 15th inst. on motion of the appellants for the Cowles Company, at their cost. The patent at issue was the Hall patent, which is said to cover the only commercial method at present in use for the manufacture of aluminum. The patent had been adjudicated and entertained by the United States Circuit Court for the Northern District of Ohio, and the result of this decision leaves the Pittsburgh Reduction Company the only manufacturers of pure aluminum in the United States.

The report of the Bureau of Statistics shows that for a period of 20 months under reciprocity, compared with 20 months before reciprocity, there was an increase in our domestic exports to Cuba of $16,217,552, and an increase of our imports from Cuba of $17,557,470.

STEAM AND HOT WATER.

The New Richmond Heater.

The Richmond Stove Company, Norwich, Conn, have added to their line of steam heating boilers a new design of the Richmond heater embodying certain improvements over the former boiler of the name. A general view of the apparatus, together with detailed views of the sections, as well as a sectional view of the boiler itself, are shown in the accompanying illustrations and present in a thorough way the constructive features of the new heater. The apparatus is adapted to either steam or hot water, the form illustrated being the steam heater equipped with all the trimmings of steam gauge, safety valve, water column, automatic damper regulator, &c. The same boiler without these trimmings is adapted for hot-water heating. The special features of this boiler are secured under letters patent, granted November 22, 1892. As will be seen by reference to Fig. 1, the heater consists of vertical sections connected to a manifold at the bottom of the water legs for the return pipes and similarly connected by nipples to another manifold at the top, which serves as a steam dome for the flow pipe. The boiler is not intended for any casing, but can be protected by a brick wall or asbestos cement if desired. It will be noted in this new form of the Richmond heater that the water surfaces extend to the bottom of the ash pit, and from the



The New Richmond Heater.—Fig. 1.—General View of Apparatus.

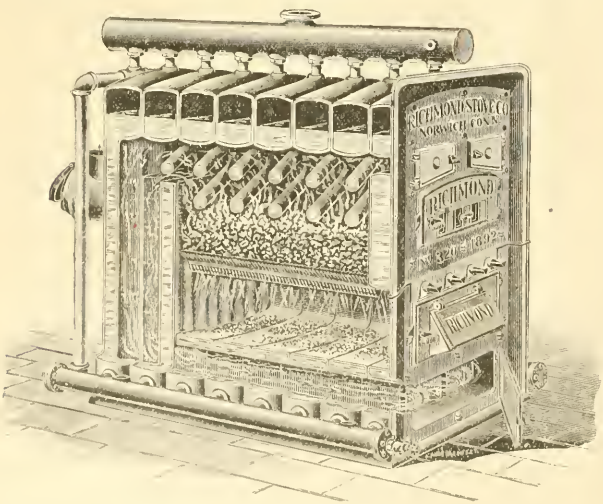


Fig. 2.—Sectional View.

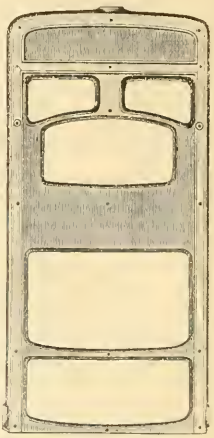


Fig. 3.—Front Section.

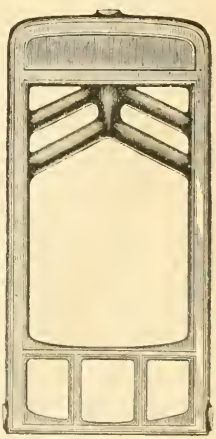


Fig. 4.—Grate Section.

sectional view it will be seen that there are waterways on the bottom of the ash pit to utilize the radiant heat from the bottom of the grate. By a reference to the views of the separate sections it will be seen that a chief feature sought after has been vertical circulation, upon which the manufacturers

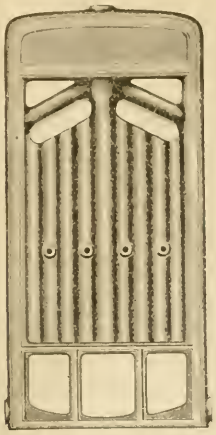


Fig. 5.—Intermediate Section.

lay special emphasis. The same order of fire surfaces is observed in this heater as in the No. 224 Richmond Sectional, a larger heater which was brought out two or three years ago and has met with great success. It has been a special object in the design of this boiler to secure direct fire surface, which is so much more efficient than flue surface. Among the patented features of the boiler is its order of flues.

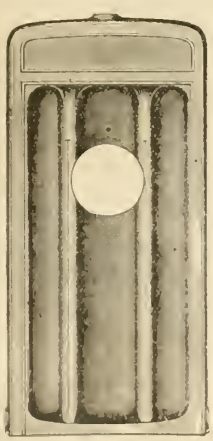


Fig. 6.—Back Section.

The gases of combustion rising to the top or crown sheet, encircle the arms or waterways within the fire chamber, then pass to the rear into the two flues (one at each side) to the base of the heater; thence forward from the horizontal flues to the front, where they unite into one and return into the back and from thence upward into the chimney. The heated gases are thus brought at their highest temperature to the top of the heater, where the water is hottest, and in becoming cool descend another way to the exit, heating the water of lower temperature. The completed boiler is made up of four sections, as shown in the illustrations, Figs. 3, 4, 5 and 6. There will be five sizes offered to the trade, comprising six, seven, eight, nine and ten sections. The six-section boiler will consist of one front, three grate, one intermediate and one back section. Additions to the grate sections will secure the remaining larger sizes, and with each size there will be a corresponding increase in grate area. The width of fire pot is 20 inches, and the length from 21 to 45 inches, increasing 6 inches with each size. The Richmond Stove Company claim a capacity of from 625 to 1225 square feet for the steam, and for hot water from 1000 to 2000 square feet of radiating surface.

The American Radiator Company.

The World's Fair exhibit of the American Radiator Company, 111 and 113 Lake street, Chicago, is now in complete order for inspection in the Manufactures Building, near O-81, the official catalogue number being 883. The company have built a fine pavilion, extending the entire distance from one of the main aisles to another. The ceiling is supported by heavy fluted columns with ornamental capitals, arches springing from one capital to another. The walls are covered with tinted paper of rich design, having a deep frieze ornamented with wreaths and festoons. The pavilion is illuminated by 64 incandescent lights. The display of radiators covers nearly every pattern made by the company, who are recognized as the largest manufacturers of radiators in the world. They operate two foundries in Detroit and two in Buffalo. The exhibit covers circular patterns for columns, dining-room radiators with warming closets, curved designs for bay windows, corner radiators, window radiators, radiators in the form of the letter S, to show the facility with which any curve can be made, direct and indirect radiators, &c. They are also shown in all hights. Some are finished with marble tops and others depend upon the beauty of the molding for their attractiveness. All kinds of finish are represented — bronzed, electro-plated, silvered, gilded, painted in different colors, &c. Single loops are also embraced in the collection, to show more plainly the character of decorations and styles of finish. The space occupied by the company is of such good size that the exhibits are not crowded, but are easily inspected separately. Every visitor to the exhibit is presented with a map of the World's Fair grounds, which is generally very acceptable. A large register is also provided, in which visitors enter their names. It is expected to be an interesting reminder of the fair in future years.

HEATING NOTES.

THE HOWARD FURNACE COMPANY, Syracuse, N. Y., have secured a patent on an attachment for combination heating for hot-air furnaces that possesses certain novel features. The attachment consists of two vertical pipes connected at the lower end by a return bend and the whole hanging directly over the fire. The two vertical pipes pass through stuffing boxes in the dome of the furnace, which arrangement permits the length of the part exposed to the fire to be varied. In this way the heating surface of the boiler can be altered to suit any circumstances. Small variations can be made by simply pulling up the U-tube, the spring of the flow and return pipes permitting this. Where a greater change is desired a short section can be taken out or inserted above the furnace.

A. J. MARTIN, the Philadelphia agent of the Adams Radiator Company of Reading, Pa., is now to be found at 262 North Broad street, Philadelphia.

THE MONITOR STEAM GENERATOR MFG. COMPANY of Landisville, Pa., are sending out a 16-page catalogue descriptive of the Monitor instantaneous steam generator and positive hot-water circulator for heating by steam or hot water. The catalogue contains a quantity of testimonials and a list of the locations of some of their boilers at present in use. C. F. Bachler, the general agent of the company, states that he is placing a battery system of two of the company's boilers in the Cosmopolitan Hotel, at Fifteenth and Filbert streets, Philadelphia.

THE MAGEE FURNACE COMPANY, Boston, Mass., print a pretty catalogue relating to their warm air and hot-water combination heater. The illustrations comprise a broken view of the Magee combination apparatus, as well as a view of the heater set in the cellar with the connecting warm-air pipes and hot-water flow and returns. The hot-water sections are also illustrated in separate views and in detail. Interesting plan views of the method of piping a house by the combination system are also shown. The whole pamphlet is intended as an answer to the broad question, "How shall I warm and ventilate my house?" which interrogation immediately follows the introduction. The front cover of the catalogue is noticeably artistic in its treatment, there being worked into the design an engraving of the first casting made at the Saugus Iron Works, 1642, which is an old iron kettle that was presented to the city of Lynn last year.

SEALED PROPOSALS will be received at the office of the Supervising Architect, at Washington, D. C., until June 27, for removing the old heating apparatus and furnishing all the labor and materials and fixing in place complete a new low-pressure steam heating and ventilating apparatus in the United States court house and post office building at Springfield, Ill., in accordance with the drawings and specifications, copies of which may be had at the office of the Supervising Architect, Washington, or from the custodian at Springfield, Ill.

JOHN DELANEY, Buffalo, N. Y., has assigned to W. F. Wendt and Henry W. Wendt of Buffalo a patent on a radiator, the special feature of which is that each section can be supplied with either exhaust or live steam, as desired. The patent covers a combination of independent radiator sections, provided with passages whereby adjacent sections communicate with each other, and also covers the valves applied to the passages.

ONE OF THE MOST MODERN and complete heating and ventilating plants in the country is to be placed in the Tourist Hotel, Tacoma, by the Baker & Smith Company, 193-197 Van Buren street, Chicago. The building is lo-

cated on a hillside, and is somewhat peculiar from the fact that it is four basements and seven stories high. There will be about 18,000 square feet of radiation required. The same firm are also placing the heating and ventilating plant in the Union Trust Building, St. Louis. About 21,000 square feet of radiation will be used.

WARREN WEBSTER & Co. of Philadelphia, manufacturers of the Webster vacuum feed-water heater and purifier and Williames' vacuum system of steam heating, are erecting a three story brick building 120 x 65 feet at Point and Elm streets, Camden, N. J. The building fronts on the Delaware River, and the site presents ample opportunities for railroad extension and shipping facilities. They will transfer their entire plant to the new building as soon as completed and will supplement it with other machinery adapted to the requirements of their growing business. They expect to commence removal about the middle of July.

Prize Competitions

$25.00.

As announced in previous issues the following competitions are now before our readers and remain open until the dates named:

Prize Competition No. 25.

SUBJECT:

Show-Window Display.

The subject of attractive show-window display is one requiring careful attention as an inexpensive and sure method of attracting and securing trade. This competition is designed to draw out suggestions as to the best methods of displaying goods, which may, if desirable, be illustrated by sketches and photographs. Prominent among the points which may be touched upon are the following:

1. The object of window display;
2. How this object may best be accomplished;
3. Kinds of goods especially suitable for window display;
4. The frequency with which displays should be changed;
5. Treatment of season goods;
6. To what extent goods in operation may be shown;
7. Suggestions for special and unique designs;
8. Arrangement of stands, shelving, &c., in windows;
9. Errors to be avoided in window display.

This competition will remain open until June 24, 1893.

Prize Competition No. 26.

SUBJECT:

To What Extent Are Manufacturers and Jobbers Justified in Selling to Consumers.

This competition is suggested by the fact that frequent complaints are made that manufacturers and jobbers interfere with the retailer's business by selling to his customers. It is intended to draw out the views of the trade on the subject. In discussing the question the following points may, perhaps, naturally be touched upon:

The annoyance and injury to which the retailer is thus subjected;

What the rights and privileges of the manufacturers and jobbers are in this matter;

What it is feasible for retailers to do for their own protection.

This competition will remain open until July 1, 1893.

Prize Competition No. 27.

SUBJECT:

Local Associations of Merchants.

It has been found feasible to form associations in many places for the purpose of securing more friendly relations among competitors and reaching an understanding in regard to matters of common interest. Among the good results referred to as coming from such associations are the following: Overcoming petty jealousies; cultivating a spirit of fraternity; listing of undesirable customers; an understanding in regard to time of presenting bills; putting in operation early-closing movements; agreement as to the prices at which goods are to be sold; mutual accommodation in supplying goods which one merchant may be temporarily short of, &c. The subject is thus evidently a broad one and of a good deal of practical interest. In discussing it the following points are suggested:

Whether it is desirable to have such associations;

How such associations may be organized;

The objects to be accomplished by them.

It will also be of interest to have any information in regard to the practical working of such associations.

This competition will remain open until July 8, 1893.

The following prizes will be awarded in each competition:

First prize.....	$12.50
Second prize.....	7.50
Third prize.....	5.00

The prizes will be awarded for answers which, in the judgment of the Committee of Award, are most suitable for publication and of the most general interest

We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than the dates on which the competitions close. They should be addressed as follows:

DAVID WILLIAMS,
96-102 Reade street,
New York.

Prize Competition No. —.

The committee to whom the contributions in Prize Competition No. 15 were referred have awarded the prizes as follows:

First Prize to T. W. STAKE, New York, N. Y.

Second Prize to R. T. PALMER, Buffalo, N. Y.

Third Prize to E. C. GOULD, Manchester, N. H.

Chicago Sheet Metal Workers.

The following articles of agreement were entered into June 12, between the members of the Employers' Association of Tin and Sheet Iron Job Workers, and the Tin and Sheet Iron Job Workers' Local Union of Cook County, Ill.:

Whereas, It is desired to have a better and fuller understanding;

Therefore, It is hereby mutually agreed that

1. Eight (8) hours shall constitute a day's work, commencing at 8 a.m. and ending not later than 5 p.m.

2. All overtime shall be paid for at the rate of time and one-half. Sunday and legal holidays, viz.: New Years, July Fourth, Thanksgiving and Christmas, or days celebrated as such, double time.

3. The minimum rate of wages shall be 35 cents per hour from the signing of this agreement.

4. One junior or apprentice, at optional wages, shall be allowed for every four tinners or fraction thereof, employed by any one employer, but in no case shall there be more than five juniors.

5. All members of the union sent to work outside of the city by city firms are subject to same rules as while at work in the city, and in addition car fare and board shall be paid by the employer when it is necessary to remain over right.

6. All members of the Employers' Association shall employ as tinners (not including foreman) only members in good standing in the Tin and Sheet-Iron Job Workers' Local Union of Cook County, Ill.

7. No member holding a clear card of Tin and Sheet Iron Job Workers' Local Union of Cook County, Ill., shall work for any firm who refuses to sign this agreement and join the Employers' Association, the city of Chicago and like corporations excepted. From this date no other agreement shall be submitted or renewed.

8. No general strike shall be ordered by any officer of the Tin and Sheet Iron Workers' Local Union of Cook County, Ill., without first submitting the grievance to an arbitration committee of six (6) members, three to be chosen by each party hereto, and in case of a disagreement or failure of a majority of the Arbitration Committee to agree, then the question at issue must be submitted to some one person, to be agreed upon by a majority of the Joint Committee, and his decision shall be final. It is understood, however, that a sympathetic strike on any special building or job shall not be deemed a violation of these Articles of Agreement, nor a hostile act to the party of the first part.

9. Piece work and subcontracting shall be strictly prohibited by members of the union.

10. No changes in this agreement shall be demanded by either party, unless due notice of said change has been duly served in writing by the party demanding the change, and not then unless said notice has been duly served at least four (4) months previous.

The Chilian correspondent of an English exchange reports that a wealthy syndicate are laying down an extensive works in Valparaiso for the production of galvanized corrugated sheet-iron ridging, pipes, gutters, hollow ware, &c. The duty on galvanized iron in Chili is 25 per cent., while the black iron and materials are entered free of duty.

Imports and Exports.

The figures given below show the quantity and value of a few leading lines of imports and exports of merchandise into and out of the United States, as compiled from the latest official Treasury statistics:

IMPORTS.

	Year ending June 30, 1892.		Ten months ending April 30, 1893.		Month ending April 30, 1893.	
	Pounds.	Dollars.	Pounds.	Dollars.	Pounds.	Dollars.
Tin in bars, blocks, pigs, or grain, or granulated	43,908,652	8,667,870	41,833,381	8,465,714	7,446,086	1,467,234
Tin plates, terne plates and taggers' tin	422,176,202	12,315,562	486,777,891	13,651,637	66,498,618	1,821,236
Sheet iron, plate iron and taggers' iron or steel	32,418,322	840,521	76,163,455	1,649,531	10,603,160	221,463

EXPORTS.

Manufactures of tin		225,113		166,088		28,606
Stoves, ranges, and parts of		230,041		178,564		17,118

EXPORTS OF CANNED VEGETABLES.

Year ending June 30, 1892	$373,068
Ten months ending April 30, 1893	220,543
Month ending April 30, 1893	7,607

SCRAP.

According to official reports the tin-plate industry of Germany had almost entirely ceased in 1892. There were produced of this material, in 1888, 18,231 tons; 1889, 22,269 tons; 1890, 21 348 tons, and in 1891, 23,479 tons, all of which was consumed in the country.

A few pots in the tinning department of the new works of E. Morewood & Co., Gas City, Ind., will be put into operation on Monday next. At present the production will be confined to terne plates, with an output of about 2000 boxes weekly. Work on the black-plate mills is progressing actively, and it is expected that four out of the eight will be ready for service before the end of August. Every effort is being made to push the whole establishment to completion as soon as possible.

The British tin-plate trade appears to be duller than that in this country. The following is the latest report from London of tin-plate market on June 10: "Trade is bad, without a doubt," is the report generally made, and even by those who up to a week or two ago held tenaciously to the opinion that matters would soon mend. The South Wales producers appear to be consoling themselves with the heavy shipments that have been made from Swansea; but the consolation does not appear to be very solid or enduring, for, do what they will, makers cannot induce buyers to give the terms asked, nor will they place more than hand-to-mouth orders. Forward supplies are quite neglected.

The works of the American Tin Plate Machine & Mfg. Company of Philadelphia, which have recently been removed to Linfield, Pa., are reported as nearly ready for operation. The machinery is in place and will be started very shortly. The company are owners of Buckman's automatic continuous seaming and tinning machines.

The latest addition to the growing list of American tin-plate manufacturing concerns is one announced from Philadelphia under the title of Black Diamond Tin Plate Works. These works, which are located at 51 and 53 Laurel street, in that city, have been started by Henry W. Scattergood for the manufacture of domestic bright and roofing plates. The manufacturing department will be in charge of Geo. Leyshon and his son, who are well known as practical tin platers. We are advised by Mr. Scattergood that two tioning stacks will be started in operation immediately, having a capacity of 600 boxes of plates weekly, and further facilities will be added from time to time as business increases. The brands adopted for both bright and terne plates are, "Black Diamond" for first-quality and "Leyshon's A1" for second-quality goods. Each plate will be stamped and guaranteed as to quality. The pots used are those on the Leyshon principle.

The tin platers of the Swansea district of Wales are going to put up a Labor candidate for the seat in the British House of Commons made vacant by the elevation of the late member for Swansea to the peerage. Their choice will probably fall on Thomas Phillips, secretary of the Tin Platers' Union, who will specially represent its interests.

The following figures show the importations of tin, tin plates, taggers metal at the port of New York during the last three weeks:

	Week ending June 2, 1893.	Week ending June 9, 1893.	Week ending June 16, 1893.
Tin, block	$234,305	$912,243	$588,954
Tin plates	87,531	71,868	151,813
Taggers metal	24,329	13,598	11,187

Advices from France state that the tin-plate industry, which has been in existence in that country on a limited scale for many years, is about to be extended by the co-operation of English firms, who will import black sheets and tin them at Nantes, where a new works is being constructed. This is being done with a view of avoiding the import duties.

Referring to the opinion attributed, rightly or wrongly, to Secretary Carlisle that the plates made of imported black sheets, but coated in this country, should not be regarded as "American tin plates," nor included in the quarterly returns furnished by Special Agent Ira Ayer, a leading manufacturer of domestic tin plates writes to us as follows: "Nothing was said in the tariff as to the materials that must be used to constitute American tin plate. There is consistency in this, as nothing ever has been said in the tariff as to the materials a manufacturer must use. He uses whatever suits his purpose. It is very silly and betrays intense ignorance of the situation to attempt to deny the use of foreign black plate to an American manufacturer if he wants to use it. Pig tin comes from the East Indies, whether it is used by Welsh or whether it is used by American makers. Palm oil is an essential article in the manufacture of tin plate, and it all comes from the West Coast of Africa, and there is no duty upon it. The product of all these materials is American tin plate if it is made in America. We never heard the word 'American' denied to any other industry merely because some of the ingredients were of foreign growth."

The exports of tin plates and sheets from Great Britain to the United States during the month of May were 26,983 tons, as compared with 31,651 tons during the previous month. The total British tin plate exports show a slight increase over those for May, 1892, when smaller shipments than usual were made to this country owing to the heavy stocks carried over from 1891.

The continuing drought is much felt in the Welsh tin-plate districts, where several mills have been obliged to shut down for want of water. The production of tin plates has consequently diminished, yet no change in prices has occurred. The trade with American markets is reported as dull, but shipments of plates from Great Britain to Russia and other points have been active lately.

The Duquesne Tin Plate Works of Duquesne, Pa., have been granted a charter, with a capital stock of $10,000. The directors are Chas. and Emmanuel Dreifus of the firm of Dreifus, Block & Co., dealers in scrap iron and steel, Lewis Block, Pittsburgh, and Jacob and Isaac Wildberg of Pittsburgh.

With the view of making the exhibit of the American tin and terne plate manufactures more attractive and representative of both the quality of the plates and the handicraft of the American tinner the following offer is made by the American Tin Plate Company of Elwood, Ind.: To any tinner who will make a vase or other ornament or article of tin plate, or to any manufacturing house who will send a collection of articles showing the best quality of tin plate for exhibition at the World's Fair, the American Tin Plate Company will furnish the necessary material from black sheets made in their mill and coated at their plant. A description of what is intended to be made for exhibition is requested with the application for material and a card with the maker's name should be forwarded with any article sent to the fair.

An international fire congress is now being held in London, delegates from all countries of the world being in attendance. It is expected that the exhibition of apparatus and exchange of ideas will result in much good to the countries participating. In this connection it may be interesting to note that despite our finely equipped fire departments—the best in the world—statistics show that the loss from fire in the United States and Canada last year aggregated $132,000,000.

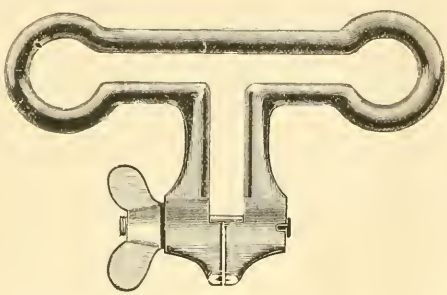
It is stated that the shortage in ten States that yielded at least 250,000,000 bushels of winter wheat last year is estimated at from 75,000,000 to 100,000,000 bushels. The greatest loss is to be seen in Kansas, where the wheat crop last year was 74,000,000 bushels, but where this year it will be necessary to import wheat into that State for seed and bread. The visible supply of wheat, however, is greater by about 40,000,000 bushels than it was a year ago.

The Welch Tap Wrench.

The accompanying illustration is of a tap wrench being put upon the market by T. F. Welch & Co., 65 Sudbury street, Boston, Mass. It is made of steel, and the jaws are regulated by a thumb screw. The wrench is intended for small size taps up to ¼ inch, and the manufacturers claim for it effectiveness and cheapness.

Flexible Metallic Tubing.

In a paper read before the British Society of Arts, Gilbert Redgrave treats of the manufacture and industrial application of flexible tubing. Touching briefly upon the production and uses of rubber tubing and its shortcomings in relation to various industrial purposes for which greater strength than it affords is necessary, Mr. Redgrave passes on to the consideration of flexible metal tubing as being more adapted to modern needs. He enumerates various methods, all falling more or less short of perfection, which have been tried in this line. By the use of coiled wire, either alone in several thicknesses, or in conjunction with a metal strip of some other section, or on what is called the accordion system, wherein numerous thin concave disks of metal are soldered together alternately, on their inner and outer edges, as well as in other ways, flexible tubes have been produced, and almost invariably in conjunction with rubber joints. But, says our authority, "as rubber used in this way is liable to deterioration and decay, we are bound to assume that this is not a joint of a permanently durable character.



The Welch Tap Wrench.

"All engineers are aware that it is no easy matter to produce an absolutely tight joint between two metal surfaces; and for this reason alone most of the earlier efforts to obtain a flexible metal tube were based on the use of some foreign substance to form a packing. This substance was generally a strip of India rubber, and, for the reasons already given, the first flexible metal tubes could not be regarded as otherwise than imperfect from the point of view of durability. The problem of making a flexible tube of metal was found to depend upon the method of coiling a strip of metal in a spiral form round a mandrel or core in such a way that the continuous joint or seam between each coil of the helix was not only perfectly sound, but was also possessed of mobility. In tracing out the steps by which this problem has been mastered, I shall bring before you the so-called flexible metallic tubing, the invention of M. E. Levavasseur."

M. LEVAVASSEUR'S INVENTION.

Mr. Redgrave then describes the inception of the idea by M. Levavasseur, a manufacturer of jewelry in Paris. Some 20 years ago that individual produced bracelets and necklets made of thin laminæ of gold or silver, of tubular form; the tube being built up of strips of metal of two different sections coiled one above the other. A flat channelled section was first employed, and above it came a semicircular clip uniting the two channels together and forming a complete tube. This device became so popular in the form of ornaments, that the inventor obtained a patent for it. Later on he produced jewelry from coiled metal strips, on the interlocking principle, where only one continuous strip is used and the convolutions grip into each other. Some six years since M. Levavasseur hit upon the idea of applying this principle to a wider field. He conceived that by the insertion of a strip of rubber between each scale, making the tube water tight, it might be adapted for many purposes in which the use of rigid, or of rubber tubing was alike undesirable. This idea was forthwith patented, and it has, after exhausted experiments and numerous alterations, now been developed into a flexible metallic tubing, which is claimed to fulfil all the conditions required for such material; but with this important modification, that the use of rubber for jointing has been entirely discarded.

METAL JOINTS.

In Mr. Redgrave's own words:

"Finding, after repeated trials, that it was impossible to produce satisfactory specimens of tubing in which the tightness of the joint was secured by means of a rubber strip, the next stage in the invention was the attempt to manufacture a spirally wound tube in which this might be accomplished by simple interlocking of the coils of metal without packing of any kind. The well known difficulty of producing a sound joint by metal against metal would appear at first sight to interpose almost insurmountable obstacles to success in this attempt, but after further experiments a considerable measure of success was obtained by the use of another section. It will be evident that to roll a thin strip of flat metal into this section it would be exposed to very severe strains, in consequence of the numerous sharp angles, and it is necessary to effect the conversion by slow degrees by the use of a graduated series of molletts through which the metal passes many times. This particular section involves six almost right-angled bends, and the manufacture can only be carried out with a very ductile metal like the best soft iron, copper or brass. The process of evolution to the form of metal strip now employed was a matter involving time and much consideration; and in the latter section packing is entirely dispensed with. In its latest form each metal strip has a comparatively large surface in contact with the one adjoining it, and, by the difference in the width of the two grooved channels, an ample allowance is made for play. This is, in fact, a piston joint; for the smaller corrugation works within the larger one, as the piston works within the cylinder. In the first form of this joint a notch was rolled upon the summit of the lesser corrugation, to receive a thread of hemp, cotton or asbestos, to serve as a species of packing; but in the latest form of the tube the packing has been entirely done away with, and we find nothing but the two metallic surfaces in contact.

"It will appear at first sight to practical men who have had experience in metal work that it would be absolutely impossible under these conditions to produce a continuous sound joint in a tube of any length, even under very moderate pressure, but that it should be possible to obtain by this means a steam-tight joint, or one capable of conveying petroleum oil gas at a pressure of 300 pounds per square inch, will scarcely be credited. Such is, however, an undoubted fact, and the tube is not only perfectly tight under these conditions, but it likewise retains its flexibility unimpaired. The only explanation is that in this form of joint the greater the internal pressure the more firmly are the metal surfaces, which approximately form two sides of a square, brought into contact. There is no possibility of torsion, or, what would be equivalent to a partial unwinding of the tube, because of the friction of the metallic surfaces; and as the internal pressure increases, in precisely the same ratio does the tightness or soundness of the tube increase, until the point is reached when the strain on the metal strip produces elongation or partial deformation of the section, and in the tube ¾ inch in diameter, formed of a coiled strip 0.6 mm. in thickness and 14 mm. wide, this would appear to be reached at a pressure of about 2000 pounds per square inch. There is practically no limit to the size in which pipes of this kind might be produced; it only becomes a question of the mechanical power needed to roll the metal strips into sections and to coil them into tubes. As this is at present effected by one continuous process in a single machine, it will be understood that the production of pipes of large diameter would need a very powerful plant; there are probably, however, but few uses for flexible tubes exceeding from 10 to 12 inches in diameter."

PRACTICAL UTILITY.

In connection with the industrial application of flexible metal tubing, Mr. Redgrave particularly points out that two conditions are necessary, viz: Flexibility, which is possessed in full measure by the rubber tubing; and resistance to external and internal pressure, in which that substance falls short. Metal tubing fulfils both conditions. In regard to the latter we are told that one great superiority of the flexible metal tubing over similar tubes of other material, is its power of supporting a heavy load placed upon it, either designedly or by accident. From experiments specially made it has been ascertained that the various sizes of tubing will support the undermentioned loads gradually placed on 1 inch of bearing surface:

Internal diameter of tube.	Weight needed to compress tube to an oval section.	Weight needed to crush tube.
Inch.	Cwt.	Cwt.
5-16	15	27
3/8	10	27
1/2	13	31
5/8	13	35
3/4	18	42
1	18	49

A tube lying on the floor can thus be trodden upon with impunity, indeed a

cart might almost be driven over it and this feature aloue is of the utmost importance when the question of the use of gas is considered. It is also stated that the metal tubing is capable of resisting an internal pressure of 2500 pounds to the square inch.

In addition to this point of superiority, possessed by metal tubing over rubber, is its capacity for withstanding without injury, an increase of temperature that would entirely destroy the rubber tube. It will not kink, moreover, and is therefore recommended for use for the transmission of air in diving operations. On board ship, too, it may be adopted with advantage in place of rigid tubing, which is often fractured and rendered leaky by the straining of the vessel. The new tubing is not liable to damage by frost, which fact opens out a possible use for it in plumbing work of many kinds.

USES TO WHICH ALREADY PUT.

Mr. Redgrave concludes his paper by enumerating some of the purposes for which the flexible tubing has already been employed. He remarks that "it has been used to convey air under pressure for driving rock drills and boring machinery. It has been found perfectly steam tight, and it was employed at the recent Royal Naval Exhibition to carry steam at pressures ranging up to 200 pounds per square inch. It is, however, quite capable of resisting under actual working conditions much more severe tests than this, for a considerable quantity of the flexible tubing has been supplied to one of the leading railway companies to carry petroleum gas from the reservoirs to the carriages under a pressure of, in some cases, 300 pounds per square inch. The tubing has also been applied with complete success to the pumping of petroleum oil, a liquid which has a peculiarly subtle power of penetrating joints of every description, and which furnishes a specially severe test for a flexible tube of this nature. In the manufacture of varnishes, in jam making, in various brewery operations, for the suction pipes for publicans' beer engines, for organ-blowing purposes, for carpet beating machinery, and for speaking tubes the new tubing has been used most successfully. An extensive field of usefulness can be predicted for this invention when employed for covering insulated wires for telegraphic and telephoning purposes. I have here some specimens of small cables sheathed with the tubing. It would be practically impossible to crush it or to injure it by friction in the ordinary way, which points to its use for the shore ends of cables. The cheapness of this mode of manufacturing the armored wire would be greatly in its favor. The tubing has been proved to be most valuable in lighthouses for supplying the oil to the wicks, which, as is well known, are moved by automatic machinery, and need a permanent flexible connection with the oil vessels."

In regard to price, we are told that it compares very favorably with that of similar tubes of rubber, to which it is undoubtedly superior in strength and durability.

The Stirling Packingless Valve.

The Stirling packingless valve, as shown in the engravings, has been in continual use for over two years at the Philadelphia Shafting Works of Geo. V. Cresson Company. The sizes used vary from an 8-inch throttle-valve on the main engine to the ½-inch for various purposes of steam and water throughout the entire works. During the entire period of their use the valves have received no attention or repairs of any kind, and yet they are absolutely free from leakage around the stems and work as freely as when new. The large engine is very highly finished and is kept bright and clean; the throttle valve, therefore, is not only made to correspond in point of finish, but it must also be absolutely free from leakage around the stem, as but very few drops would seriously mar the immaculate appearance of the bright work located directly under the valve unless some provision were made to receive the drip, which is not the case. As may be seen by reference to the illustrations, the self-packing device is extremely simple and may be used with any style of disk or gate valve in which the opening and closing are effected by rotating the stem, no matter what the resultant motion as regards the valve proper may be. The body or case D is of the ordinary pattern, as are also the valve seat G and face A. Upon the upper side of the disk, however, there is a hexagonal sleeve, *a a*, Figs. 1 and 2, which is threaded internally to receive the corresponding screw *b* of the valve stem. The sleeve is made to fit freely into a female hexagonal bearing in the part C of the body, which acts as a guide to the valve and also prevents its turning with the stem in opening and closing. The valve stem B is made with an enlarged diameter, b^2, which gives large bearing surface and is also rendered necessary to enable the hole to be of sufficient size to permit the passage of the screw *c*, it being inserted from the inside. Below the bearing b^2 is the angular enlargement b^1, working against the conical bearing c^1, with which it is ground to form a steam-tight joint. The collar, or washer, *e*, Fig. 3, is seen to have a segmental projection in the hole, which is seen to fit upon a corresponding flat on the valve stem. The nut *d* is made to fit snugly on thread *c*, to hold it in position without the use of a jam nut. The adjustment of the stem is made so as to allow perfectly free motion of the stem between the collar *e* and the cone b^1.

We will suppose the steam to be admitted in the course of arrows, Fig. 1, and the valve closed. By revolving the stem to the right, the left-hand thread *b* screws into the valve and permits the pressure to raise it from its seat. At the same time the conical bearing on the stem is pressed against its seat c^1 and forms a self-acting valve to prevent leakage around the stem beyond that point. If for any reason it is desired to reverse the direction of admission so as to have the pressure on back of valve when closed, the slight play in the thread *b* will permit the necessary contact at c^1 to prevent leakage, while the valve proper is also held to its seat by the pressure on its back.

In the first position, it is obvious that even if the valve should leak there could be no escape past the stem, as even a moderate pressure by the screw on the valve would cause the packing valve, as it may be termed, to become perfectly tight. If the leakage through valve were considerable of course the accumulation of pressure on the back would be sufficient to act on the packing valve in addition to the pressure from screw. As there is the entire area of the large end of the seat c^1 exposed to the unbalanced pressure above the valve, it is obvious that there is very little possibility of leakage from the firmness with which the two surfaces are held in contact. As to the durability of this portion of the device, the fact of its remaining in good condition after two years' service enables it to speak for itself. Any information regarding the valves can be had by addressing Antonio C. Pessano, general manager, Geo. V. Cresson Co., Eighteenth street and Allegheny avenue, Philadelphia.

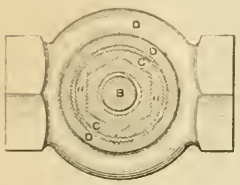


Fig. 2.—Section on Line F F.

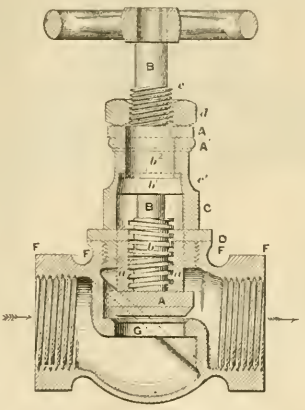


Fig. 1.—Vertical Section.

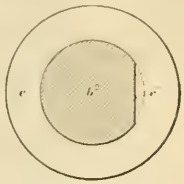


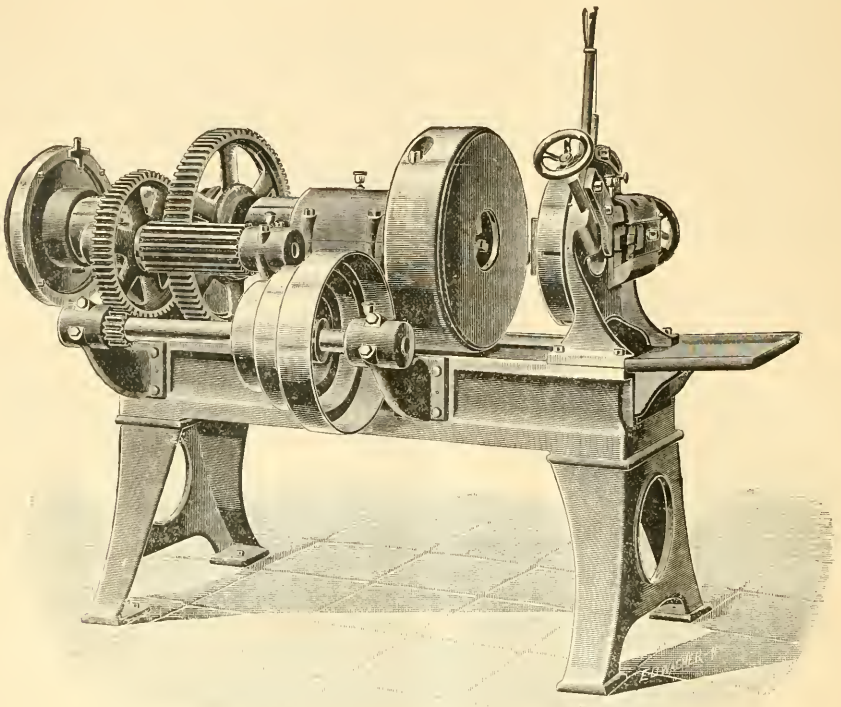
Fig. 3.—Section at A'.

THE STIRLING PACKINGLESS VALVE.

Pipe-Threading Machine.

The Eaton, Cole & Burnham Company of 82 Fulton street, New York, make a pipe-threading machine which has countershaft and cone pulleys for regulating the different speeds to suit the size of pipe to be cut, and is furnished with adjustable dies. The die head, with its cutting off attachment, is firmly bolted to the bed, thereby insuring the proper position of the dies. This die head is arranged with concentric chuck by which the dies are easily adjusted and thrown in or out of position at the will of the operator, by simply grasping the lever handle shown in the engraving.

The concentric chuck shown has three steel jaws that are actuated by an eccentric ring, making the chuck at once powerful and convenient. This chuck is attached to a long hollow spindle, through which the pipe passes, and having a suitable centering arrangement at the back end. The spindle handle has long bearings of large diameter, and is easily moved backward and forward, carrying the pipe with it, being driven by the long pinion upon which, it will be observed, the large gear wheel slides. This machine will thread pipe from 1 to 4 inches in diameter.

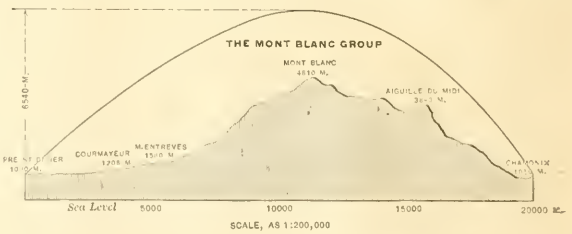


EATON, COLE & BURNHAM PIPE-THREADING MACHINE.

In a late report the British Consul at Batoum places the total output of Russian petroleum wells in that district for last year at 5,491,970 tons of crude oil, averaging a daily yield of 15,045 tons. On December 31,299 wells were producing, and the number is increasing. Petroleum to the value of $14,254,416 was exported in 1892.

The Trajectory of a Modern Gun.

An excellent illustration of the power of modern ordnance is given in the catalogue which the Krupps of Essen have issued concerning their exhibit at the World's Columbian Exposition. The 9.45 inch coast gun, which is 40 calibers long and weighs 31 metric tons, is so mounted that it can be fired at an elevation of 44°. With a projectile weighing 474 pounds and a powder charge of 253 pounds, an initial velocity of 2099 feet was obtained, and with the maximum elevation of 44° the projectile was hurled a distance of 65,616 feet at the Meppen proving grounds. In its flight the projectile reached an altitude of 21,456 feet, its flight occupying 70.2 seconds. This is reported to have been the greatest distance fired thus far by any gun with an equal weight of projectile. As the accompanying illustration shows, the projectile would clear Mont Blanc, and that it would be possible to fire over that mountain from Pré St.-Didier.



Distance, 65,616 *Feet.—Elevation*, 21,456 *Feet.—Hight of Mont Blanc*, 15,781 *Feet.*

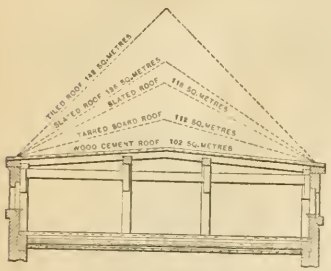
THE TRAJECTORY OF A MODERN GUN.

The agitation in New England for the nine hour working day is extending to all branches of industry.

ROOFING AND CORNICE.

Wood-Cement Roof.

In the accompanying illustration is presented a section of a building showing various roofing methods and their superficial contents in comparison with what is known as Haeuster's wood-cement roof, the latter being a new form of covering which has gained the approval of the authorities and other competent persons in Germany. It has also been frequently employed in Austria, Russia, Holland, Belgium, and especially in France. The rafters and covering being arranged in an almost horizontal position reduces the area of the roof to a minimum, and therefore results in a saving both in the amount of material required and in the labor of putting it in place. The rafters, however, must necessarily be somewhat


TILED ROOF 148 SQ.METRES
SLATED ROOF 135 SQ.METRES
SLATED ROOF 110 SQ.METRES
TARRED BOARD ROOF 110 SQ.METRES
WOOD CEMENT ROOF 102 SQ.METRES

Wood-Cement Roof.

stronger than in the case of ordinary roofs. One advantage of the wood-cement roof, so it is claimed, is that it can be used as a bleaching or drying ground, flower garden, open-air restaurant, playground for children, or for any agreeable, useful or profitable purpose, as it admits of constant use without sustaining injury. It is also stated that the temperature below a wood-cement roof with a layer of gravel or a plot of grass is in summer and winter more uniform than under any other roof. Disturbing noises caused by high winds, heavy rains or snowfalls are also avoided. The construction of the roof is said to be such that rain water can easily be drained off by arranging the slope of the roof in the middle and collecting the water in tanks for domestic or industrial purposes, or it may be carried off by means of conductor pipes of ordinary construction. This form of roof is, we understand, being introduced into England, and trials which have been made with it are said to have proven very satisfactory.

New Steel Roofing Seam.

A new construction of roof seams, as shown by the accompanying cuts, has been secured by letters patent of late date to the Decatur Steel Roofing Company, Decatur, Ill. The object of this invention is to secure a cleat fastening that will engage with the roof seams, holding the seams firm and secure without being exposed and without the use of rivets, eyelets, tongues, or any part of the cleat showing on the outside of the seam. In addition, it will be noticed that the roof seam is double fold at every point of cleat fastening, giving it the advantage of strength and security, yet doing

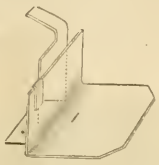


Fig. 1.—Showing Cleat.

away, it is pointed out, with one-half the work with seamers required on a double-fold roof. The manner of forming the seams by this improved method is clearly shown by the cuts, except that the projecting strip on the cleat, as shown in Fig. 1, is not used unless it is desired to lay the entire roof before seaming, in which case the cleats are

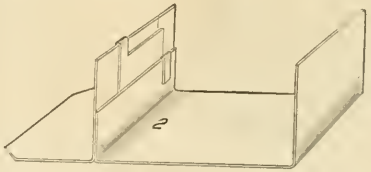


Fig. 2.—Showing Cleat and Sheets Edged.

furnished in the form as shown, and the strip is folded down over the high edge, the lower strip being folded over the 1-inch edge, holding both edges secure until the workman is ready to form the high edge over the lower, completing the seam. The material used for this roof is steel. The sheets are inspected and painted on both sides, after which

Fig. 3.—Cleat Turned Down and Finished Seam.

they are joined by a double-lock cross seam, and, if not ordered otherwise, are wired in rolls of 100 feet long, containing enough material to lay slightly over two squares.

FLASHINGS.

The Cortright Metal Roofing Company of Philadelphia and Chicago are calling the notice of the trade to their patent improved valley, heretofore made with one fold on each side to which the slates or shingles were attached. The improvement consists of an extra fold on each side, thus forming double protection against driving storms. The folds provide amply for expansion and contraction of the metal. While this valley is especially intended for use with their metallic tiles, shingles, &c., yet it is also used extensively with wood shingles and slate. It can be supplied in any weight of copper or brand of roofing tin.

The Fresno *Morning Republican* of recent date makes pleasant reference to John C. Dressel of Fresno, Cal., and mentions the fact of his having received the second prize in *The Metal Worker* skylight competition. The item also makes complimentary reference to *The Metal Worker*.

A novel use has been made of the telephone by the police authorities of Newcastle, England. Each constable carries about with him a telephone that consists of a combined receiver and transmitter. In the case of his requiring to communicate with headquarters he attaches the telephone to the alarms that are set up every here and there, and immediately he is in touch with the officer in charge. The system is of special advantage in cases of fire.

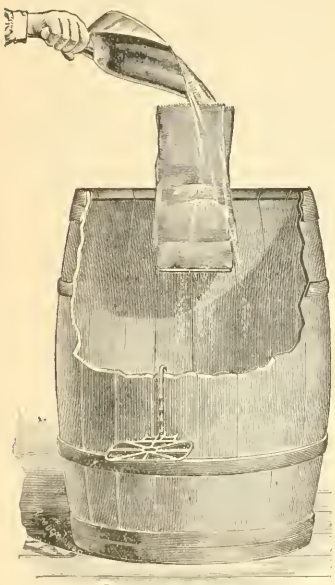
A British foreign office report on labor in Germany states that working hours in Berlin are from 12 to 17 a day. In many districts in the Fatherland adults are said to earn no more than 25 cents a day; and 60 cents is a high wage, even in Berlin. The average income of all skilled trades in Germany is less than $150 a year.

Brooklyn (N. Y.) property owners have taken a decided stand against the further extension of the trolley system in that city.

THE RETAIL STORE.

Edgerton's Hanging Shelf.

The accompanying cut shows a hanging shelf put on the market by C. W. Edgerton, Bristol, Conn. The shelf is about 7 inches square and the hanger 9 inches long, nicely japanned, and shown suspended on the barrel. The hanger, which is provided with notches, passes through an opening in the shelf by which the shelf can be adjusted to various hights. In operation the hanger is placed over the edge and inside the barrel containing flour, sugar, &c., and on the shelf the paper bag to be filled is placed, as shown at

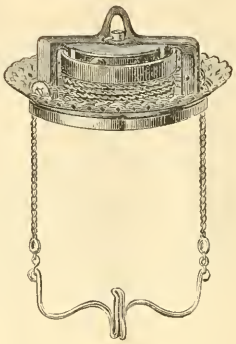


Edgerton's Hanging Shelf.

the top of the cut. As the article in the barrel is lowered the shelf is let down on the hanger to a convenient hight for holding the bag. The manufacturer claims that the device saves time, that the bag is in the most convenient position possible, and that everything spilled goes into the barrel instead of on the floor or counter.

Gravity Extension Fixture for Lamps.

The Plume & Atwood Mfg. Company, 18 Murray street, New York, are offering a gravity extension fixture, as here illustrated, having a ball stop. This device is intended to be attached to a hook in the ceiling for suspending hall or other lamps, and permits of the lamp being quickly and readily taken out for cleaning or refilling without the fixture springing back when the weight is removed. It can be drawn to any point and held and as easily released. The fixture in position is ornamental in appearance, the mechanism being concealed by a metal disk 7½ inches in diameter formed in a die. Above this disk is a cast-iron drum, grooved so that the chains after passing over wheels are taken up by the drum, which is actuated by a spring. The



Gravity Extension Lamp Fixture with Ball Stop.

locking contrivance consists of a cast-iron ball ⅝ inch diameter rolling back and forth in a wedge-shaped channel. To elevate the lamp it is swung slightly to one side to release the ball, when the lamp is gently lifted and the chains wound up. When the lamp is to be lowered it is pulled down to the desired position and lifted a moment until the ball rolls into position, thus locking it. From eye to hook the extreme length is 4 feet. The fixture is supplied in brass or brass nickeled.

The Wayne Barrel Truck.

Wayne Oil Tank Company, Fort Wayne, Ind., are introducing the truck illustrated in the accompanying cuts. The truck is designed to obviate the

Fig. 1.—Truck Ready for Use.

necessity of platforms on which to place barrels while on tap; the barrel being loaded can be pushed to any portion of the store or under a counter, and there remain on tap until the barrel is empty. The handle is removed when the barrel is placed in the desired location, as in Fig. 3; where several trucks are in use

Fig. 2.—Barrel Loaded.

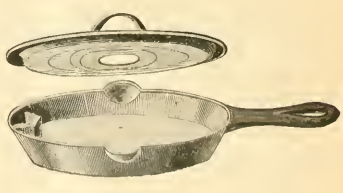
only one handle is necessary. The manufacturers also make a drip pan to place under the faucet, to catch the

Fig. 3.—Barrel while on Tap.

overflow or drippings, keeping the surroundings neat and clean.

Smokeless Frying Pan.

W. E. Beveridge, Baltimore, Md., has secured a patent for, and intends placing on the market, what he describes as the Smokeless frying pan, a general view of which is shown in the accompanying illustration. The pan is made with a lip at both sides, and provided with a close-fitting cover. An important feature is the opening in the lid and in the body of the pan itself, which is claimed to create a draft that



Smokeless Frying Pan.

serves to carry away all unpleasant odor which may result from cooking, and prevent its finding its way into the house. The pan is being made in three sizes.

Suggestions as to Improvements in Putting Up Goods.

SECOND ARTICLE.

BY J. E. BACKENS.

This subject is one presenting a wide field for inquiry and investigation. It must be admitted at the outset that the improvements in the putting up of goods have been very marked during recent years: one has to search much more closely now than formerly for shortcomings. Probably in no country has this matter received as much attention as has been given to it by Hardware manufacturers in the United States. Still there is room for improvement, as I will endeavor to point out by considering the subject in its different aspects.

STRENGTH OF PACKAGES.

Many goods are put up in pasteboard boxes, which are too weak to hold them; this is notably so with heavy articles, such as Hammers, Hatchets, Pincers, &c. In some cases Nail Hammers are being put into wooden boxes, but in my opinion Hatchets require such boxes even more than Hammers. The edge of the Hatchet has a tendency to cut through at the angle of the pasteboard box, as the article is one frequently handled in a retail establishment, and the edges sticking through soon cut into and mar the shelving. In Pein Hammers, I venture to say, very few retailers ever get a box of the larger sizes that is not broken. In drawing these out of the shelf, as soon as the bottom of the box becomes weak they drop out at the heavy end. Of course it could not be expected to have the cheaper grades of these articles put up in slide-cover boxes.

E. 510 **704** G. 369
1 Doz. 3 Inch.
Broad Iron Bolt, Shoots Right and Left.
IRON WARDROBE LOCKS.
Corbin Cabinet Lock Co.

Fig. 1.—Printed Black on Green Paper.

E. 43 **02** G. 71
1 Doz. 1½ In.
Single Link.
BRASS CHEST LOCKS.
Corbin Cabinet Lock Co.

Fig. 2.—Printed Black on Orange Colored Paper.

THE SIZE OF PACKAGES.

As far as the quantity is concerned good judgment is very generally displayed; but the size of the box is frequently too small to contain the articles after they once become slightly disarranged. Perhaps there is a good argument in favor of having bulk and weight at a minimum, but I think it is slightly overdone.

PACKING OF GOODS.

As a rule care and system are noticeable in this direction, but there is room for improvement, particularly in the packing of Locks and Trimmings. While much progress has been made in the style of package, and the separate boxing of Locks and Knobs, it still remains a general custom to place the Screws "at large" somewhere in the box. The Locks, Escutcheons, &c., are wrapped in a light quality of paper; through friction and otherwise the Screws get loose in the box and too often turn up partly missing, having escaped through a crack in the edge of box, or perhaps dropped out in examining at the factory and overlooked. I have experienced this same trouble with expensive bronze front door and store door Locks; these being large and heavy the boxes do not always reach the retailer in perfect shape. If Screws are short, he cannot replace them, because retailers do not carry assortments of the various finishes of Screws in stock. Now, to remedy this, how simple it would be to place all Screws for each Lock in a stout manila envelope and seal it. That would prevent the scattering of Screws, which will work out of the smallest opening; the envelope would not be overlooked, and would obviate the necessity of counting the Screws when selling a Lock.

ONE, **01285** 3½ x 3 In.
Ornamental Bronze Front
Mortise Knob Lock.
Patent Steel Key.
4533 Knobs. 3 FINISH. 4971 ¼ Esc.
1¼ to 2¼ In. Doors.
P. F. CORBIN, New Britain, Conn., U. S. A.

Fig. 3.—Printed Black on White Paper; 3 Finish, in Red Ink.

LABELS.

This is an important feature on certain lines of goods, particularly such as are not usually sampled and placed in drawers. The usual fault of labels is that they are too uniform—not sufficiently distinctive. That which should receive prominence is frequently overlooked. Take, for instance, Cabinet Locks. These are usually sold from sample and listed by number, the number consequently is the part that should have prominence on the label. Some manufacturers have "caught on" to this, as shown by the labels reproduced in Figs. 1 and 2.

The advantage of these labels will be at once apparent to those who have experienced the difficulty at times of finding the desired number or size amid an assortment of goods of the same line. It will be noticed that additional numbers are also given corresponding with two other makes of Locks, thus covering the three makes most commonly found in jobbers' stocks. In Door Locks the same suggestions will apply: if it is a Mortise Lock, the word MORTISE should be extra prominent, or the number may be given prominence, as in Fig. 3.

HALF DOZ. 6 INCH.
TOWER'S
CHAMPION
SCREW DRIVERS.
Patented May 15th, 1877, and April 29th, 1879.

Fig. 4.—Black on Green Paper.

No. **86** 1-2 Doz.
SCREW DRIVERS,
Manufactured by the Stanley Rule & Level Co., New Britain, Conn.
4 INCH.

Fig. 5.—Black on Blue Paper.

Applying the same rule, for instance, to Screw Drivers, it will be found that the point to be emphasized is the length. The labels, Figs. 4 and 5, show by contrast the significance of this suggestion. Providing for space for marking cost and selling prices on a label I do not recommend. The ordinary green label cannot be plainly marked in pencil, besides the cost and selling marks should be distinctive, and that is best accomplished in using a separate label.

SHORTAGES IN COUNT

or weight are of rare occurrence so far as my experience goes. With few exceptions there seems to be constant progress noticeable in the putting up of goods: in some cases enterprising jobbing concerns have led the way to certain reforms or improvements, by having goods specially packed for them. The vast extent of the territory over which most of the articles of Hardware are shipped, requiring extra handling and perhaps repacking, are alone sufficient reason for permitting no relaxation of efforts toward further improvement.

Waste in a Store and How to Avoid It.

THIRD ARTICLE.

By G. B. Korbett.

A careful business man tries to avoid wasting anything useful, as much as possible, not merely alone for economy's sake, but also from principle. It is wrong to let any substance, whatever it may be, go to waste, instead of turning it into use. Careful husbandry means to apply everything to its proper use, and is therefore the source of order, and without order there can be no success—no lasting one anyhow. A careful salesman will, without showing any niggardly disposition, do all he can to turn everything into use, and never forgets that the smallest sales are the ones which naturally bring the highest percentage of profits; purchasers who have any common sense do not expect it any other way. It would therefore be foolishness not to charge for trifles out of a false sense of liberality or chevalierly impulse. There are exceptional cases, though, where a certain display of liberality is well placed. It is a safe rule to remember, notwithstanding, for everybody who tries to make a living by selling merchandise, that goods are kept in store to bring financial returns and not to be given away as little tokens of friendly feeling.

WEIGHING AND MEASURING.

In weighing or measuring articles which you sell you must be just, but need not be liberal. To do so it requires some skill, as it looks very mean if you make your efforts at strictness too noticeable. A salesman who takes out a few nails to drop them back again, and maybe repeats this, gives the impression of trying to treat his customers rather niggardly and will drive them away by and by. It requires a good deal of practice to use a scale in such a way that, without your giving anything more than the strict weight, you create the impression of liberality. In measuring goods with a yard measure it is the same thing; it demands practice, and the first rule should be exactness and justice to both sides concerned—the seller and the buyer.

ODDS AND ENDS.

Economy can further be practiced by using your wrapping paper carefully and by never taking any more than necessary for immediate use, also by keeping it as much as possible in a cool place, out of draft, to prevent it from getting too brittle and thereby weak. Goods which you receive and unpack have in most cases their wrappings, boxes or twine well enough preserved that they can be made to do service once more, and there are always some spare moments in any salesman's business hours which he can utilize by making such odds and ends fit to be used over again.

ECONOMY IN GAS.

In many places of business it is necessary to have a light burning even during daytime, as without it desks or counters or storage rooms would be too dark to work in. Such lights should always be turned low if not really wanted for work. You will be astonished what a difference it makes after the end of a month in your gas bill if you mind your gas lights carefully.

In every packing room there might be a convenient hook fastened in the neighborhood of the packing counter or table, on which you should hang all the ends of twine which can be used over again, while a convenient space should be found for your odds and ends of wrapping paper and for your used boxes, none of which need go to waste.

GRATIFY YOUR CUSTOMER.

Empty pasteboard boxes will form very practical and welcome receptacles for nails and different Hardware. Mechanics who have to work outside prefer them greatly to paper wrappings. You will save by so doing the outlay for new wrapping paper and gratify your customer besides. Try to get rid of remnants of goods also, even if you have to sacrifice a cent or two. If, for instance, you can sell a remnant of picture wire, let us say one and three-quarter yards, it is more practical than if you would sell two yards which you would have to cut off from the piece.

It is also true economy to try and sell the last articles out of a lot rather cheaper than the regular price. This is wiser than to keep them and have them thrown into the background by the new stock, which always looks fresher and more inviting.

In leaving your place of business at night time you should turn off the gas at the meter and so prevent any possible leakage.

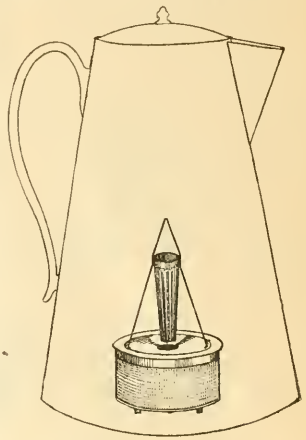
DON'T TRUST HIM.

It happens in every store once in a while that a customer is a few cents short, and even if you do only a cash trade with him you don't like to refuse him the goods on this ground. Be careful to charge such small items into his next purchase or to ask in a polite way for it directly. If the customer is honest he willingly pays it, and if not you have to make him pay it in some way or another and not trust him again.

Do not use any of your tools or belongings in a careless way and do not get into the habit of handling your merchandise as if it were imperishable. Many articles get shopworn in a short time on account of being carelessly handled. Consider all your goods as things which you hold, so to say, in trust for the purchaser and which you are bound to deliver in good order. This will save you many a loss and give your whole place the aspect of neatness and order, the precursors of well-doing and success.

Ideal Coffee Purifier.

Donathen Novelty Mfg. Company, 510 Broadway, Kansas City, Mo., are introducing the coffee purifier herewith shown. In operation the coffee is made in the usual way, by boiling, but one or two minutes before taking the coffee off the stove, while it is yet boiling, the purifier is dropped into the coffee pot. In a minute or two it is lifted out, when, it is stated, all the

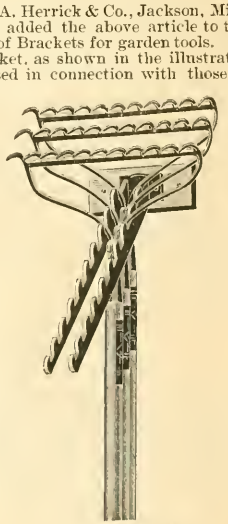


Ideal Coffee Purifier.

sediment will be found in the perforated tin box. The manufacturers claim that this device will enable any one with a common coffee pot or a tin pail to make as good coffee as could be made with the more complicated and expensive pouring coffee pots. The purifier is made in two sizes: No. 1 for 2 to 4 quart pots, and No. 2 for 4 to 6 quart pots.

New Rake Bracket.

F. A. Herrick & Co., Jackson, Mich., have added the above article to their line of Brackets for garden tools. The Bracket, as shown in the illustration, is used in connection with those for



New Rake Bracket.

Forks and Shovels, recently described. The Rake Bracket fits the same wall plate as the others, and is interchangeable with them, and projects the same distance from the wall as the former ones. The Bracket accommodates ten Rakes.

STOVE TRADE NOTES.

Stop the Leaks.

A well-informed correspondent in the stove trade, writing under the *nom de plume* "Economy," discusses features of business policy which at the moment are exceedingly appropriate. Among other things he says:

A good many business men in all lines are undoubtedly to-day speculating upon the possibilities of business during the latter half of the present year, and to what extent it will be affected or influenced by the recent and present financial disturbances in the country. I have met a good many in the stove business who look with more or less doubt upon the prospects for the fall trade, and are inclined to think that business will not be nearly as good as it was last year. It is a fact that this view obtains to a considerable extent, but not by any means in a panicky degree, and the convictions of those so minded are not so strong that poor business and disasters will come as to cause them to shut down their works, and quite generally foundries are being run as full as was anticipated and planned earlier in the year.

A monetary panic, such as the country has seen for the last six or seven weeks, does not necessarily create a panic among the industries, although it would be folly to urge that it does not have a disturbing effect upon business. There are few concerns but can point to incidents at such times that settle it beyond dispute that their business has been affected to a certain extent. I have in mind now a manufacturer who was called on by a builder and debtor a few weeks since, who had negotiated for a permanent loan on his new buildings, part of which he was to pay the range man, but the capitalist declined to perform his part of the contract and loan the money while the panicky condition of affairs in Wall street existed, and the range bill was unpaid.

It is useless to say that the stove man was not affected then and there by the Wall street disturbances—he was, to the extent of the delay of payment of $1000 due, and for every case of direct evidence there are always several not brought to direct notice, but the effect is felt. The havoc created by the flurry in the money market at the present time is largely confined to a certain class of brokers, whose wealth having been counted at inflated values, finds its true level, and they score an imaginary loss, and there is but little actual or material loss; although, of course, there are a good many men in the mercantile line who dabble more or less in stocks as a side issue, and suffer loss, when, either from timidity or compulsion, they sell their holdings. While there does not seem to be good reason to adopt radical measures of retrenchment in one's business affairs because of the stringency in the money market, or to go about with a pruning knife curtailing expenses, which itself has the effect of increasing or prolonging the conditions, the result of which it is sought to avoid, yet it is advisable for all good business men to exercise a little more circumspection over details, and guard against waste in their business. Retrenchment and cutting down expenses frighten the employees, who are apt to imitate and exercise extra economy on their part, with the result that money disappears from circulation very fast.

LOCATING THE LEAKS.

There is probably no stove house where the system of superintendence is so perfect that destruction, waste and loss do not take place more than they should, owing to the laxness of those in an overseeing capacity, and which cannot be stopped by increased vigilance.

In the selling department of the stove business alone there is always room for saving money without inflicting penalties or extra labor upon men or reducing their wages. Stoves while in transit from foundries to warehouse are bound to suffer more or less breakage, and, while it may be the duty of the boss carman or other person to look out for broken castings and duly file claims with the transportation company, he is quite apt to grow lax occasionally, especially when but one stove is found broken in a carload. Neglect in this instance to report the breakage or lay the claim seems of little account, and the smallness of the amount is sufficient to warrant him in letting it slide. It means a loss of $1 probably to the firm, however, and though small, 50 such cases a year make $50. The truckmen once in a while drift into carelessness, encouraged by the lack of proper inspection of goods when unloading at the store, and, as a consequence, two or more stoves in excess of the average are broken in hauling the contents of a car to the warehouse, and in a business of a carload a day it makes say 600 more broken stoves a year, or $600.

Now, if the same inattention exist on the part of the foreman having charge of porters, who pile up the stoves, $100 more may be safely added for extra breakage during the year in that department, and another $100 due to the carelessness in trucking out again for shipping.

THE SHIPPING DEPARTMENT.

The shipper may be a good servant, and, on the whole, make comparatively few mistakes, but he has become so familiar with his duties that he ticks off a delivery or shipping load with a dash inconsistent with absolute correctness, and has learned, too, to rely on certain of his draymen to detect at the shipping wharf an over or under shipment and bring back what was over, or alter the receipt if one or more are short, but he loses sight of the fact that extra trips to straighten out such innocent omissions increase the expense account. It may seldom or never happen that a stove is really lost in that way, but haste should never be held at a premium above correctness, and one should never excuse himself in making petty errors on the ground that they are not gross or vital.

Let us say that the shipper could save the house by simply curing these small omissions $150, and altogether we find that $1000 per year is being wasted—not wantonly or recklessly, but simply through a little relaxation of the ordinary watchfulness of employees. It does not appear prominently, nor would it be noticed against the profit and loss account in prosperous times, but would, if saved, be very acceptable in a bad year, and could be easily saved without subjecting anybody around to hardship. One thousand dollars saved by simply stopping a few small leaks! to say nothing about those in the repair department, credit and other departments of the house, which, in a business of the size indicated by the foregoing, would raise the amount to probably $5000, enough to turn loss to profit and save the business of a year, when others may be deploring the fact that they have worked a year for nothing and drawn on their surplus besides.

This may be such a year that a general survey of one's business now, and a few suggestions to clerks and employees in a pleasant way to give a little extra attention to the small things with a view to stopping the leaks, will prove to have been wise, and furnish those who adopt the plan reason to be very well satisfied with themselves, and inclined to remember your correspondent for his timely reminder.

Additions to the Fortune Line of Stoves.

We are indebted to the Thomas, Roberts, Stevenson Company, Philadelphia, Pa., for a number of handsome photographs of stoves which they have just placed upon the market. The patterns include heating stoves and ranges and are of a high order of merit. The first to which attention is invited is the Sterling Fortune, a first-class square base burner, made as a single and double heater. It is ornamented in a rather clever manner, nickel being used in such a way as to produce with the black iron very neat effects. A noticeable feature is the dome top, that portion directly over the fire being curved in such a way as to add to the brilliancy of its appearance when the stove is in operation. The Sterling Fortune is made with the nickel parts removable, so that they can be lifted off when it is desired to blacken the stove. The latter separates in the center, thus facilitating the setting up as well as repairing. It is made in three sizes and is fitted with Ransom's patent duplex and shaking grate. When made as a circulator the air is taken in at the bottom of the stove and passes up the flues, which are located in each corner and extend from the top to the bottom. Another novelty which the company have added to their assortment is the Ideal Fortune range, made in two sizes with right or left hand oven. In the decoration of this range a noticeable feature is the treatment of the oven door, which carries upon it a nickel-plated panel having the name "Ideal Fortune" in script letters. More or less cast ornamentation is em-

ployed, giving, in connection with the polished surfaces and nickel-plated portions, a rich and pleasing effect. The trimmings, such as handles, knobs, &c., are of the Alaska type. The oven, which is removable and made of wrought steel, measures 18 x 20 x 14 inches. There is a slide on the bottom of the oven by which its contents may be drawn out for the purpose of inspection or removal. There is also a cast-iron top oven plate to protect the steel oven. The stove has sheet flues and duplex or triplex grate, which can be removed without disturbing the fire brick or water back. The Ideal Fortune is made in the usual varieties, the photograph which we have before us showing five styles. Another range is the Colonial Fortune, made with right or left hand oven, and possessing the same general features as those enumerated in connection with the Ideal. This range, however, is intended especially for the building trades, and is made in portable form and well adapted for brick work. It has steel hot closets, plate racks, canopy, &c. The Active Fortune, known as No. 68, is another member of this general class, and is the same as the Colonial Fortune, except that it has horizontal boiler and upper hot closet. The boiler is concealed in its horizontal position by means of a cast-iron ornamental plate, which extends its entire length.

The Portsmouth Stove & Range Company.

We are indebted to the Portsmouth Stove & Range Company of Portsmouth, Ohio, for a copy of their second annual catalogue and price-list relating to the Model steel ranges. The volume in its general shape and size closely approximates the form of publication which has proved popular with the trade, the illustrations being numerous and the descriptive text ample for the purpose. In presenting this catalogue to the trade the company direct special attention to the steel range which they are offering under the name Model. It is made of extra heavy cold rolled steel, flanged and closely riveted, the oven being thoroughly braced throughout and the bottom plate of such a nature that it can be easily removed and replaced without dismounting any portion of the stove. The fire box employed in this range was patented April 21 of the present year. It is fitted with a heavy anti-clinker grate, and well ventilated linings, the method of ventilation being such that a current of cold air is supplied behind the linings as well as through small holes in the top of the fire back and ends. The front as well as the rear of the fire box is well lined, while an extra large hopper feed is provided, the door of which is also ventilated. Another feature of the Model range is the oven door, patented in September of last year, and so made that it is easily operated with the hand or foot, without the aid of weights, complex levers or other machinery liable to get out of order. The company provided a "simple, inexpensive and efficient device to prevent the startling and hideous noise that always follows when the door is thrown open and falls upon its supports." The arrangement of parts is such that the door is automatically retained in a closed position without the aid of latches, while an improved form of pedal or tumbler serves as a means for readily opening or closing the door. For this year the company have brought out a new style of the Model range provided with feet, and made in six sizes, adapted for burning hard or soft coal, coke or wood. This range has either solid or cut long centers, flat shaking and dumping grate, and can be had with either iron or tile linings. The company also make the range in cabinet style with nickel-plated back rail. The goods are illustrated in great variety and in connection with each style is given a description and price list. The Model steel range is shown with circulating boiler, also attached to charcoal broiler on brackets and the range provided with double ovens.

ODD PLATES.

The Leaf Stove Company is the name of the concern who succeed the Phillipsburg Stove Company of Phillipsburg, N. J. During the past year the company have had an efficient corps of pattern makers at work, and are now introducing to the trade a new and complete line of goods to be known as the Leaf stoves and ranges. For this reason the change in the name of the company has been made. Special attention is invited to the Maple Leaf, a large, well-finished six-hole high-oven range; also to the Holly Leaf, a five hole range, and to the Ivy Leaf, a neat and attractive parlor stove made as a double heater. The trade-mark consists of a leaf bearing in white letters the name and address of the company.

J. M. Davis, Great Falls, Mont., has recently brought to the attention of the trade a stove of novel construction, designed for the use of camping parties. The stove is made of sheet iron, and is so constructed that it can be folded up into very small space. It is said that a box 25 x 26 inches in size, and 2 inches deep, will carry the whole apparatus, including the stove pipe, which is telescopic in character. John Sinclair is associated with Mr. Davis in the patent, and we understand that this stove will shortly be put on the market. Orders from sheepmen and others have already been received for more than 30 of the stoves.

The Bennett & Peck Heating & Ventilating Company, Cincinnati, Ohio, were recently awarded the contracts for heating and ventilating the High School building at Centerville, Ohio, also a six-room school house, by the Board of Education, at Decatur, Ind., and an eight-room school house at South Bend, Ind.

The B. C. Bibb Stove Company, Baltimore, Md., have issued from the press an exceedingly attractive catalogue illustrating and describing the line of hot-air furnaces made by them. The publication is oblong in its general shape and bound in paper covers of a greenish tint, carrying a side title of neat design largely typographical in character. The early pages of the catalogue are devoted to remarks intended for would be purchasers of heating apparatus, following which are illustrations of the Sanitary hot-air furnaces made in portable form and also adapted for brick-setting. A table gives the dimensions of the Bibb Sanitary hot-air furnaces, together with the estimated heating capacity of the various sizes which are made. Another feature of the catalogue is found in a number of suggestions relating to the setting of furnaces, both portable form and those intended for brick work. A long list of testimonials are also given showing the popularity of the goods named.

The Michigan Stove Company have issued from their Chicago office a rather unique advertising novelty, consisting of a little pamphlet bearing the title "So Different." It is made up of 16 pages, measuring 4½ x 5¼ inches, and within its covers is a little story told in rhyme by Nixon Waterman, with sundry illustrations by Walter H Bradley. The story is of a young man who, thinking of marriage, is somewhat discouraged by the experience told by a friend of his, whose meals were always late, the cook mad, the house dreary and cold, and life anything but "a joy sublime." In fact, matters were so bad that a divorce case was in sight, when one day the married couple discovered that the trouble was due to the cooking and heating apparatus. They at once looked about for new stoves, and finally decided upon a Garland range and heater. The results of the change were so satisfactory that they invited their young friend to dine with them. He found things "so different" from what they were when he first considered the question of marriage that he changed his mind and decided to wed. The story is told in a pleasing style, and illustrated in a manner which emphasizes the fine points from beginning to end.

A. T. Nye & Sons, Marietta, Ohio, have added to their line of cook stoves for this year the Leader, which is said to embody the latest improvements. It is of attractive design and the workmanship is first class. The firm also have ready for the fall trade a new line of Round Oak Leaders, intended for burning wood, coal or gas. These goods are of neat and attractive design, have square bases, draw grates and air-tight joints. They are offered in five sizes, handsomely nickel plated. The makers have also brought out a dwarf stove, cheap in price, yet attractive in appearance, and is put upon the market under the name Opal. The goods above enumerated are now ready for the trade, and the makers are prepared to meet any reasonable demand for them on the part of consumers.

We are indebted to the Kelsey Furnace Company, 339 West Fayette street, Syracuse, N. Y., for an advance copy of an exceedingly neat catalogue which has just been issued from the press. It is a well arranged publication of 48 pages, bound in colored paper covers with side title of tasteful design, in which is wrought a representation of sections of a cold-air duct and hot-air pipe. The pages are devoted to an illustrated description of the Kelsey corrugated warm air furnace which, from the tone of the testimonial letters received by the company, is proving very popular with the trade. The heater has the base cast in one piece upon which rests the ash pit with a fitted joint to prevent all escape of dust into the hot-air chamber. The grate employed is of the Smythe patent, and the fire pot is of novel construction. The inside casing is of heavy steel, while the outside is of galvanized iron lined with asbestos sheeting and tin. A sectional view of the heater is given showing the passage of the air from the time it is taken in at the base of the heater until it escapes into the pipe at the top.

The Buckeye Stove Works of Canton, Ohio, send us photographs of two heating stoves which they are making in several styles and sizes. The first of these is the Oak Halcyon, of neat appearance and provided with nickel-plated foot rail. It is offered in four sizes, the diameter of the body of the stove at the

feed door being 11, 13, 15 and 17 inches respectively. The other photograph shows a neat cannon stove, made in three sizes and adapted for burning coal.

THE PENINSULAR STOVE COMPANY report a large number of visitors daily to their salesroom at 79-81 Wabash avenue, Chicago, as well as at their exhibit at the fair grounds. The company state that for the first five months this year their trade has shown a large increase over that for the corresponding period of 1892, and with the new stoves which they have recently introduced, together with the changes in their old lines, they expect business this year will show very gratifying results. One of the changes which they have made in their old lines is the open fret-work panels on their oven doors.

THE NORTH DIGHTON CO OPERATIVE STOVE COMPANY of North Dighton, Mass., favor us with a variety of advertising matter relative to the goods which they are offering to the trade. These include, among others, the Prize Oak, a neat six-hole construction made with draw center or plain grate and in a variety of styles and sizes. It has a large fire pot, three ring covers, sheet iron ash pan, patent oven-door opener and Alaska handles. Another leader of this company is the Live Oak, a range made with ventilated oven, triangular or duplex grate, direct damper and other features of utility. The White Oak is another member of this general class, made in four sizes and the usual modifications. The Oak Grand is still another novelty which is being brought out by the company and which is referred to as being first-class in every particular. A very neat heating stove is the Oak Leaf, made in three sizes.

GAS STOVES are beginning to be used in the southern portions of Europe. A private letter from the island of Malta, in the Mediterranean, mentions the adoption of such devices as a somewhat new feature there, and one which promises to become permanent. Their advantages for cooking in the hot weather, which prevails in Malta for the greater part of the year, have been found to be very material over the coal and coke ranges usually employed. A suggestion is made that good gas stoves of American patterns would find a profitable market there, where no duties on such goods exist.

UZAL CORY & Co., 210 Water street, New York, are offering an improved patented smoke pipe damper which they have just brought out. It is a combination of the Boston and common damper. It is entirely of cast iron, and so made that it can be readily attached to the pipe. The damper consists of a metal plate having four $\frac{7}{16}$-inch holes at the extreme back end. On the front is a solid apron of iron, the apron and damper being one casting, that deflects the gases around and through the damper, but away from the front opening when the damper is closed. From this point they pass up the chimney instead of into the room or cellar. The damper is riveted to a handle which automatically closes the damper and opens the check draft, or *vice versa*. It is now made in 6 and 7 inch sizes, but will be made larger and smaller if the trade warrants it.

ISAAC A. SHEPPARD & Co. of Philadelphia will soon bring out a new line of fire-place stoves bearing the name Fidelity. The stoves will be made in two sizes, 14-inch and 16-inch fire pots, and the fronts finished in Berlin black or full nickel. The makers state that they will be highly ornamental and that in design the requirements of Brooklyn, Philadelphia, Baltimore and Washington have been carefully studied.

THE WEBSTER OIL & GASOLINE COMPANY, 261 Federal street, Boston, Mass., are sending out their goods put up in a novel way. The oil is contained in cans holding $\frac{5}{6}$ gallon, six of which are packed in a case. A postal card, addressed to the firm, accompanies each, which the consumer is requested to mail when the case is empty and it will be removed and a full one substituted. The advantage claimed for this method is that the small cans are easily handled and are less likely to overflow the reservoir.

"THE METAL WORKER" has been favored with a handsome volume entitled "Illustrated Guide to Cincinnati," consisting of over 430 pages bound in cloth and gold, bearing an illuminated title-page, from the John Van Range Company, 169 Elm street and 4, 6, 8 and 10 Home street, Cincinnati, Ohio. The opening pages of the work are devoted to a description of the city, its resources, future possibilities, &c., followed by a history of the leading business houses and manufacturing establishments, among the latter being included that of the John Van Company, to which it refers as having established its now extensive business in 1854, nearly 40 years since, and, like the city, has grown to very large proportions from a very small beginning. The goods of the concern are distributed all over the country in the largest and most prominent hotels, restaurants and public institutions, withstanding the severest of tests. A number of minor details are also referred to, the article closing with the names of the officers of the company, who are as follows: L. E. Ziegle, president; C. H. Blanchard, vice-president; C. F. Koester, secretary and treasurer, and John Gibson, superintendent.

J. J. WILSON, the popular and well-known heating and ventilating expert, is making a visit to the principal cities of the West in the interest of the Fuller & Warren Company.

THE SCHUYLKILL VALLEY STOVE COMPANY of Spring City, Pa., will place on the market this season the Chief, a new six-hole, second-class range, designed to meet the demand for a range of medium price. Their Grand Chief range has been remodeled to some extent and now appears with a new ash pit. It has six holes, left-hand oven door, and is attractive in appearance. The Chief is made in two sizes and the Grand Chief in one size only. The company are also remodeling their Damascus square parlor stove and claim that they are considerably improving its adaptability to the heating of upper rooms.

THE GRANDER STOVE COMPANY of Royersford, Pa., are putting on the market the Volga square double heater. This is a handsome addition to their already large line. The distinctive features in the Volga are a revertible flue; the Ransom grate, which is a combination of the duplex grate with a surface grate on the outside; and a provision for the removal of the lower section of the front, a feature which it is claimed will be readily appreciated by dealers, as new cylinders can be fitted to the stove, when required, with little trouble. They are also introducing their new Torrid soft-coal stove, which is of square pattern having a center discharge grate. In design, it is handsome, and is gotten up to fill the demand for a low-priced soft-coal stove. The company are also preparing, and expect to have on the market in time for the fall trade, the Milton heater. It will be constructed on the double-heater principle, the base and fire chamber of cast iron and the upper chamber of sheet iron in a round form; the cylinder will be exposed except for the covering provided by an ornamental open screen surrounding it, thus permitting of air passing in and up between the casings to the heat pipe designed for transmitting heat to upper rooms. It will be provided with a register of such design as to allow of the stove being used as a single heater when desired, and the heat pipe will connect at the back of the crown top in such a manner as to allow of the use of a top ornament when used as a single heater, thus retaining its handsome appearance.

THE READING STOVE WORKS of Reading, Pa., have issued a catalogue of their Torrid and Torrid Sunshine steel plate warm-air furnaces. Pages 1 to 27 are devoted to descriptions of the furnaces, directions as to setting and piping, ventilation, and general information regarding heating by warm air. Additional pages A to L illustrate particularly the Torrid Sunshine furnaces and the Torrid Sunshine combination hot-water heater, by the use of which it is claimed from three to six rooms can be heated in addition to those heated by hot air, without appreciably diminishing the power of the furnace as a hot-air heater. The remainder of the book is devoted to price-lists and an abundant supply of testimoniala concerning the Torrid furnaces. The catalogue is well printed, and appears in handsome lithographed covers.

THE FAVORITE STOVE & RANGE COMPANY of Piqua, Ohio, have just issued from the press a supplement to their catalogue showing their new goods for the fall trade. The supplement is of the same size of page as the last catalogue and is intended to form a part of it. The new goods are handsomely illustrated and described in such a way that the dealer is informed concerning all the features of construction and operation. The Favorite base burner, "A series," is first given attention, following which is described the "B series," and then the Aileen, a very attractive direct draft cottage parlor stove for wood only. Two large corrugations in the bottom form a rest for the stove and increase, it is claimed, the radiating surface as well as the strength of the bottom. This stove is made in two sizes, taking, respectively, wood 20 and 22 inches in length. The company have also issued a pamphlet relating to the gas ranges, which are made in a variety of styles and sizes. The statement is made that the cast front doors and polished steel bodies will not tarnish or discolor, while they are easily blackened and kept in good condition. The ovens are 16 x 16 and 18 x 18 inches in size. The company also claim that the cast top and bottom oven plates will not rust, nor burn out. Under all top burners is a galvanized apron, while one hole on all the ranges is fitted with a double burner. The ovens and sections are so arranged as to be easily removed and replaced. The double oven burners are provided with two valves, all burners being operated with steel needle point valves,

with stop to prevent the thread entering the packing. The polished steel bodies of the ranges are lined with asbestos. The Favorite is made with and without the hot-water heater and step at the side. The fourth page of the pamphlet presents a bird's eye view of the company's works, the entire depth of the buildings being 1270 feet.

J. W. SHEELER, the energetic representative of The Reading Stove Works, is sending to his friends a long list of additions and improvements in the lines he represents, and states "the half has not been told." It is inferred that the remainder is reserved for personal visits.

THE READING STOVE WORKS, Orr, Painter & Co. of Reading, Pa., are this season adding to their line some new goods, and announce many improvements in their old styles. Among their additions are a new first-class circulating base burner and double heater under the name Golden Sunshine, a new six-hole range in five sizes, to be known as the Ideal Sunshine, a new cheap straight draft sheet-iron stove Gem Sunshine, in seven sizes, and the Laundry Sunshine, a new laundry stove in two sizes. Their improvements cover the rebuilding and reornamenting of their Royal Sunshine sheet-iron base burner and their Merry Sunshine and Parlor Sunshine stoves and double heaters. Improvements have also been made on their Othello and Home Sunshine ranges, which have been provided with a device to enable the duplex grates to be quickly and easily removed and replaced without disturbing any other part of the fire box. Their lines of Gay Sunshine and Hot Sunshine revertible flue sheet-iron stoves have been remodeled and two sizes have been added.

THE YEAGER-HUNTER SPRING CITY STOVE WORKS, Spring City, Pa., are putting on the market a square heater which they are calling the Bright New Era. It is offered as a cheap and effective heater, and is made single or double with straight draft and full revertible flue.

THE BUCKWALTER STOVE COMPANY of Royersford, Pa., have their new square heaters about ready for the market. They are pushing forward their new catalogue in the expectation of placing it in the hands of the trade by the middle of July.

A SPECIAL PAMPHLET on Acorn base burners has been issued by Rathbone, Sard & Co., Albany, and is decidedly attractive. The front is sky blue and is printed in two colors. It is profusely illustrated, printed in good, large type, and tells of the Royal Acorn, Princess Acorn, the Avenue Acorn Art parlor, Acorn square parlor, and the Art Westminster, with their special features.

MR. MACKNIGHT of the Mount Penn Stove Works, Reading, Pa., is managing to relinquish the cares of business sufficiently to allow of a visit to the Chicago Exposition. He will return about the end of the month.

THE HOT WAVE was so serious last week that a number of the stove foundries in Albany and Troy, N. Y., were obliged to shut down for a time.

J. G. YEAGER of the Yeager-Hunter Spring City Stove Works is making a lengthy visit to the World's Fair.

THE NEWLY ORGANIZED Columbia Furnace Company of Buffalo, N. Y., have elected Gustave F. Miller president, Horace K. Tallmadge vice-president, C. H. Bagley treasurer, Oliver W. Day secretary. All of the necessary arrangements have been made, and the concern will begin immediately to manufacture its new furnace.

MAJOR LITTLEFIELD, manager of the Littlefield Stove Company of Albany, N. Y., reports a fine outlook for the sale of West Shore ranges. The trade of the company exceeds that of last year, and another good season is expected. A number of new ranges in the West Shore line have been gotten out by the company.

THE MOLDERS' UNION of Albany, N. Y., has elected the following officers: President, James E. Roach; vice-president, William Burgess; recording secretary, John J. Sayres; financial secretary, Peter Donnelly; treasurer, Matthew Young; inductor, Conrad Weinline; doorkeeper, Charles Lavey; roll clerk, Henry Hoccur. Trustees: Joseph C. Pedlow, Michael Day, William Murdock, George Sharpe and Samuel Keith.

THE PERRY STOVE COMPANY, Albany, N. Y., are getting out many fine stoves for the season and expect large sales of the Argand lines of parlors and ranges. The Royal oil and gas stove lines are having almost unprecedented sales.

"PERFECT COOKING" is the title under which Isaac A. Sheppard & Co. of Philadelphia and Baltimore publish an interesting 24-page pamphlet descriptive of their Excelsior and Fidelity ranges. "Because a thing is to be used in a kitchen it does not necessarily follow that it must be ugly," says the writer of the pamphlet; and a glance at the fine illustrations in it would show that the firm have acted on the theory and have not spared any expense or labor to make their ranges handsome and artistic. The Excelsior and Fidelity range are well known to the trade. In describing the Fidelity ranges the firm announce that they now make their own range boilers for these ranges, and claim to be the only manufacturers in the stove trade doing so. Their boilers, they state, are made from extra heavy plate, either black or galvanized, in sizes varying from 34 x 10 inches to 39 x 14 inches, and are all tested to a pressure of 150 pounds to the square inch, and guaranteed against leakage. The pamphlet is well written and printed, and appears in a handsome cover, lithographed in colors, the front page depicting "ye olde way" of cooking by means of a pot suspended from a hook over a log fire, and the back page being ornamented with the medallion adopted as a trade symbol by the firm.

A. M. BLANCHARD, advertising manager of Rathbone, Sard & Co., Albany, N. Y., is spending two weeks in Chicago.

BUCK'S STOVE & RANGE COMPANY, St. Louis, Mo., are justly proud of their exhibit at the World's Columbian Exposition. This is the only stove concern represented from St. Louis, and, we believe, one of the few west of the Mississippi River. They have adopted a plan or method of illustrating the progress made in American manufacture, which is notable principally for its simplicity. It is strange that the same idea had not occured to manufacturers of other lines, but a search through the exposition fails to find one which can be called similar. The exhibit has already been referred to in these columns, and in brief is as follows: A chimney and fire place of the last century represents the early manufacture, while an old Clipper stove made by this house under date of 1846 represents the progress of a half century. As an exhibit of what they are at present making they show a finished stove of to-day's manufacture, which is in striking comparison with the Clipper of 50 years ago. Taking it altogether the exhibit is one which is attracting a great deal of attention from both the stove trade and others, as it follows more closely the primary object of the exposition—that is, showing the improvements made in art, science and manufacture. This company are now engaged on their 1893 catalogue, which will contain a number of new goods. Prominent among them are six family sizes and styles of Buck's steel ranges for all kinds of fuel, 16 sizes and styles of Buck's Fashion range for wood, in four and six holes, plain and high finish; 16 sizes and styles of Buck's Peerless range for coal and wood, in four and six holes, plain and high finish; four sizes of Buck's Flora, a low-priced cooking stove; three sizes of Buck's Brilliant hard coal base burner and ventilator; two styles Buck's Blazon hard coal base burner, a medium priced stove; two sizes of Franklin stove for hard or soft coal or coke, and four sizes and styles of Buck's Utopia wood heater, revertible flue base heater and direct draft.

EDWARD W. PECK, long known to the trade as the secretary and treasurer of the Rochester Co-operative Foundry Company, and recently first vice-president of the National Association of Stove Manufacturers, has assumed temporarily an additional duty. He has accepted the treasurership of one of the largest patent medicine houses in the country, that of the H. H. Warner Company of Rochester, whose financial matters recently became somewhat complicated, owing to the personal embarrassment of the president, Mr. Warner. Mr. Peck informs us that everything is looking favorable for the medicine company, whose financial matters are already shipshape and bound to come out all right. With characteristic modesty Mr. Peck disavows any personal responsibility for the improvement in the Warner Company's situation. His connection with the Co-operative continues, and is not affected in any way by the duties assumed in the side issue.

SHERMAN S. JEWETT & CO. of Buffalo, N. Y., favor us with photographs of two parlor stoves which they have added to their already varied and interesting assortment. Under the name of Jewett's Ext a they have brought out a fancy base burner, of graceful proportions and rich ornamentation. The entire design gives evidence of careful attention to details, while the treatment of the base, top and open-work section is exceedingly clever. Nickel is employed in a judicious manner in the embellishment of this parlor heater, and the urn which surmounts the top is of a high order of merit. The stove is first class in every particular and the constructive features of such a nature as to warrant the makers in expecting a large demand. The second photograph shows what is known as Jewett's Regent, a medium-priced base burner of tasteful ornamentation. It is embellished with nickel-plated base, name plate, foot rails, magazine panels, top rim, swing cover, ornaments, shaker, knobs and hinge pins, while it is surmounted by a handsome brass and nickel urn of somewhat conventional pattern. Constructively the stove is well made, and among other features has an automatic magazine cover.

TRADE REPORT.

The Iron Market.

Dullness approaching practical paralysis has character'zed the markets in Iron and Steel throughout the country. Nearly every merchant and manufacturer is more busily and anxiously engaged in putting his finances into unassailable shape than he is hunting for new business. In fact, sellers are closely scrutinizing the credit of customers, and reject any business which does not seem absolutely safe. There are sellers in plenty, providing they could get reasonably satisfactory prices, but as that cannot be done, except to a very limited extent, they simply wait until there is a demand. The recent failures that have occurred in Chicago and vicinity in the Iron trade have been precipitated solely by the scarcity of money and the difficulty in securing banking accommodations.

Pig Iron.—Complaints of very dull trade are quite general in the New York market, and special transactions are becoming relatively numerous. We quote Northern brands at $14.50 @ $15 for No. 1; $13.75 @ $14.50 for No. 2, at tidewater. Southern Iron, same delivery, $13.75 @ $14.50 for No. 1; $12.50 @ $13.50 for No. 2; $12 @ $12.25 for No. 3; $12.25 @ $12.50 for No. 2 Soft, and $12.75 @ $13.25 for No. 1 Soft.

Good brands are scarce in and about Philadelphia, and command pretty full prices for such small lots as are called for, but the bulk of the deliveries are on old contracts, with no great disposition to enter into new engagements for large lots. The decrease in stocks combined with a decreased production are points in sellers' favor, which may assume great importance later on, and while, as yet, they only attract passing attention and have not stimulated buying, they have stiffened holders considerably. Sales have been at about the following quotations for Philadelphia deliveries, and at nearby points accessible by water from the South 20¢ @ 30¢ less, but a good deal depends on quantity, delivery &c.:

American Scotch, No. 1X...	$16.00	@ $16.50
American Scotch, No. 2X...	15.00	@ 15.50
Lake Superior Charcoal.....	$16.25	@ $16.50
Local Coke Foundry, No. 1...	13.75	@ 14.25
Local Coke Foundry, No. 2...	13.00	@ 13.25
Local Coke Foundry, No. 3...	12.75	@ 13.00

In the Chicago market local Coke Irons have been in reasonably fair demand. Notwithstanding the generally poor condition of business there seems to be a class of consumers who are in need of Iron of this quality, but they are, of course, taking it only in small quantities. On this kind of business our quotations fairly represent the market. Quotations are as follows, cash, f.o.b. Chicago:

Foundry.

Southern Coke, No. 1.	$13.00 @ $13.25
Southern Coke, No. 2.....	11.50 @ 11.75
Southern Coke, No. 3.....	11.00 @ 11.25
Ohio Soft Stone Coal, No. 1....	16.00 @ 16.25
Ohio Soft Stone Coal, No. 2....	15.00 @ 15.25
Lake Superior Coke No. 1.....	15.00 @ 15.25
Lake Superior Coke No. 2.....	14.00 @ 14.25
Hanging Rock Charcoal, No. 1..	18.50 @ 19.00
Hanging Rock Charcoal, No. 2..	17.50 @ 18.00
Tennessee and Alabama Charcoal, No. 1.....	15.00 @ 15.50
Tennessee and Alabama Charcoal, No. 2.....	14.00 @ 14.50

The volume of business in Pig Iron seems to be reduced to its lowest terms in Southern markets. There is absolutely no buying for forward delivery, and only the current necessities of consumers are purchased in small quantities, mainly in single car lots, and they rarely reach as much as 500 tons. There is no urgency to sell Pig Iron for forward delivery, the main endeavor being to find cash buyers, and if there were any of these there is no doubt that they could secure much stock at lower prices, but no transactions have become public that would justify reduced quotations, although the whole market seems to be so far demoralized that quotations are little better than nominal. Quotations are as follows:

Metal Market.

Pig Tin.—Since the date of last week's review the price of Straits Tin for prompt and current month delivery has been carried from 19.90¢ up to 20.25¢; July delivery was raised to 20.42½¢ and remote deliveries relatively as high on paper. More recently prices have reacted to 20.12½¢ for prompt delivery and quite as much on futures. There was some sign of softness at the close, spot stock having been sold on Wednesday at 20.10¢ @ 20½¢, and June delivery at 20⅜¢, one day's notice.

Copper.—Regarding the rumored sales of Lake Superior Ingot at 10½¢, nothing has transpired except that persons supposed to be well informed deny knowledge of any contracts having been made at that price.

Pig Lead.—Fully 1500 tons of Common Domestic have been sold at from 3.75¢ down to 3.60¢, and the official bullion price has dropped to 3.55¢. The purchases were chiefly of Lead for late June and July shipment from the West. At the close, 3.55¢ bid, 3.60¢ asked, was quoted.

Spelter.—Dealings here have been on a very moderate scale, and the demand at present is extremely tame. Prices are difficult to gauge in the absence of business, but 4.20¢ @ 4.30¢, delivered, would seem to be a fair range of quotations on Western brands.

Antimony.—Business has been moderate and prices are somewhat irregular, with 9¾¢ @ 10¢ quoted for Hallett's, 10½¢ @ 10¾¢ for L.X. and 10½¢ for Cookson's.

Tin Plate.—The market is dull and weak. Canners and canmakers are not only very indifferent buyers, but it would appear, have, in some instances, sought to have deliveries deferred. From other sources the demand is strictly perfunctory. Late arrivals add considerably to the stock on spot and the assortment is fuller than it has been for some time past. The demand from retailers is small, while the financial standing of all customers is closely scrutinized.

Chicago Report.

Scrap.—The market is very dull. Dealers quote buying prices as follows:

	Per net ton.	Per lb
No. 1 Wrought Scrap.....	$12.00	....
Machinery Cast.....	9.00	....
Malleable Cast.....	7.00	....
Stove Plate (free of burnt)..	6.50	....
Burnt Iron and Grate Bars..	4.00	....
Sheet Iron and Hoops.. .	3.00	....
Plow Steel and Breaking Stock.....	8.00	....
No. 2, such as Shovels, Hoes, &c.....	4.50	....
Old Boilers—whole (Iron)....	7.00	....
" (Iron)—cut in single Sheets and Rings..	10.00	....
Old Gas-Pipe and Boiler Tubes.....	7.50	....
Cast Borings.....	4.00	....
Turnings.....	5.50	....
Horseshoes.....	12.00	....
Copper Bottoms.....	....	8 ¢
Copper Clips and Heavy.....	....	9 ¢
Heavy Brass.....	....	8 ¢
Light Brass.....	....	4 ¢
Pipe Lead.....	....	3 ¢
Tea Lead.....	....	2¾¢
Zinc.....	....	3 ¢
Rubber.....	....	2¾¢

Anthracite.—Dealers report very little doing. Quotations on carload lots of 12 net tons are continued as follows:

	Grate.	Egg, Sto. and Ch.
Chicago, Ill.....	$5.60	$5.85
Milwaukee, Wis.....	5.00	5.85
Kansas City, Mo.....	8.80	9.05
Council Bluffs, Iowa.....	8.80	9.35
Lincoln, Neb.....	8.95	9.20
Sioux City, Iowa.....	8.80	9.05
Aberdeen, S. Dak.....	8.85	9.10
Dubuque, Iowa.....	6.90	7.15
Madison, Wis.....	7.10	7.35
St. Paul, Minn.....	8.10	8.35
Burlington, Iowa.....	7.10	7.35
Des Moines, Iowa.....	8.55	8.80
Davenport, Iowa.....	6.90	7.15
St. Joseph, Mo.....	8.80	9.05
Leavenworth, Kan.....	8.80	9.05
Omaha, Neb.....	8.80	9.05

Colorado Anthracite.

COLORADO FUEL & IRON COMPANY.

Denver.....	$8.00
Pueblo.....	8.00
Colorado Springs.....	8.00
Leadville.....	8.00
Cheyenne, Wyo	10.00
All points between Denver and Missouri River.....	9.35

CONDITION OF THE

Hardware Trade.

WITH THE ADVANCE of the season it is natural to expect a falling off in the volume of general business, but a fair trade is reported, principally from retail merchants whose business in many sections of the country is in excellent condition, they being apparently unaffected by the financial conditions which are influencing the large trade. A considerable volume of business is thus being done, and in all parts of the country large quantities of goods are entering into consumption. A good many manufacturers are still well occupied on orders, but the majority are preparing for the summer dullness. While there is a good deal of complaint in regard to collections there is a commendable disposition on the part of many merchants to make exceptional efforts to settle their accounts promptly, knowing that this will be appreciated by those from whom they purchase in view of the existing stringency of the money market. Prices on the whole are without important change, but in several staple lines the tone of the market is weak and irregular. Manufacturers are, however, prudently refraining from endeavoring to force goods on the trade by means of concessions in price, and, as a rule, in Shelf Hardware former quotations are quite generally maintained.

Advices from Chicago.—The Shelf Hardware trade has been very good for some time, and the first mails this week indicated further improvement. Country merchants are now coming in to see the fair. A very considerable number made their appearance last week, probably as many as in all previous weeks combined. Jobbers say that they do not find them coming in to buy any considerable quantity of goods, yet nearly every one makes out a bill for some little stock. The demand now is of a general character including the whole line of Hardware. Staple goods are also doing better. Builders' Hardware, however, is considerably behind past seasons, showing that building improvements are not being pushed with much vigor. Prices show no special change, except that Wire Cloth is growing still scarcer and those who have stock now ask $2.25. Poultry Netting is also very firm and in comparatively light supply. Collections have improved in Shelf Hardware, but are not yet what they should be and what jobbers would like to see. The volume of business in Heavy Hardware is less than last month, but in some directions trade is a little better. The pleasant weather continues, and while the trade in heavy wagon material is fully as large as in past seasons, quite a number of manufacturing consumers report their business quiet and are consequently purchasing very much less stock than usual.

Notes on Prices.

Cut Nails.—The demand for Cut Nails is light and diminishing and prices also show evidence of further receding. The market in the East is represented in a general way by the quotation of $1.05 on carload lots at mill, but offers have been made and some sales effected at a somewhat lower figure. Small lots from store in New York are held at about $1 35. Many of the mills are preparing for the usual shut down in July for inventory, repairs and general overhauling. The condition of the market will not unlikely in many cases induce a longer stoppage than usual.

Advices from Chicago.— Manufacturers of Cut Steel Nails are in receipt of a fair amount of business, but trade is by no means large. Specifications are being held back to some extent on old contracts, which also makes business rather quiet and causes some anxiety for the receipt of fresh orders. The retail trade in the extreme Northwest has been cut off by the very low freight rates now ruling from Wheeling to Duluth by rail and lake. The Wheeling manufacturers are reported to be quoting very low prices in this vicinity also, but it is stated that such prices are only made on an average above base, which will give the manufacturers some little advantage. Prices on factory lots here are now about $1.20 to $1.25. Jobbers quote small lots from stock $1.30.

Wire Nails —There has been little change in the general situation during the past week or two, but the market is, perhaps, on the whole, in a somewhat better condition. It has not, apparently, been affected by the embarrassment of the Baackes Wire Nail Company, and it is understood that the company's stock of Nails are being held at good prices, which are somewhat in advance of the lowest prices recently prevailing. Some of the mills also are withdrawing their extreme quotations and refusing to meet the lowest prices of some of their competitors, their impression being that with the stoppage of the mills during July the market will be relatively clear of Nails, which should have a strengthening influence on prices. In anticipation of this shut down a number of orders are also being received from the trade. At the present time our former quotation of $1.35 for carload lots at mill still fairly represents the market, notwithstanding the fact that during the past week it has been slightly shaded.

Advices from Chicago.— Wire Nail manufacturers state orders are coming in more freely from outside points. The smaller jobbers throughout the Northwest are sending in orders without solicitation; large buyers here, however, are reported to be well stocked, having taken in considerable quantities when the break in prices occurred some two or three weeks back. The indications now seem to point to stiffer prices. Agents have been advised within the past few days that there will be a pretty general shut down of the factories on July 1, which will so heavily curtail production that they think a slightly better price should be asked for delivery after that time. The general quotation on factory lots is still $1.50, Chicago, but some of the mills referred to are naming $1.52½. They expect that this will stiffen the market, but it remains to be seen whether the trade is not so well stocked up that the restriction of production contemplated will be easily endured. Jobbers report a better inquiry from their trade now that prices have receded. They quote $1.60 in a regular way and $1.55 in mixed carloads.

Barb Wire.—The Barb-Wire market is sluggish, the volume of business being only fair and prices giving some indications of weakness. We still quote $2.45 to $2.50 for carload lots at mill, with concessions in special cases.

Advices from Chicago.—The factories are now catching some of the business which they lost early in the year. Manufacturers report the demand remarkably good for this season, keeping up at a time of the year when it usually falls off. Prices are unchanged at $2.15 for Painted and $2.55 for Galvanized from factory, and $2.30 to $2.70 for small lots from stock.

Glass.—The market is without interest, dull and featureless, with but a small amount of Glass changing hands. A conservative policy is being pursued by dealers in the matter of extending credits, satisfied to do less business until the financial horizon brightens. At the regular meeting of the National Window Glass Company, held at Chicago last week, the general situation was discussed, but no change in list or prices was made. Under the present condition of affairs it is not at all improbable that all the factories will be closed down before July 1. A large number of contracts with importers of foreign Glass expire July 1, and until then there is little likelihood of any advance in prices. Trade in all kinds of Window Glass is very quiet, with no change in prices. We understand that every Plate Glass factory in the country is closed, an arrangement agreed to by all the companies with a view to stop production and reduce the present accumulated stocks. Demand has improved a little with favorable weather, but did not keep up with the weekly production of about 182,300 feet. Quoted prices remain unchanged, as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and over, not to

exceed 17½ cents per 100 pounds ; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Old Rubber.—The following are the current prices paid for Old Rubber delivered in New York:

Car Springs, ton lots, ₽ lb.	....	@	$0.03½
Rubber Shoes, ton lots ₽ lb.	....	@	.04
Large Hose, ₽ ton	....	@	9.00
Wringer Rolls, ₽ lb	....	@	.04½
Wringer Wire Rolls, ₽ lb.	.01	@	.02
Syringes, ₽ lb	....	@	.05

Old Rags, Paper, Etc.—The following are the current prices paid for Old Rags, Paper, &c., delivered in New York:

No. 1 White Rags	₽ lb		4¢
No. 2 White Rags	₽ lb		3¢
Mixed Rags	₽ lb	1¼ @	1¾¢
Blues and Silks	₽ lb	1¾ @	2
Hard Sized White Shavings	₽ lb	2¾ @	3 ¢
No. 1 White Book Shavings	₽ lb	2¾ @	2¾¢
No. 2 White Book Shavings	₽ lb	1½ @	1¾¢
Light Book Shavings	₽ lb	⅞ @	1 ¢
No. 1 Mixed Shavings	₽ lb		1½¢
No. 2 Mixed Shavings	₽ lb	¾ @	1⅛¢
No. 1 Printed Books	₽ lb	1⅜ @	1½¢
Ordinary Mixed Books	₽ lb	¾ @	⅞¢
Newspapers	₽ lb		½¢
No. 1 Manila Paper	₽ lb	1½ @	1¾¢
No. 2 Manila Paper	₽ lb	⅞ @	1 ¢
Bogus Paper	₽ lb	¾ @	⅞¢
Common Paper	₽ lb	¾ @	1⅛¢
Straw Chips	₽ lb	½ @	⅝¢
Binders' Clippings	₽ lb	½ @	⅝¢
Jute Butts	₽ lb		1⅛¢
No. 1 Jute Bagging	₽ lb	1¼ @	1⅜¢

Old Metals.—The following are the current prices paid for Old Metals in New York:

Heavy Copper	₽ lb	9½¢
Light and Tinned Copper	₽ lb	8½¢
Heavy Brass	₽ lb	7¢
Light Brass	₽ lb	6¢
Lead	₽ lb	3½¢
Tea Lead	₽ lb	3½¢
Zinc	₽ lb	2½¢
No. 1 Pewter	₽ lb	14¢
No. 2 Pewter	₽ lb	7¢
Wrought Scrap Iron	₽ gross ton,	$13.00
Heavy Cast Scrap	₽ gross ton,	9.00
Stove Plate Scrap	₽ gross ton,	6.00
Burnt Iron	₽ gross ton,	4.00
Mixed Bagging	₽ lb	1 ¢
No. 2 Bagging	₽ lb	⅞¢
Hemp Twine	₽ lb	2½¢
Manila Rope	₽ lb	2½¢
Jute Rope	₽ lb	1½ @ 2 ¢
Mixed Rope	₽ lb	¾ @ ⅞¢

Trade Notes.

H. A. Tweed, for many years connected with the United Nickel Company and the N. Y. Nickel Plating Company, is in New York. During the past ten years he has resided in Phœnix, Arizona, where he is extensively engaged in the mining business, and where he has met with unusual success in all his business ventures. During his sojourn here he will be the guest of George F. Dodge, president of the N. Y. Nickel Plating Company.

The Buhl Stamping Company, Detroit, Mich., issue a seasonable circular directing attention to some of the specialties of their manufacture. The double page price-list relates principally to Milk Cans, including a variety of patterns of Railroad Cans. Cheese Factery Milk Cans are also noted, as well as Gauges, Covers and other supplies. The back of the circular is devoted to Buhl Tubular Lanterns and Headlights. Brief descriptive particulars and tables of sizes and prices accompany the illustrations of goods.

Among recent contracts secured by E. T. Barnum, Detroit, Mich., is one for the ornamental Wrought Iron Fence, 395 feet in length, to inclose the Rural Cemetery, Waldoboro, Maine. The fence is to have six large double gates at the driveways and three smaller ones for the footpaths.

The Niagara Stamping & Tool Company, Buffalo, N.Y., issue a postal circular calling attention to the increased competition and to the fact that they are abreast of the times with their improved Tools, Machinery and Dies for working sheet metal. They also note their exhibit at Chicago, which is at Machinery Hall Annex, Section 28, Column L-46.

The New Kensington Mfg. Company, New Kensington, Pa., have been granted a charter of incorporation, with a capital of $8000, for the manufacture and sale of Enameled Iron and Steel, Brass and Tin goods.

The Detroit Dynamo Company, Detroit, Mich., issue a circular devoted to "Nineteenth Century Figures," designed for house numbers, which are supplied in various finishes, as follows: Plain bronze, plain brass, antique copper and brass, old copper, old brass, Bower-Barffed and nickel plated. Roman Metal Figures for the same purpose are furnished in nickel plate 2, 2½ and 3 inches in size.

A mistake in the firm's address was made in a note in last week's *Metal Worker* respecting the contract of E. T. Barnum for fittings for the cavalry stables at Fort Leavenworth, Kansas. The address, it is hardly necessary to state, should have been Detroit, Mich.

The New Kensington Mfg. Company of New Kensington, Pa., have been incorporated for the manufacture and sale of Japanned and Enameled Iron, Steel, Brass and Tin Goods, and Japans, Varnishes and Enamels. The directors are Hugh A. Gallagher, Robert H. Bellman and Frederick Dindlen of New Kensington.

John Sweeney & Co., New York and Chicago, issue a very handsome poster calling attention to the Columbian Souvenir Stove Board of their manufacture. The poster, which measures 20 x 14 inches, is decorated with a reproduction in gilt and black ink of the Columbian Souvenir Stove Board. The design is handsome and particularly appropriate for the present season. The center shows four eagles, while in the middle are horns of plenty. A lot of little gilt cupids, riding bicycles, frame this central panel, while on the outer line are portraits of Columbus and pictures of the strange crafts in which he ventured over the Atlantic.

Oscar Roessler, proprietor of the Roessler Stove Polish Works, at Warsaw, Ills., is sending to the trade a series of circulars calling attention to his line of Stove Polish. The Black Luster Paste Stove Polish, which has been on the market a number of years, is referred to as being more popular than ever, and is put up in 5 and 10 pound cans. Attention is also called to the Black Luster Liquid Stove Polish, which is put up in convenient shape for family use. In the line of benzine polishes Mr. Roessler has his Black King, which he claims is the quickest, blackest and best. Mr. Roessler has also introduced what is known as Lusterine, which is intended for use in keeping metal bright, and is particularly adapted for use in hardware and stove stores for articles that need occasional polishing. It is also adapted for polishing gold and silver ware, brass railings, brass or zinc signs, showcases, harness trimmings, &c. It is put up in 4-ounce bottles for domestic use, and ½-gallon cans for stove dealers, engineers, mechanics and general factory use.

James Donaldson & Co. have recently opened a kitchen and stove furnishing store at 1036 Boylston street, Boston, Mass., where they will carry a complete line of Tinware and Oil stoves.

J. E. Titzell, who for two years past has been traveling on the road in the interests of B. M. Savery of Cliff street, New York, has returned to take charge of his stove and tin store at Millerstown, Pa.

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Metal and Miscellaneous Prices.

See Standard Lists on Following Pages

CHICAGO, JUNE 22, 1893.

Tin—

Straits pigs.....22½¢

Imported Tin Plates—

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

			Per box.
Calland and Melyn Grade	IC,	10 x 14	@ $6.75
	IC,	12 x 12	@ 6.75
	IC,	14 x 20	@ 6.75
	IC,	20 x 28	@ 13.50
	IX,	10 x 14	@ 8.75
	IX,	12 x 12	@ 8.75
	IX,	14 x 20	@ 8.75
	IX,	20 x 28	@ 17.50
	DC,	12½ x 17	@ 6.50
	DX,	12½ x 17	@ 8.50
Allaway Grade,	IC,	10 x 14	@ 6.50
"	IC,	12 x 12	@ 6.50
"	IC,	14 x 20	@ 6.50
"	IC,	20 x 28	@ 13.00
"	IX,	14 x 20	@ 8.00
"	IX,	20 x 28	@ 16.00

Coke Plates—Bright.

	Per box.
Steel Coke—IC, 10x14, 14x20	@$6.00
IC, 14x20, 90 lb	@ 5.75
IC, 14x20, 100 lb	@ 5.85
10 x 20	@ 9.00
20 x 28	@12.00
'X, 10x14, 14 x 20	@ 7.50
Grade. IC, 10x14, 14x20	@ 6.00

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Mansel and Dean Grade— IC, 14 x 20	@$5.62½
20 x 28	@ 11.25
IX, 20 x 28	@ 14.25
Worcester Brand and equal.— IC, 14 x 20	6.12½@
IC, 20 x 28	12.25 @
IX, 14 x 20	7.62½@
20 x 28	15.25 @

American Tin Plates.

Charcoal Plates.—Bright.

Irondale, A. A.—	IC, 14 x 20	$7.00
" "	IX, 14 x 20	9.00
" "	IXX, 14 x 20	11.00
" "	IC, 20 x 28	14.00
" "	IX, 20 x 28	18.00
" "	IXX, 20 x 28	22 00
Florence.—	IC, 10 x 14, 12 x 12, 14 x 20	$6.75
	IX, 10 x 14, 12 x 12, 14 x 20	8.75
Palma.—	IC, 10 x 14, 12 x 12, 14 x 20	$7.50
	IX, 10 x 14, 12 x 12, 14 x 20	9.50

Each extra cross $2.00 and 20 x 28 double these prices.

Brilliant, Tissue Packed, IC, 14 x 20	$9.25
Royal extra, IC, 14 x 20	7.25
Merlon, IC, 14 x 20	7.00
Almond, IC, 14 x 20	6.50
Mint, IC, 14 x 20	6.25

Coke Plates.—Bright.

Elwood.—IC, 14 x 20	$6.00
" IC, 20 x 28	12.50

Roofing Plates.

Arch (205 lb), 20 x 28	@$12.00
Palm (205 lb), 20 x 28	@ 12.25
Crescent, IC, 20 x 28	@ 12.50
Crescent, IX, 20 x 28	@ 15.75
Empire, IC, 20 x 28	@12 75
" IX, 20 x 28	@16.00
Hickory, IC, 20 x 28	@ 13.00
" IX, 20 x 28	@ 16.10
Alaska (heavily coated), IC, 20x28	@$14.50
Alaska IX, 20 x 28	@ 17.75
Special, IC, 20 x 28	@ 15.00
" IX, 20 x 28	@ 18.25
Merchant's Roofing (extra coated), IC, 20 x 28	@$17.75
Merchant's Roofing (extra coated), IX, 20 x 28	@21.50
Merchant's Old Method, (extra heavily coated), IC, 20 x 28	@$19.75
Merchant's Old Method (extra heavily coated), IX, 20 x 28	@23.60
Irondale A: IC, 14 x 20	$8.25
IX, 14 x 20	7.75
IC, 20 x 28	12.50
IX, 20 x 28	15.50
Westmoreland: IC, 14 x 20	$8.25
IC, 20 x 28	12.50
Elwood: IC, 20 x 28	$12.00
Juno: IC, 14 x 20	$5.75
IC, 20 x 28	11.50
Scott's Extra Coated, Stamped and Resquared, IC, 14 x 20	$9.50
Scott's Extra Coated, Stamped and Resquared, IX, 14 x 20	11.00
Scott's Extra Coated, Stamped and Resquared, IC, 20 x 28	19.00
Scott's Extra Coated, Stamped and Resquared, IX, 20 x 28	22.00
Neville, Stamped, IC, 14 x 20	6.25
" " IX, 14 x 20	7.50
" " IC, 20 x 28	12.50
" " IX, 20 x 28	15.00
Taylor's Old Style, IC, 14 x 20 (Stamped and Resquared)	$9.50
Taylor's Old Style, IC, 20 x 28 (Stamped and Resquared)	19.00
Taylor's Roofing, IC, 14 x 20 (Stamped and Resquared)	8.25
Taylor's Roofing, IC, 20 x 28 (Stamped and Resquared)	16.50
Columbia, IC, 14 x 20 (Stamped)	7.25
" IC, 20 x 28 (Stamped)	14.50
Maple, IC, 14 x 20 (Stamped)	6.75
" IC, 20 x 28 (Stamped)	13.50
Willow, IC, 14 x 20	6.50
" IC, 20 x 28	13.00
Knoxall, IC, 14 x 20	6.25
" IC, 20 x 28	12.50
Globe, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
Miami, IC, 14 x 20	6.00
" IC, 20 x 28	12.00
" IX, 20 x 28	15.00
" (Redipped), IC, 20 x 28	17.00

Tin Boiler Plates.

	Per box of 100 sheets.	Per box of 112 sheets.
X, 14 x 28	$13.00	$13.00
XX, 14 x 28	14.50	14.50
X, 14 x 31	14.50	15.80
XX, 14 x 31	16.50	17.50

	Per box of 56 sheets.
X, 14 x 56	16.50
XX, 14 x 56	18.20
X, 14 x 60	17.65
XX, 14 x 60	20.90

Sheet Iron—

Black.

	Common American	Refined.
Nos. 10 to 16	℔ lb 2 7-10¢	3 3-10¢
17 to 20	℔ lb 2 8-10¢	3 4-10¢
21 to 24	℔ lb 2 9-10¢	3¼¢
25 and 26	℔ lb 3¢	3 6-10¢
27	℔ lb 3 1-10¢	3 7-10¢

Russia, Planished, &c.

Genuine Russia, all numbers....13¢ net.
Patent Planished....℔ lb A, 10½¢; B, 9½¢ dis. 5%

Galvanized.

List on following page.
Juniata or first quality.....dls. 70&2½%

Copper—

Ingot.

Lake.....12¢ @ 12½¢
Casting Brands.....11¢ @ 11½¢

Sheet and Bolt.

List on following page. Discount to retailers, 25%.

Copper Bottoms.

List on following page. 25%.

Seamless Brass and Copper Tubes.

Base price, 17½¢, Chicago, with extras according to size.
Copper, Bronze and Gilding Tube, 3¢ ℔ lb additional.

Brazed Brass Tubing.
(To No. 20 inclusive.)

Add freight from New York to Chicago to these prices, or 50¢ ℔ 100 lb.

Above 5-16 inch to 3 inch inclu	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ¼ inch	60¢
Plain, 3-16 inch	$1.00
Plain, ⅛ inch	$1.50
Fancy Tubing, Brass, to No. 20 inch	43¢ lb
Bronze Tubing, 3¢ ℔ lb more than Brass	

35 & 40%

Rod and Sheet Brass.

List on following pages. 35 @ 40%.

Slab Spelter—

Western Spelter.....5

Sheet Zinc—

600 lb casks.....6¼¢
Less than Casks, ℔ lb.....6½¢

Lead—

Soft Pig Lead.....4¼¢
Bar.....4.60@5¢
Pipe.....5½¢, dis. 10¢
Block Tin Pipe.....35¢
Sheet.....6¢, dis. 10%

Solder—

½&½.....13¼¢@13⅞¢
Extra Wiping.....12¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony—

Cookson.....12½¢@13½¢
Hallett's.....11½¢@12½¢

Wire—See *Hardware.*

Wrought-Iron Pipe—

List on following page.

1½ and under, Plain	60&10%
1½ and under, Galv	52½&10%
1½ and over, Plain	70&10%
1½ and over, Galv	60&10%
Boiler Tubes, list Oct. 24, 1892	.65@67½¢
Casing, list Nov. 16, 1892	52½%
Inserted Joints Casing, list Nov. 16, 1892	47½%
Steel Boiler Tubes	27½¢
Cold Drawn Seamless Steel Tubing	50%

Cast-Iron Soil Pipe—

Cast-Iron Soil-Pipe, Tarred; sizes 2 to 6 inches, inclusive.....dls 70&2½%
Other sizes.....dls 60%

Leader Pipes—

Abendroth's Galv. Spiral Riveted	55%
Austin's Corrugated	60%
Gordon & Gilbert's Corrugated	55%
Ritchie's (Galv. Iron only) Cor'd	55%
Ritchie's Spiral Lock Seam, Galv'd	50%
Austin's Spiral Ribbed Pipe	55%
Plain Adjustable Elbows	55%
James A. Miller Bros. (Galv'd Iron only) Corrugated	55%

Furnace Fittings

Discount from Excelsior Steel Furnace Co.'s list.....50%

Steel Roofing—

Perfection	$3.75 square
Climax	$3.50 square
The Lloyd Spanish Tiling	$4.50 square

Metallic Shingles—

Cushman's	$1.25 square
Merchant & Co.'s Spanish Tiles: Copper (8 oz.)	$36.00 square
Steel, painted	$9.00 square

Drain Pipe—

Discount from list.....50%

Paints, Oils, &c.—

Deodorized Benzine	7½@8 ¢
Iron Paint, Bright Red	℔ lb, 2 ¢
" " Brown	℔ lb, 1¾¢
" " Purple	℔ lb, 2½¢
" " Ground in oil, B. Red	℔ lb, 6¢
" " Ground in oil, Red	℔ lb, 6¼¢
" " Ground in oil, Brown	℔ lb, 5½¢
" " Ground in oil, Purple	℔ lb, 6 ¢
Linseed Oil, Boiled, in bbls	88¢
Linseed Oil, Raw, in bbls	50¢
Mineral Paints	2@4¢
Orange Mineral	10½¢
Pure White Lead in Oil	6¾@7¼¢
Dry White Lead in bbls	6¼@6¾¢
Red Lead, American	7@7½¢
Red Venetian, English, dry	$1.65@$1.70
Red Venetian in oil; asst'd cans, 85¢; kegs	7½¢
Sipe's Japan Oil, in bbls, ℔ gal	34¢
Spirits Turpentine, in bbls., ℔ gal	34½¢
Asphaltum, Trinidad Refined, ℔ ton	$45
Tarred Felt, 1 Ply, ℔ 100 lb	$1.65
Tarred Felt, 2 Ply, ℔ roll 108 sq. feet	$1.50
Tarred Felt, 3 Ply, ℔ roll of 108 sq. feet	$2.00
Roofing Pitch, ℔ bbl. of 300 lb	$3.80

NEW YORK, JUNE 23, 1893.

Aluminum—

No. 2 Grade Metal, in ton lots..℔ lb, $0.75
No 1 (guaranteed to be 98 ℔ pure and over), in ton lots.....℔ lb .90
Lots less than 1 ton, 10¢ ℔ lb additional.

Antimony—

Cookson.....℔ lb, 11½¢
Hallett's.....℔ lb, 10¾@11¢

Brass—

Planished.....net
Roll and Sheet.....35@40%

Brass and Copper Tubes

Brazed Brass Tubing—

List May 20, 1889.

Per lb.	
Plain, to No. 20 inclusive, above 5-16 inch to 3 inch inclusive	35&40%
Plain, to No. 20, above 3 inch	45
Plain, 5-16 inch to No. 20	45
Plain, ¼ inch	60
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.40
Fancy Tubing to No. 20, inclu	43

Copper and Bronze Tubing—

3¢ ℔ lb more than brass.

Bronze, Tobin—

Drawn Rods for Bolts, Forgings, &c

Over ¼ to 3½ inches inclusive....17¢ ℔ lb
Over 3½ to 5 inches inclusive....18¢ ℔ lb

Piston Rods, Finished True, Smooth and Straight.

Over ¼ to 3½ inches inclusive....18¢ ℔ lb
Over 3½ to 5 inches inclusive....19¢ ℔ lb

Clips—

Buffalo Damper: Nos. 1, $1.25; 2, $2.50 per doz.....40&10%

Conductors—

Corrugated. *Round or Square*—

Galvanized	60%
Galvanized, Locked Joints	60%
Tin	60%

Spiral Riveted—

Galvanized	50%

See also *Elbows and Shoes; Eave-Trough Miters; Strainers, Conductor.*

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats.....15@25%

Ingot.

Lake.....12¢
Ansonia Grade Arizona.....11¾¢
Ansonia Grade Casting.....11¢

Planished......net

Sheet and Bolt......25@30%

Tubes—See *Seamless Brass Tubes.*

Coppers, Soldering—

See *Irons, Soldering*, in current Hardware Prices.

Damper Clips Buffalo—

See Clips, Buffalo Damper.

Eave Troughs—

Lap or Slip Joint, Galvanized.....60%
Lap or Slip Joint, Terne.....50%

Eave-Trough Mitres—

Lap or Slip Joint.....list, net

Elbows—

Plain Adjustable—

Tin	70%
Galvanized	70%

Crimped Tubing—

Re-Tinned or Galvanized	35%

Stove-Pipe—

Buffalo Four-Piece.

4½	5	5½	6	7 inch,
$0.78	.87	.90	.99	1.20 per doz..20 %

Elbows and Shoes—

Flat Crimp,

Tin	35%
Galvanized	35%

Corrugated. Flat Crimp.

Galvanized	60%

Round or Square.

Tin	60%
Galvanized	60%

Iron, Sheet—

Black.

	Common American.	R. G. Cleaned American.
Nos. 10 to 16	℔ lb, 2¾@...	3¼¢
Nos. 17 to 20	℔ lb, 3 @...	3¼¢
Nos. 21 to 24	℔ lb, 3¼@...	3¾¢
Nos. 25 and 26	℔ lb, 3¾@...	3¾¢
No. 27	℔ lb, 3¾@...	3¾¢
No. 28	℔ lb, 3⅝@...	3⅞¢
American B. B.	℔ lb, 4½@4¾¢	

Russia, Planished, &c.

Genuine Russia, accord-ing to assortment.....℔ lb, 12@13¢
Patent Planished....℔ lb, A, 10¢; B, 9¢, 5%
Craig Polished Sheet.....℔ lb, 8½¢

Galvanized.

	B. B.
Nos. 10 to 16	℔ lb, 4¢
Nos. 17 to 22	℔ lb, 4¼¢
Nos. 23 to 24	℔ lb, 4½¢
Nos. 25 to 26	℔ lb, 4¾¢
No. 27	℔ lb, 5¢
No. 28	℔ lb, 5¼¢
Nos. 29 and 30	℔ lb, 6¼¢

Filter Joints—

Lee's.....33⅓ %

Lead—

American Pig.....4¾¢
Bar.....4¾¢

New York Prices.

Pipe.....6¼¢, 20%
Tin Lined Pipe.....7½¢, 20%
Block Tin Pipe.....37½¢, 20%
Sheet.....7¢, 20%
Old Lead in exchange, 3½¢ ℔ lb.

Pittsburgh Prices.

Lead Pipe in whole coils. ℔ lb, .05¢, 10&5%
Sheet Lead in whole coils. ℔ lb, .05½¢, 10&5%

Metal, Expanded—

Manufacturers' list No. 5.

Lathing	10%
Fencing, Painted Sheets	20%
Netting, Painted Sheets	20%
Door Mats, Galvanized	25%
Window Guards, Painted	15%
Tree Guards, Painted	15%

Mitres Eave-Trough—See *Eave-Trough Mitres.*

Paints Oils &c.—

Lead, Ann. White, Dry or in oil: Kegs, lots less than 500 lb	7 @ 7¼¢
Kegs, lots 500 lb to 5 tons	6¾ @ 6¾¢
Kegs, lots 5 tons to 12 tons	6¾ @ 6⅝¢
Kegs, lots 12 tons and over	6¼ @ 6½¢
Lead, White, in oil, 25 lb tin pails, add to keg price	½
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, Red, bbls. and ½ bbls	6 @ 7
Lead, Red, kegs	6¼ @ 7¼
Ocher, American	½ @ 1½
Red, Venetian, American	℔ 100 lb...1.00 @ 1.10

Linseed Oil:

City, raw, ℔ gal	@ .50
City, boiled	@ .53
Western, raw	@ .50

Spirits Turpentine:

In regular bbls	28½ @ .29
In machine bbls	29 @ .29½

Putty:

In barrels and ½ bbls	.01¾ @ .01¾
In tubs	.01¾ @ .01¾
In tin cans	.01¾ @ .02¼
In bladders	.01¾ @ .02¼

Roofing Material, &c.:

Asphaltum, Trinidad Refined, ℔ ton	$30.00@$35.00
Asphaltum, Rock, ℔ ton	$11.00
Coal Tar Felt, 1 Ply, ℔ lb	.2¢
Coal Tar Felt, 2 Ply, ℔ roll 108 sq. ft.	$1.42½
Coal Tar Felt, 3 Ply, ℔ roll 108 sq. ft.	$1.85
Roofing Pitch, ℔ bbl	$2.24

Pipe, Drain—.....50%

Pipe and Fittings, Cast Iron Soil—

Cast-Iron Soil Pipe, Tarred, sizes 2 to 6 inches, inclusive	60&10%
Other sizes	55@55&10%
Cast-Iron Fittings, Tarred, sizes 2 to 6 inches	60@60&10%
Other sizes	55@55&10%

Pipe, Spiral—

Galvanized	60%
Tin	60%

Pipe, Wrought Iron—

For discounts see Current Hardware Prices.

Polish, Stove—

Raven Liquid: 6 oz. bottles, ℔ gro	$8.00
8 oz. bottles, ℔ gro	$9.00
Water Polish	$7.20

Rivets and Burrs—

For discounts see Current Hardware Prices.